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Project "Enhancing capacity of universities to initiate and to participate in clusters development on innovation and sustainability principles" (UniClaD)

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Practical guide to creating and developing clusters

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Content

Executive Summary

This manual – as one output of the ERASMUS+ project UniClaD (Enhancing capacity of universities to initiate and to participate in clusters development on innovation and sustainability principles) – comprises various theoretical and practical findings about clusters, their advantages, creation, development and success factors.

Chapter 1 explains the underlying theory of clusters. Various factors such as geographical, historical and cultural elements, institutional conditions, macro-environment, individual decisions, business model selection and the influence from authorities determine the clusters. A certain level of trust, identity and communication influence the functioning of the community and its striving for the overarching objective of increasing competitiveness. Clusters should foster an ideal integrated innovation ecosystem for their members. The advantages of participating in a cluster include the utilization of synergies, improved product and service supply, common marketing and sales efforts, enhanced innovation conditions and higher competitiveness in both domestic and international markets. Additionally, clusters facilitate training of human resources, exchange of knowledge and information and a common infrastructure. Economic conditions and relations undergo continuous changes and therefore require steady adaptation and the formation of new partnerships. These dynamics could be supported by cluster policies which promote innovation, productivity and competitiveness. Advantages of clusters are clearly seen in increasing the economic efficiency, a high level of information flow and maximisation of the consumer values. Clusters can be classified by the origin of the cluster initiatives, the industry affiliation, the territorial coverage, the sources for finances, the spatial dynamics and connectivity.

1.5 Peculiarities of agri-food clusters follows…

Chapter 2 comprises the EU cluster policy, the national implementation and the EU UniClaD partner countries and gives an overview of the situation in Ukraine, Azerbaijan and Moldova. The specific EU cluster policy began in 2008 with the document “The Concept of Clusters and Cluster Policies and their Role for Competitiveness and Innovation”. In 2014, financial aids were dedicated to innovation clusters, comprising all known characteristics and objectives from cluster definitions. The Europe 2020 strategy formulated more specific tasks, providing targeted support in the agricultural sector for producer groups, cooperatives, cross-sectoral organizations and e.g., the European Innovation Partnership. In the UniClaD EU partner countries, cluster platforms are predominantly installed and agricultural and rural topics are based on EU regulations and implemented in national strategic plans. These plans facilitate thematic networks, multi-actor projects and other activities within the Agricultural Knowledge and Information System (AKIS), for example, in Austria. Italy initiated the Policy of Development for Clusters in 1991, at first focusing on technology. Beside national programs also regional strategies support cluster initiatives. Spain accounts for 8.3% of all cluster organizations in the EU-27, with many of the food clusters often being region-specific. Since 2020, Polish public policy has supported formal cluster initiatives, categorizing clusters in Seed clusters (min.12 months, min.15 members), Growing clusters (min.2 years, min.25 members) and national key clusters (min.3 years, min.51

members). In Lithuania, the development of clusters is directly related to various innovative policy measures. Clusters are active in the fields of food, production and engineering, information and communication technologies and energy. Hungarian law however, does not define the concept of a cluster or specify its form and content. Formalized cooperation can be based on an agreement defining cooperation or on an organization specified by the Civil Code. In Azerbaijan, state policy and development of regional clusters are reflected in various state programs, e.g., "Azerbaijan 2020: a Look into the Future". Efforts to form agro-industrial, industrial and SME clusters are ongoing. In Moldova, cluster implementation is in its early stages. Up to now there is a lack of leaders representing the cluster's interests, collaborations and partnerships, and access to business information. However, there is considerable potential for clusters in the agri-food sector.

Ukraine follows…

The cluster examples in chapter 3 show the importance of cooperation, leveraging synergies, knowledge exchange and transfers – not only among similar actors but also across sectors, as well as spatial and political boundaries. The basis of well-functioning clusters includes a clear system of objectives and a comprehensive management structure, typically consisting of a board of directors, an advisory board and a managing team. Essential for the success of clusters are regular information exchanges and involvement of all members, a high diversity among them is of advantage. Members must be aware of additional values generated from cluster activities, which can range from seminars, vocational trainings, improving skills, information exchange, fostering cooperation, networking and innovation opportunities. Quality assurance and certification activities can help in trust building and ensuring sustainable activities. Member fees are common for financing the cluster activities. Often public support is necessary and given and additional funding is earned via policy programs or participation in projects. While cluster activities generally concentrate on a certain territory, networking should go beyond these boundaries to gain broader knowledge and chances and to react to external developments. Umbrella organisations at national and EU level are beneficial for widening the horizon and creating new ideas and options.

Chapter 4 gives useful insights into conditions necessary and useful for creating clusters. Cluster initiatives are often initiated and stimulated by public authorities with the overarching objective of achieving sustainable growth and increased competitiveness and with the approach being based on technology, geography or concrete project investments. The creation process can be divided into three phases: Initiation, Market Assessment and Cluster Formalization, each guided by a strategic idea.

4.3 Financing

4.4 Support follows…

The Innovation Transfer, as an essential part of cluster activities, should be highly integrated in all the activities, adopting a more collective approach than in former times. This involves the presence of science, institutions, policy, production and the consumer sector.

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Introduction

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The guide deals with the role of clusters in sustainable development of local territories. The concept of clusters has been around for centuries, with studies tracing its roots back to the 19th century. In spite of the fact of cluster presence across various business fields there's still no single, universally agreed-definition of a cluster. Different scholars approach it from various angles, leading to a rich but nuanced understanding. In the context of local business, education, and science collaboration, here are some prominent authors who have written about clusters. A prominent researcher Michael Porter defines clusters as geographically concentrated groups of interconnected companies and institutions within a specific industry, benefiting from proximity and shared resources[1]. Porter's concept of "industry clusters" highlights the importance of geographic proximity and collaboration between businesses, universities, and research institutions in fostering innovation and economic development. Henry Etzkowitz is known for his work on the "Triple Helix" model. Etzkowitz emphasizes the interactive relationship between universities, industry, and government in creating knowledge-based economies. Clusters are seen as hubs where this innovation ecosystem thrives[2]. Maryann Feldman focuses on "regional innovation clusters" and how they contribute to technological change and economic growth. He emphasizes the importance of knowledge spillovers, collaboration networks, and shared infrastructure within these clusters[3]. All authors on cluster studies acknowledge multifaceted nature of "cluster" notion and continue to explore its potential and limitations.

In this guide cluster is regarded as an association of entrepreneurial structures that closely cooperate with scientific (educational) institutions, public organizations and local authorities in order to promote the economic development of the certain region. Their role is to foster collaboration between local businesses, universities, and research institutions. This proximity among the players advances knowledge sharing, facilitates joint research projects, and accelerates innovation. Moreover, companies gain access to a pool of skilled labor trained by nearby educational institutions, while universities can tailor their programs to meet the specific needs of the cluster. Therefore clusters perform as key drivers of economic growth and innovation in today's market economy (especially in the regions that have economically been less developed before).

In addition, clusters also create a synergy effect, where the success of one member benefits others. Shared infrastructure, logistics networks, and specialized services reduce costs and improve efficiency for all participants. This collaborative environment allows businesses to stay at the forefront of technology and adapt quickly to market changes, giving them a competitive edge.
One of the advantages is that local authorities can work more effectively with a concentrated group of businesses, providing targeted support programs, infrastructure development, and streamlined regulations.

Moreover, clusters can also have a stronger voice in advocating for their interests with policymakers on the local level.

The guide provides a brief description of one or more examples of successful cluster activities in UniClaD participating countries. It describes different experiences as to legal, political and geographical contexts as well as the broad diversity in fields of activity and forms of management in Hungary, Spain, Lithuania, Poland, Austria , Italy, Ukraine, Moldova and Azerbajan.. Each chapter includes the topic and objectives, zone of activity, cluster management and organization including the SWOT analysis and success factors. They have been presented in the field of food or agri-food production, agrotourism, food technologies. All described clusters demonstrate high economic efficiency and competitiveness when compared to established forms of business organization.

These are just a few of the many examples of clusters in the modern market economy nowadays. By fostering collaboration and innovation, clusters create a fertile ground for businesses to thrive and contribute to regional economic development. Thus, today the application of the cluster approach has proved to be one of the necessary conditions for the revival of domestic production to increase the efficiency of innovative development of regions and achieve a high level of economic development and competitiveness.

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Chapter 1. Theory of cluster

1.1 Classification of clusters

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1. Clusters are distinguished by their structure:

- the first tier or "cluster nucleus" consists of manufacturing companies, which include both firms operating in the local market and leading firms that export their products (goods or services) outside the region;
- the second tier is made up of related companies that group around the cluster core and produce components, technological equipment, machinery, raw materials, etc. This group may include large, medium and small enterprises;
- the third tier consists of service companies that form the economic infrastructure of the cluster: scientific, technical and service centres; financial and credit institutions; investment funds; higher, secondary, specialised and vocational educational institutions; research organisations; public organisations; insurance and consulting companies, etc.

2. Classification groups have been identified based on geographical features:

- macro-level clusters – operate within the national economy and within several industries that sell products on a global or national market scale;
- meso-level clusters – operate within industries and sub-industries;
- micro-level clusters – leading firms and their key supplier networks.

3. The types of clusters are distinguished by territorial features:

- global (transnational) clusters – competitive within the global economy as a whole, selling products almost all over the world, requiring the most significant investment and created by the largest corporations;
- national clusters – competitive mainly within the national market or most of the country;
- regional clusters – competitive mainly within their own region and a few adjacent ones;
- local clusters – competitive parts of the territory of a region or within a municipality;
- point cluster – localised in a single settlement or urban agglomeration;
- distributed cluster – localised in several settlements of one or more regions bordering each other and not part of the same agglomeration.

4. Clusters are divided into the following according to industry specifics:

- discrete clusters – include enterprises producing products (and related services) consisting of discrete components, including enterprises of the automotive, aviation, shipbuilding, engine building, and other branches of the machine-building complex, as well as organisations of the construction industry producing building materials;
- process clusters – formed by enterprises belonging to the so-called process industries, such as chemical, pulp and paper, metallurgy, agriculture, food industry, and others;

- innovation and "creative" clusters – developing in the so-called "new sectors", such as information technology, biotechnology, new materials, as well as in the sectors of services related to creative activities (e.g. cinematography).

5. By the form of ownership:

- formed from state structures – usually created within the state of priority industries and production areas, as well as in the implementation of programmes of innovative regional development;
- private enterprises and organisations – most actively emerge in an already developed and institutionalised cluster economy, where there is both a general understanding of the nature of the cluster itself and a highly effective system of support for cluster initiatives.

6. According to the directions of their ties, there are:

- clusters with a regionally limited form of economic activity within related industries – tied to a particular scientific institution (research institutes, universities, etc.);
- clusters with vertical production links in narrow areas of activity – formed around the main companies or a network of main companies covering production, supply and sales processes;
- sectoral clusters – formed in various types of production with a high level of aggregation (e.g., "chemical cluster").

7. Characteristic features that distinguish clusters from other types of organisational structures:

- geographical separation – implies that the cluster member organisations are located in the same or neighbouring regions;
- the existence of links between cluster members, thanks to which they form a single socio-economic, organisational and technological system as elements;
- the cluster has an infrastructure that facilitates the implementation of projects of its member organisations;
- the dichotomous principle of market interaction between the cluster's members – they can either cooperate with each other or compete, producing similar types of products.

8. By stages of development:

- agglomeration – the region has a number of companies and other entities;
- emerging cluster – a number of actors in the agglomeration begin to cooperate around a core activity and realise common opportunities through their connections;
- growing cluster – as new entities and links between them emerge in the same or related activities;
- mature cluster – achievement of a certain critical mass of actors, development of relations with other clusters, activities, regions.

9. By stages of the life cycle:

- nascent clusters include those structures in which inter-cluster communications for cooperation between participants are only being formed, joint production plans are being developed and implemented, and a single team of cluster managers is being created;

- developing clusters – have passed the stage of birth and formation of primary connections, are active network structures that are competing for a place on the market and strive to expand their market share;
- maturity stage – clusters usually reach the peak of their production, scientific and technological capabilities, which influence the maximum possible market share given their potential;
- transformation stage – due to major changes, the cluster overcomes stagnation and begins the next development cycle, which may be based on other production technologies, new types of products, more advanced business models, etc.
- a state of decline – characterised by a systemic decline in its efficiency, a reduction in market share, a crisis in the management team, an outflow of investments and other negative economic and technological phenomena.

10. By type of innovation:

- dependent or limited cluster – includes technologically interconnected enterprises, sometimes significantly dispersed geographically, with activities limited to a set of typical functions (extraction of resources, processing, enrichment, shipping);
- industrial clusters – represented by cooperating enterprises that produce typical products or services;
- innovative and industrial – a group of companies that manufacture products and services that require constant updating, quality improvement, and the introduction of new functionalities;
- pro-innovation clusters – aimed at rapidly acquiring the necessary knowledge and technologies to improve current competitiveness;
- innovation-oriented clusters – creation of dynamic groups, companies using advanced knowledge and technologies, and attraction of talented labour resources from around the world.

11. Clusters are divided according to the principle of formation:

- those that arose from natural economic factors – organisations whose members have jointly decided to integrate their potentials based on objective economic reasons and to achieve common goals and interests;
- those created artificially – formed under the influence of a certain external will, which can be either the state represented by regional authorities or a strong business structure pursuing its strategic goals in this way.

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1.2 Objectives and structure of cluster

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Despite on the large number of interpretations of the definition of "cluster", some authors identified a group of the most used definitions, each of which emphasizes the main objectives of the functioning of cluster:

- regionally limited forms of economic activity within related sectors are usually tied to research institutes, universities and other scientific institutions;
- vertical production chains, narrowly defined sectors in which adjacent stages of the production process form the core of the cluster. Networks are formed around the main firms fall into the same category;
- industries are defined at the high level of aggregation or a set of sectors at the even higher level of aggregation.

However, we believe that, in general, a cluster is an association of interrelated enterprises, institutions or organizations, concentrated in a certain territory, which are representatives of business, science and the state and, as a result, complement each other, thereby achieving the maximum economic the effect of such an association and strengthen the competitive advantages of such enterprises within the industry, region or country as a whole. However, it should be noted that, if earlier, one of the main signs of clustering was the principle of territorial localization, now, in the conditions of strengthening information and communication technologies, this principle has lost its previous significance.
Next, we consider it necessary to consider the main factors that influence on the forming of cluster. According to the Swedish researcher O. Solvell, the basis of any cluster is a balance of two types of factors: evolutionary and constructive. The first evolutionary factors include objective conditions: geographical, historical and cultural factors, institutional conditions, macro environment and decisions of individual entrepreneurs and firms on strategy formation and business model selection. These factors lead to the creation of clusters according to the "bottom-up" principle.

The constructive factors are factors that determine the development and competitiveness of the cluster, they include: influence from the state (regional, innovative, cluster, etc.), as well as cluster initiatives that are formed within the framework of the "triple helix" mechanism (interaction and interpenetration of the state , business and science).

In addition, O. Solvell and M. Williams draw attention to the fact that the goal of cluster organizations as meta-organizations is the forming of the certain community. In order for this community to emerge and, in the future, function successfully, a number of institutional components must be accumulated:

- a level of trust that will enable the exchange of ideas and cooperation;
- the level of identity that stimulates the creation and using of the community;
- some structure that facilitates communication and networking (between firms and academic and other organizations, firms and government);
- the level of constant interaction, which is the basis of network relationships and joint projects.

Currently, most countries of the world are actively implementing strategies for the forming of cluster formations. The most famous clusters in the world include:

- Silicon Valley (Silicon valley, California, the USA), in the field of computer technologies;
- American car manufacturing in Detroit (Detroit, the USA);
- differentiated/unique processes and products (compared with the competition based on low costs and natural center of nanotechnology, biotechnology, renewable energy sources and digital printing in New Mexico (New Mexico, the USA);
- Bangalore (Bangalore, India), software;
- Dhahran Techno-Valley, Saudi Arabia, energy;
- London financial sector, City (The City, East London, the Great Britain);
- London Post and Logistics Center Soho (Soho, London, the Great Britain);
- aviation and space industry in Toulouse (Toulouse, France);
- container port of Rotterdam (Rotterdam, the Netherlands);
- technological park, engineering for the printing industry Heidelberg (Heidelberg, Germany);
- diamond center in Antwerp (Antwerp, Belgium).

Italy's industrial clusters, for example, account for 43% of the number of persons, which are employed in the industry and more than 34% of the volume of national exports.

In France, 99 projects have been approved, which unite 4,300 enterprises, among the most famous clusters are the aerospace cluster in Toulouse and the perfume cluster in Grasse.

About 500 clusters operate on the territory of Germany, which successfully conduct their activities and strengthen competitive advantages in the market.

Cluster is an instrument for increasing competitiveness, moreover, the foreign experience provides examples of increasing the territories' and production complexes' competitiveness through the implementation of innovative-integrated structures – clusters. The largest contribution to the promotion of clusters was given by Michael Porter, who defined the essence of cluster as

„geographic concentration of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions (for example universities, standards agencies and trade associations) in a particular field that compete but also cooperate"[1]. To addition, Preissl and Solimene supported Porter's idea and defined clusters as a group of interdependent organizations which contribute to innovation in a particular sector or in a particular industry[2].

Tan and his colleagues argue that relations between companies in the cluster is based not only on cooperation but also on competition, so there are developed coopetition relations, the competition between companies generating a further innovation within the cluster[3].

Camison indicates that cluster brings many advantages to its members, advantages unavailable to those who are not part of the cluster[4].

Analyzing scientific works of foreign researchers about clusters we can notice the following[5, 6]:

- Clusters have a key role and they are very important in the development of microeconomic competitiveness. Clusters affect the competition of companies in three ways: by increasing the productivity of companies, by driving the direction and pace of innovation (which underpins future productivity growth) and by stimulating the formation of new businesses. For example, countries with well-developed clusters in many industrial segments have internationally successful and globally competitive companies, and the nature of the company competitive advantage is based on sophisticated and resources in companies that do not operate in a cluster environment). Through microeconomic competitiveness, clusters contribute to building the sustainable competitive advantage of a region and nation in the global economy in a particular industry sector. It is important to point out the huge impact of clusters on creating a stimulating and desirable business environment, through which an indirect impact of clusters on national competitiveness is achieved. The impact of clusters on the quality of the business environment is reflected in: (1) encouraging the local competition (many studies show that local rivalry is the key driver of international competitiveness, and clusters encourage exactly the competition among the local companies); (2) the development of entrepreneurship; (3) the presence of numerous and specialised suppliers in the local market; and (4) the established public–private partnership and the like.

- Many countries, such as Israel, the Netherlands, Finland, Germany, thanks to their high level of productivity and high investments in research and innovations, have built high national competitiveness, which further promotes the development of innovative world-class clusters.

- On the other hand, the quality of the business environment, as well as the stage of development of a country (seen through a national competitiveness) significantly affect the opportunities for cluster development in a country, their depth, externalities, etc. In general, in all transition and developing countries clusters are still not fully developed (they do not have critical mass) and 'suffer' from the lack of many supporting industries and institutions, specialised local infrastructure, undeveloped forms of association and the like.

- It is important to note that clusters affect national competitiveness in conjunction with other components of the business environment, as well as with components that are in the area of macroeconomic sources of competitiveness (fiscal and monetary policy, rule of law, political institutions, etc). At the same time, cluster development in a country depends on the development of all components of the business environment and stimulating measures in the field of macroeconomic competitiveness.

So, we can suppose, that clucter development of regions impact on the country's competitiveness. And for testing this research hypothesis, we decide use the following World Economic Forum (WEF) data[7]:

1. 'Global Competitiveness Index. WEF assesses GCI by using over 100 variables, which are organised into 12 pillars of competitiveness (Fig. 1). For assessing a large number of variables, use is made of the Executive Opinion Survey of randomly selected companies in each country (sampling of companies that are the subject of survey is followed by dual stratification, based on company size and sector of activity). The survey is carried out through partner institutions in each country, which guide the survey. Questions in the survey instruct respondents (company managers) to assess competitiveness variables on a scale from 1 to 7. One end of the scale (score 1) represents the worst possible situation, while the other end of the scale (score 7) represents the best possible situation.

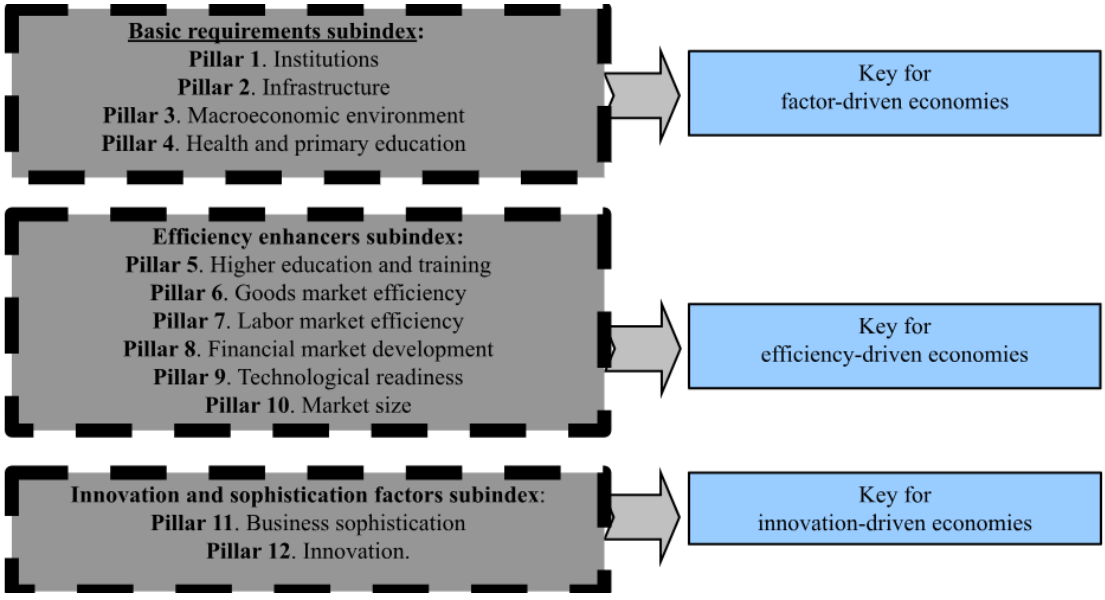

Fig. 1. **The components of the Global Competitiveness Index**

Variable ‘State of cluster development’ at the level of national economy enters into the calculation of GCI, is contained in the 11th pillar of competitiveness (‘Business sophistication’) and belongs to the third sub-index of competitiveness (‘Innovation and sophistication factors’). The data are provided on the basis of personal assessment of managers in surveyed companies about cluster development in their country. The question that surveyed entrepreneurs are being asked is: ‘In your country, how prevalent are well-developed and deep clusters?’ The entrepreneurs answer to this question by giving scores on the scale from 1 to 7, where score 1 means an absence of clusters in the country, while score 7 indicates well-developed and deep clusters in many fields.

A statistical method of simple linear correlation is used to explore the nature and strength of correlation between the state of cluster development and national competiveness, where both observed phenomena are treated as random variables[8].

The authors' hypothesis is that strong correlation exists between cluster development and country's competiveness.

We will consider that values of Pearson’s correlation coefficient ρ above 0.7 represent a strong positive correlation[6]. Then, formally written, the null versus alternative hypothesis is:
H0: $\rho = 0.7$ versus
H1: $\rho > 0.7$.
Besides, the authors decided to analyze the existence of relationship between cluster development and another sub-indexes, such as innovation, business sophistication, higher education and training and institutions. We chose these sub-indexes taking account the idea of Triple Helix system[9].
As we can observe the stated below scatter plots from the Fig. 2, the relationship between all variables is linear, there is normal distribution.

As we may note, looking at Fig. 2, there are strong correlations, which indicates a close relationship between the above Sub-Indexes and Index of state of cluster development and country's national competitiveness.

This fact makes it possible to explain why countries with developed cluster structures more prone to the rapid economic development and high economic results.

Therefore, such an instrument as clusterization, under current conditions of development of an innovative model of economy, is particularly effective for the countries that are increasing their economic potential.

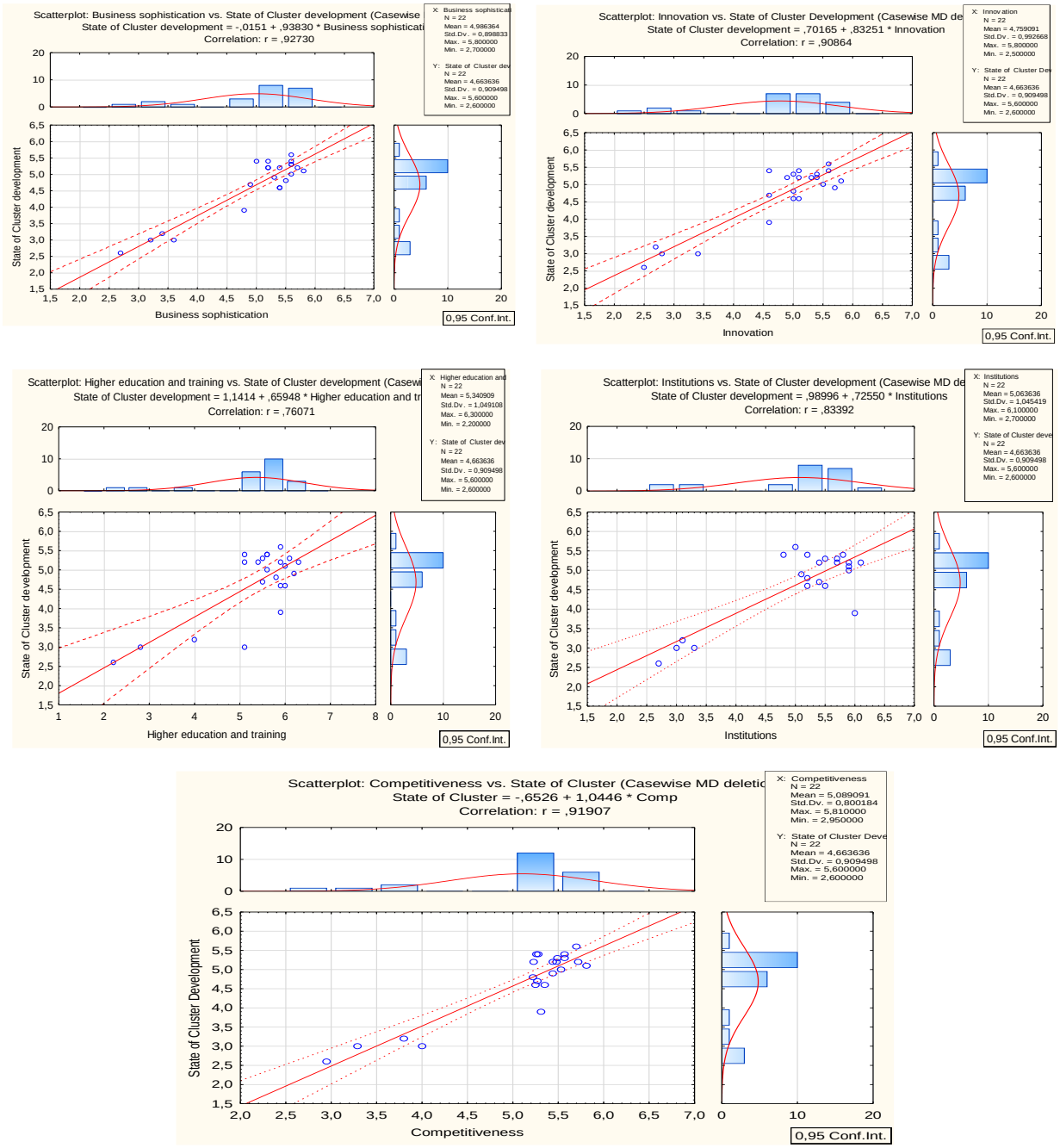

Fig. 2. **Sub-Index Business sophistication and state of cluster development (upper left); Sub-Index Innovation and state of cluster development (upper right); Sub-Index Higher education and training and state of cluster development (lower left); Sub-Index Institutions and state of cluster development (lower right); Index state of cluster development and GCI (lower)**

From the Table 1, where are indicated the coefficients of correlation between all variables.

Table 1. **Matrix of correlation coefficients**

	The Global Compe-titive-ness Report	State of Cluster Develop-ment	Inno-vation	Business sophisti-cation	Higher education and training	Institutions
The Global Competitiveness Report	1	0,92	0,96	0,97	0,93	0,92
State of Cluster Development	0,92	1	0,91	0,93	0,76	0,83
Innovation	0,96	0,91	1	0,97	0,88	0,86
Business sophistication	0,97	0,93	0,97	1	0,87	0,89
Higher education and training	0,93	0,76	0,88	0,87	1	0,80
Institutions	0,92	0,83	0,86	0,89	0,80	1

Source: calculations by the authors on basis [9;10].

So, looking at Table 1, there the following strong correlations, in particularly: state of cluster development and national competitiveness (GCI in general) (r = 0.92); state of cluster development and sub-index of GCI 'Innovation' (r= 0.91); state of cluster development and sub-index of GCI 'Business sophistication' (r= 0.93); state of cluster development and sub-index of GCI 'Higher education and training' (r= 0.76); state of cluster development and sub-index of GCI 'Institutions' (r= 0.92).

Taking account the strength of correlation between the analysed variables, the following conclusions can be made. First of all, the autours' hypothesis that strong positive correlation exists between cluster development and country's national competitiveness (which expressed through the global competitiveness index) can be accepted.
Furthermore, coefficients of clusterizations of such sub-indexes as innovation, business sophistication, higher education and training and institutions indicate, that the process of clusterization is based on the idea of Triple Helix.

Thus, such instrument as clusterization is one of the more effective ways of increasing of countrys' competitiveness, first of all, for the developing countries. Because the spreading of cluster development can be significantly encourage innovative activities and productivity of enterprises, as a result the increasing of added value. In this way, state of cluster development can be one of

the effective sources of competiveness for the transition and developing economies to increase an economic wealth in general, specially in the era of the 4th Industrial Revolution, where innovations become the unique instrument for their realization.

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1.3 Competitive advantages of cluster

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The main idea of the cluster is the voluntary activity of companies, research and study institutions and other members, functioning on the principle of partnership, whose members, working together, aim to increase the added value created. The main objectives of cluster development are to increase competitiveness by making the value creation chain more efficient, directing activities to the creation of common products, increasing exports; increase competitiveness by creating

products with higher added value and joining international research and experimental activity networks.

Small and medium-sized companies, farmers, scientific institutions and associations often join clusters. The following stakeholders benefit from cluster participation:

- *Activities synergy* – it is a process in which a cluster consists of companies that can effectively cooperate with each other. This means that companies share knowledge, experience, resources and can develop common strategies. In clusters, companies, scientific institutions, farmers and other members are located next to each other and often interact closely. Collaboration between companies, both in the supply chain and with researchers, can help drive innovation and innovation;
- *Products and services supply* – it is the process by which companies or organizations collaborate and jointly provide products or services. This form of cooperation can take many forms and causes, but its main idea is joint action to achieve mutually beneficial results. Typical examples of this could be joint product sales, joint marketing, partner network development or joint services;
- *Common marketing and sales* – the cluster can take advantage of common market conditions and trade networks. It can help cluster companies to develop new markets and increase demand for their goods or services;
- *Better conditions for innovation* – close cooperation between companies and research institutions in clusters can stimulate innovation and technological progress. Collaboration with scientists can lead to the development and application of new technologies in industry;
- *Competition in domestic and international markets* – cluster companies are more competitive. A successful cluster should be focused on global markets. The ability to export products or services can help a cluster to remain competitive and gain an international reputation;
- *Human resources* – the successful operation of the cluster is inseparable from the training and upgrading of qualifications of specialists. Scientific institutions are much more interested in cooperating with a group of business companies, listening to the collective needs and wishes of companies. Also, specialists with special skills and knowledge are often attracted to clusters. The presence of such specialists in the cluster can help increase the competitiveness and innovation opportunities of companies;
- *Exchange of specialized knowledge and information* – it is a process where cluster members share their specialized knowledge and innovative ideas. This exchange of knowledge can be a key factor in driving innovation, as it allows companies to take advantage of shared resources and expertise, respond more quickly to market changes and create a competitive advantage. The process includes the following key aspects: knowledge sharing, joint research, joint development networks, application of innovation;
- *Creation of a common infrastructure specialized for the cluster* – good communication, convenient infrastructure of the cluster members, modern technologies – these are important factors contributing to the success of the cluster. Infrastructure development can contribute to more efficient use of resources and promotion of innovation.

Participating in cluster activities focuses on external and internal communication, collaboration, training and skills development, innovation and technology, joint marketing, international development, partnerships with other clusters and lobbying.

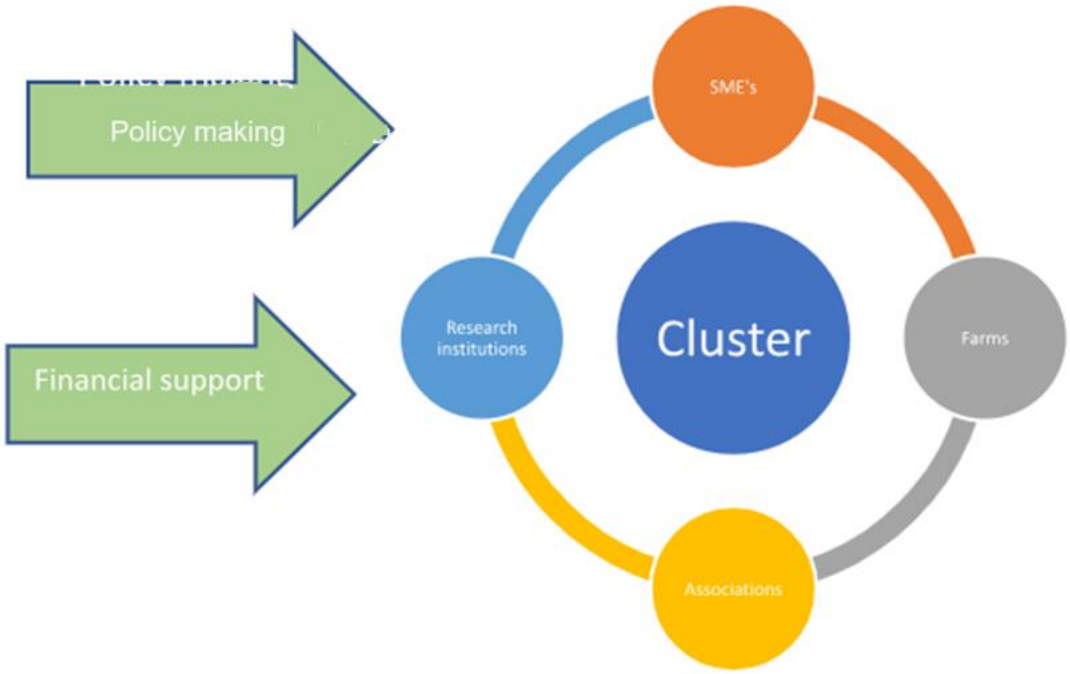

Fig. 1. **Structure of cluster and external support**

However, in order to maximize the advantages of the cluster, it is important that cooperation is properly organized, innovation is encouraged, and the authorities create suitable conditions for the development of the cluster. Also, it is very important the government's financial support, as well policy-making, creating suitable business conditions and investing in infrastructure. Government policy and legislation should also support cluster activities.

To summarise, a successful cluster is a dynamic community that functions as an ecosystem where business, research and government institutions interact and achieve synergy. This requires constant updating and adaptation to changing market conditions.

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1.4 Clusters, regions, economic results. Cluster ecosystem

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The ability of the state to achieve economic development in recent decades has been determined by the ability of its economic entities to adapt to continuously changing market conditions. Through the prism of recent events, it has also turned out to be vital. Unprecedented economic sanctions against Russia have exacerbated the problem of the flexibility of industrial relations that have developed since the Soviet industrialization, the ability of production to adequately respond to changes in external conditions, and intensively increase "falling out" production volumes.

Factors such as the renewal of the technological base of production, the widespread introduction of digital technologies, the reformatting of industrial and social ties as a result of the rupture of established trade and economic ties and value chains also have a significant impact on economic relations in modern conditions. In these conditions, business entities of the industrial sector of the economy need to rebuild logistics and business processes, build new mutually beneficial partnerships in order to solve the problems of import substitution and import dependence. In such a situation, it is difficult to overestimate the role of the state, which consists primarily in building an effective regional and industrial policy.

One of the approaches to the solution actively used by public authorities is cluster policy – as a type of industrial policy, according to which the development of clusters is one of the priorities for increasing competitiveness and economic diversification. The cluster model of socio-economic development refers, in our opinion, to one of the most important internal reserves for the intensification of regional development processes, the use of which will allow, in a systemic crisis,

to avoid the degradation of domestic industries and move to a qualitatively new level of development through the use of so-called “windows of opportunity”.

Clusters play a significant role in economic development by promoting innovation, productivity, and competitiveness. Here are some key points regarding the impact of clusters on economic development:

- *Knowledge spillovers:* Clusters facilitate the exchange of knowledge and ideas among firms, universities, research institutions, and other actors within a geographic region. This proximity and interaction foster knowledge spillovers, where ideas, skills, and best practices spread more easily. These knowledge spillovers lead to increased innovation and productivity within the cluster, driving economic growth.
- *Innovation and entrepreneurship:* Clusters provide an environment conducive to innovation and entrepreneurship. The concentration of firms, specialized suppliers, and skilled labor in a particular industry within a cluster creates a critical mass of expertise and resources. This fosters collaboration, enables the sharing of risks and rewards, and encourages the formation of new ventures. The presence of a strong cluster can attract entrepreneurs and venture capital, further fueling innovation and economic development.
- *Specialization and competitive advantage:* Clusters often develop around specific industries or sectors in which a region possesses a comparative advantage. By focusing resources, skills, and infrastructure on these specialized areas, clusters can enhance the competitiveness of firms within the region. The specialization allows firms to achieve economies of scale, access a skilled workforce, and benefit from a shared supply chain and infrastructure. This can result in increased productivity, cost efficiencies, and improved market access, leading to economic growth.
- *Job creation and employment:* Clusters are known to generate employment opportunities. As firms within a cluster grow and innovate, they create new jobs to meet increased demand. Moreover, the presence of a cluster can attract related industries and support services, leading to job creation beyond the core cluster firms. The availability of diverse job opportunities attracts skilled workers and contributes to the overall economic vitality of the region.
- *Collaborative networks and synergies:* Clusters facilitate collaboration and networking among firms, research institutions, and other stakeholders. These collaborative networks enable sharing of resources, joint research and development efforts, and the pooling of knowledge and expertise. Such synergies strengthen the competitive advantage of the cluster as a whole and lead to the emergence of new opportunities and innovations.
- *Regional economic diversification:* Clusters can help in diversifying regional economies by promoting the development of new industries or expanding existing ones. By nurturing emerging sectors and encouraging entrepreneurship, clusters contribute to a more resilient and dynamic regional economy less dependent on a single industry or sector.

Of course, the core of any development will be an effective, free (liberal) education model. Schools are increasingly promoting project-based learning, and universities are trying to keep up with developing programs to meet the needs of the modern world.

However, when faced with reality, we understand that meeting the challenges of modern education is like walking the green path in the Smart program – an easier path, but quite a long one. It is

necessary to form goals and long-term strategies: from the national goals, the strategy of scientific and technological development, the strategy of socio-economic development of the country and the region, one common task can be identified – creating opportunities for the identification and development of talents, and their subsequent self-realization.

Why exactly does such a task become a cornerstone? The great economist Joseph Schumpeter helped answer this question, who in the first half of the 20th century formulated a new model of understanding the modern market economy based on people who realize their talents in the form of innovative entrepreneurship: the economy develops to the extent that innovative innovations are generated in it. This is exactly the kind of social effect that all developing countries should strive for, where an environment and tools are being created to support the talents and abilities of the people living in it. For example, Germany went this way, creating entrepreneurship as the core of its socio-market economy. At the same time, this approach has created greater employment and well-being of the country's residents, as well as opportunities for their own development, thereby making themselves the largest economy in Europe.

This approach declared a new post-industrial era in which business is more committed to horizontal partnership, forming a network, instead of a vertically integrated, hierarchical one. In 1993, James Moore defined such a phenomenon as a business ecosystem aimed at creating new values and mutual benefits through cooperation and competition. At the same time, competition takes a back seat here. Common goals and interests, and most importantly, the need to respond to the growing demands of consumers, make cooperation the basis of ecosystem business, neutralizing the “scarlet markets”. It is similar to an ecosystem in nature, when individual representatives of flora and fauna compete and depend on each other at the same time. Such a system suggests evolution and coexistence, and even complementarity of each other. An individual species by itself may have little impact, but its disappearance or displacement may shake the entire ecosystem. In the same way, an ecosystem can affect all its agents, both their flourishing and their extinction.

And, of course, the main factor in the growth of the post–industrial sector of the economy, where technology, innovation and new knowledge (ideas) rule, is a new social class of people who change the future, in other words, become “leaders of change”, determining not only the development of individual organizations, the growth and prosperity of entire cities and regions, but also the power powers on the global geopolitical map. To designate this type of person, Richard Florida introduced the concept of “creative class”. According to his theory and the researchers who share his point of view, unlike the executive classes, representatives of the creative class prefer horizontal movement and change of jobs in favor of the most creative, which fully corresponds to the principles of the business ecosystem, to vertical promotion through the ranks. Today, the creative class is global, it is mobile, and mobility is its main feature, which is so necessary in the VUCA world, which is an active reality.

Clusters are a modern form of territorial organization of the region's economy. A regional cluster is a geographically concentrated group of economic entities whose activities are carried out within a single reproductive chain based on vertical and horizontal relationships without loss of economic and legal independence, exploiting one or more competitive advantages of the territory. Unlike

corporate and holding structures, clusters are more mobile and efficient due to internal competition and the market nature of interaction between its participants. Adaptability to changing conditions is also a characteristic feature of clusters, which allows you to distribute risks and maximize the effect by reducing the cost of time, financial and material resources due to the high degree of complementarity of production.

The formation of clusters is based on a set of principles. The initial prerequisite for the participation of an economic entity in a cluster is the desire to increase competitiveness and increase the stability of existing competitive advantages. The achievement of the indicated result can be ensured by observing a number of principles for the implementation of the cluster approach.
1. The availability of a technological basis, the implementation of which requires the creation of a generating, producing and servicing infrastructure that forms a cluster. In this case, adequate goal setting and formulation of a common development strategy for the entire cluster is ensured. In the absence of technology, any artificially created association of enterprises will spend significant resources on maintaining unity and integrity to the detriment of economic expediency.
2. The long-term nature of relations based on the technological leadership of a certain large manufacturer, which forms the center of attraction of other cluster participants, against the background of a dynamic structure characterized by continuous adaptation to changing market conditions.
3. Resource availability, which assumes that each member of the cluster brings to it a certain competence, which is the subject of his specialization, acting as a resource for the entire cluster. Competencies can be organizational and managerial, financial, intellectual, logistical, marketing, sales, etc. Well-established outsourcing and delegation of authority mechanisms should contribute to the effective provision of resources.
4. Mobility of resources within the cluster is required to effectively meet the needs of some business entities at the expense of temporarily free resources of other cluster members. Thus, maximum utilization is ensured and the return per unit of resources increases, and the degree of internal cooperation increases. The mobility of information is ensured by the presence of a single information platform, access to which is open to all members of the cluster.
5. The presence of a credit and financial institution that mediates the flow of cash and capital, including through the use of the full range of instruments for financing capital investments and current activities (concessional lending, leasing, factoring, settlements, insurance, etc.), will make it possible to reduce the cost of projects by reducing transaction and financial costs.

The cluster approach is a set of methods, techniques, and technologies of managerial influence on the economic space of the region, which allows to increase its competitiveness through the implementation of cluster initiatives. The implementation of the cluster approach contributes to the activation of innovation and modernization of the region's economy by solving a number of tasks:

- coordination and harmonization of targets and development vectors of cluster participants;
- identification of innovation-oriented enterprises operating at the early and initial stages of the development of an innovative product;
- building an information support and support infrastructure in the interests of cluster participants;

- attracting investments, forming venture capital funds and redirecting funds in favor of innovative and active enterprises based on the principle of targeting;
- ensuring network interaction and the formation of working models of monetization and other development of the effects of such interaction.

The application of the cluster approach contributes to both the building and fine-tuning of regional innovation systems to the conditions of absence or inefficient operation of some links in the chain of creation of innovative products from idea to mass production.

Fig. 1. **The map of the most frequently occurring words for the search query "innovation cluster", "industrial cluster", "regional cluster", "cluster policy"**

The innovative development of regions depends on the state of market institutions, the formation of which is largely determined by the cluster form of organization of economic activity. The spread of clusters, due to the rational use of the regional innovation environment, allows achieving a synergistic effect, ensuring the growth of economic indicators of business entities in the region.

The advantages of implementing the cluster approach are as follows:
1) to increase economic efficiency due to the rational use of economies of scale, reduce transaction costs, eliminate infrastructure barriers, increase business transparency and improve the competitive environment;
2) the formation of a layer of related and service industries in response to the growing demand from cluster participants (for example, in the field of legal support for innovation and foreign economic activity, information support, in the field of recruitment and retraining);
3) economic specialization in the most significant types of economic activity and maximizing the generated value for the consumer in the production of goods and services.

The cluster approach is implemented on the basis of cluster policy, which is a system of state and public measures and mechanisms to support clusters and cluster initiatives, ensuring an increase in the competitiveness of the subjects included in the cluster. The following types of cluster policy are distinguished: state cluster policy, regional cluster policies and sectoral cluster policies. Cluster policy extends to a set of activities, and the diversification of cluster initiatives makes it possible to develop innovative projects combining several technologies, thereby increasing the degree of interaction between various actors of the innovation system: the state, business and the research and development sector.
Regional cluster policy should be implemented in the form of measures aimed at stimulating the creation and support of a portfolio of cluster initiatives, which will maximize the likelihood of positive outcomes and minimize risks. The initiative to create clusters should not be a single one. On the contrary, a set of such is required so that the implementation of cluster policy complies with the principles of portfolio management. Since cluster initiatives demonstrate significant diversity, it is necessary to consider their classification (Table 1).

Table 1. **Typology of cluster initiatives**

Classification criteria	**Types of cluster initiatives**
Sources of cluster initiatives	Public law entities of various levels of subordination; business entities of all forms of ownership
Industry affiliation of the cluster	Clusters in the manufacturing industry, agro-industrial complex, mining, mechanical engineering, tourism, education, scientific and technological segment
Territorial coverage	National, macro-regional, trans-regional, regional and local
Sources of financing	Cluster initiatives with budget financing, mixed financing, and private financing. Cluster initiatives based on the principles of public-private partnership
Spatial dynamics and connectivity	Concentrically expanding clusters. Linearly expanding clusters. Migrating cluster initiatives. Cluster initiatives of a mixed type

The cluster approach to the development of creative industries in the region requires a certain adjustment of traditional goals and indicators.

The policy on the development of subjects of creative industries based on the cluster approach involves a certain change in traditional forms and tools of support. The main tools for supporting

entrepreneurship in the field of creative industries within the framework of the proposed approach should include.

1. Formation of the institutional and organizational foundations for clustering entrepreneurship in the field of creative industries. For the effective development of clusters of entrepreneurship in the field of creative industries, it is necessary to form collective mechanisms of interaction that allow combining the efforts of authorities, local governments, development institutions, and subjects of creative industries.

2. Stimulating the creation of facilities and resources for collective use, in particular, the construction of trade and exhibition, transport and logistics, infrastructure facilities (for example, within the framework of public-private partnerships); as well as centers for the development of innovative competencies, staff training, the formation of outsourcing companies that can perform the work required at a high professional level for most of the cluster members.

3. Stimulation of cooperation of subjects of creative industries, integration processes, regulation of intra-cluster turnover. The intensity of internal exchange is one of the distinctive characteristics of the cluster, therefore, its intensification is necessary based on the dissemination of information, the introduction of modern trade and logistics formats. Of course, it is also important to organize sustainable interactions of creative industries with educational, scientific and service organizations.

4. Financial support for the cluster of creative industries in conditions of extremely limited funds of regions and especially municipalities seems to be the most problematic.
The formation of clusters of creative industries will significantly increase the effectiveness of supporting small and medium-sized businesses, reduce the limitations and risks of this type of activity, and regulate its development in accordance with the strategic vision and goals of the territories. Entrepreneurial universities, as the main resource of human capital and a favorable innovation culture, should contribute to regional specialization and act as intermediate stations for the creation and implementation of innovative products, forming an ecosystem, the main purpose of which would be the formation of value propositions that meet the needs of the economy. It is necessary to develop an interactive map that will be a platform that combines all the elements of the ecosystem of the creative economy.
First of all, we consider it is necessary to define the essence of the concept of “ecosystem” or “innovation ecosystem”.

Analyzing the existing approaches to the interpretation, one can state that the concept “ecosystem” in the economic context is used recently, but now it is a well-established concept is used by the subjects of the innovation market.

Innovation ecosystems have been described in multiple ways. According to Adner, innovation ecosystems can be defined as “the collaborative arrangements through which firms combine their individual offerings into acoherent, customer-facing solution”.
Mercan & Göktaş specify that an “innovation ecosystem consists of economic agents and economic relations as well as the non-economic parts such as technology, institutions, sociological

interactions and the culture", suggesting that an innovation ecosystem is a hybrid of different networks or systems.

It should be noted that the innovation ecosystem is distinguished by its versatility and integration among the established types of innovation systems, which are based on specific networks.

Table 2. **Approaches to the definition of the concept of "innovation ecosystem"**

№	Definition	Authors
1.	Innovation ecosystem is the term, which is used to describe the large number and diverse nature of participants and resources that are necessary for innovation. These include "entrepreneurs, investors, researchers, university faculty, venture capitalists as well as business development and other technical service providers such as accountants, designers, contract manufacturers and providers of skills training and professional development"	DJ. Jackson
2.	Innovation ecosystems – the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution. Enabled by information technologies that have drastically reduced the costs of coordination, innovation ecosystems have become a core element in the growth strategies of firms in a wide range of industries.	R. Adner
3.	An innovation ecosystem is a network of relationships through which information and talent flow through systems of sustained value cocreation The systems approach has been used to describe the multifaceted nature of innovation at various levels – national, regional, technological, and sectors – and to describe the processes by which research capabilities build knowledge, then transfer the knowledge to support business development in the context of the Triple Helix of business, government and academic interaction. The systems approach recognizes the interaction among the many actors and other "determinants of innovation processes... that influence the development and diffusion of innovations". The ecosystem metaphor enriches the systems model with value and culture.	M. Russell
4.	Innovative ecosystem is a dynamic set of organizations and institutions, a mobile community their multidimensional internalities. The innovation ecosystem approach focuses on the constantly evolving relationships between a wide spectrum of innovation partners and draws attention to how their interactions affect knowledge creation, the rate of knowledge diffusion, knowledge transformation to innovation and the expansion of that innovation. Innovation ecosystems consist of countless individuals, communities, organizations, material resources, rules and policies across large and small businesses, universities, colleges, government, research institutes and labs, and financial markets within a given region which collectively work towards enabling knowledge flows, supporting technology development, and bringing innovation to market.	A. Bramwell

Consequently, the innovation ecosystem is a synergy of the state, entrepreneurial and research environment with using the organizational, normative, educational, methodological and financial resources, and the implementation of the mechanism for transferring knowledge in order to the transform into the innovative products.

The notion of "ecosystems" offers an attractive metaphor to explore a variety of interactions and inter-linkages between multiple organizations in innovation. The metaphor emphasizes that the relationships are constantly co-evolving through actions and interactions of involved actors.

Moreover, an innovation ecosystem is the place where the relationships formed between the actors or entities are reflected, and whose functional purpose is to allow technological development and innovation, integrating the above two types of ecosystems: exploration (knowledge) and exploitation (business). Thus, innovation policymakers, local intermediators, innovation brokers, and funding organizations (such as venture capitalists or public funding agencies) are salient actors in innovation ecosystems.

Table 3 shows some characteristics of innovation ecosystem, such as: their outcomes, interactions, actor roles, and logic of action.

Table 3. **Characteristics of innovation ecosystem**

Peculiarities	Definition
Baseline of Ecosystem	Co-creation of innovation
Relationships and Connectivity	Geographically clustered actors, different levels of collaboration and openness
Actors and Roles	Innovation policymakers, local intermediators, innovation brokers, and funding organizations
Logic of Action	Geographically proximate actors interacting around hubs facilitate by intermediating actors

So, innovation ecosystems occur as an integrating mechanism between the exploration of new knowledge and its exploitation for value co-creation in business ecosystems. Thus, innovation policymakers, local intermediators, innovation brokers, and funding organizations (such as venture capitalists or public funding agencies) are salient actors in innovation ecosystems.

The success factors for implementing an innovation ecosystem are in the areas of resources, governance, strategy and leadership, organizational culture, human resources management, employees, partners, technology and grouping in clusters or networks. Table 4 indicates the factors seemingly facilitating innovation ecosystems as reported in the papers reviewed. The factors can be grouped based on the following dimensions: resources, governance, strategy and leadership, organizational culture, human resources management, people, partners, technology and clustering.

Table 4. **Overview of success factors facilitating innovation ecosystems**

Factors supporting innovation ecosystems	Studies
Resources	
Resource management	Watanabe & Fukuda (2006)
Resource allocation	Adner (2006)
Resource availability	Tassey (2010)
Availability of different funding possibilities (private and public)	Tassey (2010); Samila & Sorenson (2010)
Governance	
Continuous investments in infrastructure	Iyer & Davenport (2006); Tassey (2010)
Architectural control	Iyer & Davenport (2006)
Rigorous decision making facilitated by data	Iyer & Davenport (2006)
Timing referring to all partners involved	Adner (2006); Watanabe & Fukuda (2006)
Systematic risk assessment	Adner (2006)
Democracy	Carayannis & Campbell (2009)
Own organizational structure	Rohrbeck et al. (2009)
Use of internet platforms to support and foster interaction between partners	Rohrbeck et al. (2009)
Flexible system that allows integration and expansion	Rohrbeck et al. (2009)
Clear role assignment	Tassey (2010)
Strategy and Leadership	
Patience	Iyer & Davenport (2006)
Clarity of purpose and attention to detail	Iyer & Davenport (2006)
Distant and distanced view on innovation	Mezzourh & Nakara (2012)
Organizational culture	
Open to failure and chaos	Iyer & Davenport (2006)
Innovation culture	Mercan & Göktas (2011)
Human resources management	
Innovation as integral part of job descriptions	Iyer & Davenport (2006)
People	
Involving post-doctoral researchers to get access to worldwide R&D community	Rohrbeck et al. (2009)
Technology	
Technology	Carayannis & Campbell (2009)
Partners	
Pluralism of a diversity of agents, actors and organizations	Carayannis & Campbell (2009)
Use of a variety of partners	Rohrbeck et al. (2009)
University – industry collaboration	Mercan & Göktas (2011)
Clustering	
Foster interactions	Mercan & Göktas (2011)

The table 4 indicates that especially the governance dimension plays a central role in innovation ecosystems which is easily comprehensible given the different actors and thus communication challenges that need to be coped with in such a system. Thereby the factor addresses areas such as control, structural and technological aspects, data management, data analysis and data processing. Moreover, issues related to flexibility as well as the form of governance are highlighted.

Additionally, strategy and leadership, organizational culture and partners are viewed as critical aspects that need to be carefully handled to increase the success of innovation ecosystems.
In the Ecosystem a triple flow (exchange) to occur:

1. Goods and services, including transactions relating to contracts and invoices, receipt of orders, requests for proposals, confirmations or receipts and payments.
2. Knowledge, exchange of strategic information planning, process knowledge, expertise, collaborative design, policy development, etc.
3. Intangible Benefits, exchanges of value and benefits that go beyond the actual service and are not counted by traditional financial measures such as community spirit, loyalty, image enhancement, etc.

So, an innovation ecosystem is a hybrid of different networks or partnerships linked with agreements and based on industrial local concentration and global, networked with interdependent actors, system in which the idea of open innovation broadens the scope of potential participants in the innovation process of internal actors function I + D + many possible co-creators anywhere in the network.

In this sense, and from the point of view of knowledge management, the ecosystem fosters community building intended for professional development and innovation in which the actors deliberately exploit the inputs and outputs of internal knowledge by opening the innovation process, thus accelerating innovations and expanding markets for external use of the same.

The focus of (economic) national innovation system can also be viewed as a Quintuple Helix in which five actors converge:

- Academy/ Science & Arts/Research
- Companies/Industry/Economy & Creative Industries
- Environment and interaction between society and nature/Social Ecology
- Media/Culture/Society
- Government/Policies

The innovation ecosystem includes and interrelates two different economies, but largely separate, the knowledge economy, which is driven by fundamental research (university-driven) and the commercial economy that is market-driven (industry-driven).

Then, we are analyzing the main features of both types of ecosystem (industry-driven ecosystem and university-driven ecosystem) at different levels (table 5).

Table 5. **Main features of both types of ecosystem (industry-driven ecosystem and university-driven ecosystem) at different levels**

Main feature	Eco-system level	Industry-driven ecosystem	University-driven ecosystem
Type of innovation supported	Macro-level	Technology innovation	Open innovation
Economic impact on the territory	Macro-level	Global or regional	Regional (State-based)
Drivers of public support	Macro-level	Regional or national authorities	Channelled through the university funds
Geographical focus	Macro-level	Industrial interest with public-private agreements	Pre-existing university Campus
Internationalisation	Macro-level	Networking in several geographical areas	Weak alliances
Leadership	Meso-level	Industrial excellence driven by a multinational high-tech industry(or group of related industries)	Academic excellence driven by a technologically-based research university campus
Main actors	Meso-level	SMES, start-ups, research centres, universities, venture capital	Spin-offs, (joint) research centres, high-tech industries, business angels
Sectorial or thematic focus	Meso-level	Linked to the main sector of the lead industry	Multi-sector by emphasising inter-disciplinary work
Type of activities and instruments	Meso-level	Project-based	Project-based and educational programmes
IPRs	Meso-level	Patent cross-licensing agreements controlled by larger companies	Open licenses (based on non exclusivity) Diffusion of academic publications
Cultural bias for evolution	Meso-level	Mergers and acquisitions	Entrepreneurship
Attractiveness for location of actors	Meso-level	Access to contracts and venture capital funds	Access to ideas and seed capital funds
Governance schemes	Meso-level	Based on bilateral or multilateral contracts	Advisory Boards
Recruitment of key personnel	Micro-level	Doctorate, technicians	Engineers, technicians
Research projects	Micro-level	Company decision	Research groups decision
Technology transfer offices	Micro-level	Large departments in companies	University offices Specialised companies

Comparing the figure 2a with figure 1b we can note, that figure 2a gives a schematic view of the concept in the case of an industrial-driven ecosystem. Bubble colours represent different types of actor (universities, start-ups, research centres, etc.); some of them can appear and disappear over time due to the dynamic character of the membership. In fact, the stability of the ecosystem is very important and this is the reason for thinking about "partnerships" and not only about "relationships" which could be shorter.

Figure 2a also represents three proximity circles to the core activity of the industry. Even if partnership occurs in all of them, entities in the outer circles have more freedom to contribute to future innovations because they are less linked to product development. For this reason, it is more frequent that open innovation initiatives occur with entities located in the external circle.

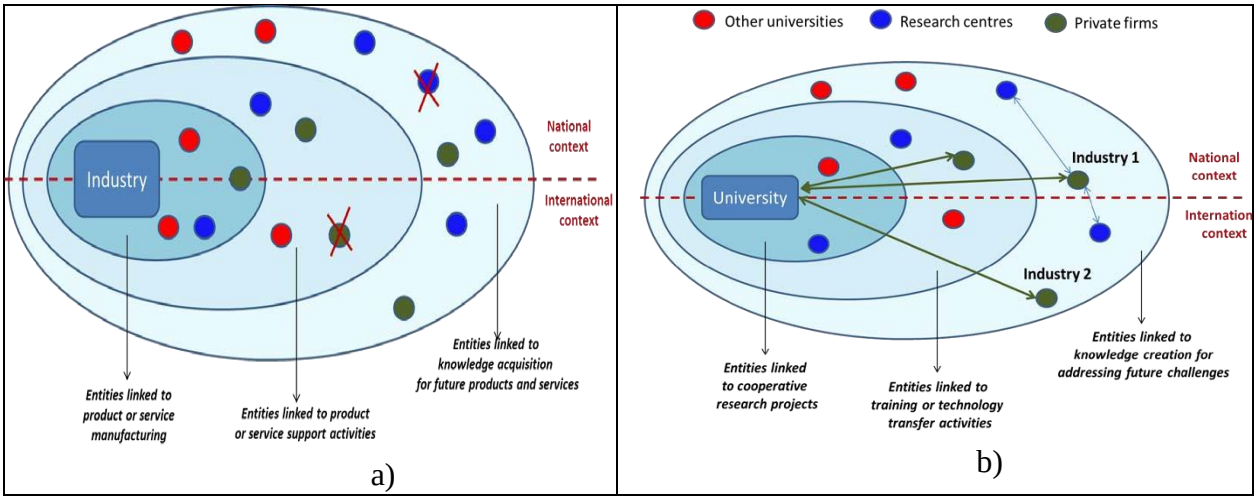

Fig. 2. **Main interactions between industry-driven ecosystem and university-driven ecosystem**

Figure 2b shows the specific partnerships with different industries located at different levels of proximity (both at the national and international contexts). The rationale is to distinguish between university-industry partnerships to commercialize or to integrate research results obtained by the university (playing the role of brokers) and university-industry partnerships where the main goal is to contribute to knowledge creation in some areas jointly proposed for addressing future challenges. Both types of partnership complement each other.

Unfortunately, only a few set of universities have created rich ecosystems around them. Only two elements become decisive to ensure the stability of these university-driven ecosystems: 1) the existence of a strong internal institutional positioning towards supporting innovation and 2) it is also necessary to establish rich interactions with the external environment.

Thus, in current conditions of development of knowledge-based economy, the universities are seeking ways to play a more proactive role in the transfer of knowledge from university to industry

and to create the opportunities for direct collaboration in innovation activities with diverse stakeholders.

In such way, the concept of an "innovation ecosystem" helps for the universities to play a driving role in creating such opportunities and realizing the broader outcomes, which are not possible under traditional models of university–industry interactions. The origins of the innovation ecosystem indicate how universities can play a driving role in future collaborations toward outcomes of the common interest of these activities.

As for considering the prospects of forming the innovation ecosystems in "transition economies", we should note about the existing problems which hinder their development, in particular, first of all, the lack of proper state regulation and evaluation of the innovation environment. However, undoubtedly, the main precondition for the forming of such systems is the presence of highly educated human capital, which indicate a high potential for a technological breakthrough in the future. That is why the universities, which combine the students, professors, staff and graduates, are the driving force behind the forming of innovation ecosystems, are the main source of needed talent for these ecosystems, are capable for the supporting of start-ups and high-growth companies. Moreover, universities are able to accelerate the development of the innovation ecosystems, to bring together the different actors within the ecosystem and teach the skills of more deep collaboration.

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1.5 Peculiarities of agri-food clusters

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The importance of the concept of cluster development is extremely important for the agri-food sector, as this sector has the greatest potential for sustainable growth. The development of clustering in agri-food production is determined by the peculiarities of agriculture and the food industry, including the following: high dependence on natural and climatic conditions, seasonality of production and consumption, long lag in production, the use of biological resources – plants and animals, the multi-structure of agriculture, high dependence of the food industry on agricultural raw materials, supply of agri-food that meets the primary needs of humans, etc[1]. At the same time, the development of the agri-food cluster is a holistic dynamic process that is the basis for ensuring the region's food security and, accordingly, improving the living standards of the population.

In modern conditions, the economic sustainability of the agri-food sector can be achieved only through the introduction of innovative developments, the use of resource-, moisture- and energy-saving technologies, which can be effectively implemented in the context of cluster formation. The purpose of forming and developing agri-food clusters is to create conditions for expanding domestic production; increasing the competitiveness of sub-sectoral products; strengthening integration links, forming and improving management mechanisms for industries and sub-sectors.

From a conceptual point of view, the creation of "value networks", i.e. agri-food clusters, makes it possible to create new competitive advantages and strengthen existing ones through the following conditions in supply chains through development:

- vertical relationships between suppliers of raw materials and inputs, agricultural producers, processors and exporters, wholesalers and retailers, and end consumers;
- horizontal relations between producers, which take the form of agricultural cooperatives or various types of small business consortia;

- establishing relations between producers and organisations representing local and regional authorities, business service providers, research institutes, universities and non-governmental service organisations that improve the quality, efficiency and sustainability aspects of the chain[2, 3.]

An agri-food cluster can be viewed as certain economic relationships (formed not only for profit, but also for the introduction of innovations in the production, processing and marketing of agri-food products) between agricultural producers, processors, distributors, educational and research institutions, local authorities and public organisations. This is an organised form of voluntary cooperation between enterprises that are structurally, geographically, institutionally and relationally included in the cluster.

Cluster members focus on joint project implementation, which allows them to gain certain advantages and increase the efficiency of physical and information flows. In particular, this applies to access to knowledge and qualified human resources, as well as cooperation with scientists, which allows them to exchange information or transfer innovative developments. In addition, close cooperation of agricultural producers with educational and research organisations and innovative companies contributes to improving the efficiency of production activities and strengthening their innovation potential, mutual access to a wide network of connections and information exchange in the industry.

A positive fact is that the form of cooperation based on the cluster approach increases the possibility of attracting financial resources from external sources, and within the framework of joint activities, cluster members can distribute risks and related costs among a larger group of participants. In general, the activities of business entities operating in a cluster formation allow participants in the agri-food supply chain to minimise administrative barriers and establish closer cooperation with regional authorities.

An important advantage that creates added value for agro-food cluster members is the organisation of training through scientific seminars, advanced training courses, webinars, as well as opportunities to use the results of research and experimental development, which are usually carried out within the cluster at the request of direct agricultural producers, ensuring knowledge exchange with partners who have unique competencies and practical skills in the relevant field.

Thus, an agri-food cluster is a complex system consisting of numerous elements (organisations) from different areas of activity, which can be represented as a set of agro-food supply chains, the purposeful management of which ensures the manifestation of the synergistic effect provided by the following factors:

relations between the cluster members are based on the principles of partnership, and cooperation promotes mutual knowledge exchange, which is a driver of innovation activity;

the cluster provides for the optimisation of all business processes at the enterprises included in the supply chain, which helps to reduce costs;

the cluster is focused on the economies of scale, based on the specialisation of the cluster members;

it helps to increase the investment attractiveness of cluster members;

there is an increase in employment and living standards;

the processes of attracting foreign investment are intensified;

development of industrial, social and innovation infrastructure in the region;
development of rural areas is ensured.

The conditions for the manifestation of the synergy effect in the agro-food sector are shown in Fig. 1.

Let us consider in more detail the characteristic features of the development of agri-food clusters based on the values and benefits they create.

Clustering in the agro-food sector contributes to increasing the investment attractiveness of commodity producers in the sector, which ensures the spread of innovations in production practices and the modernisation of the material and technical base. The advantages of cluster formation are formed due to the following conditions: a favourable environment is created for establishing vertical and horizontal relations between its participants; systems are created that promote the dissemination of innovative developments; it is a means of directing public support to increase the competitiveness of the agri-food sector in a particular territory[4].

Small and medium-sized agricultural producers benefit from participating in agri-food clusters by being included in high value-added supply chains[4]. That is why clusters are often used to support SMEs (small and medium-sized agricultural enterprises) and small farmers, as it allows them to achieve economies of scale and share the costs associated with training, information exchange, certification and the introduction of innovative technologies. It is by operating within the framework of a cluster that agri-food producers can ensure the competitiveness of their products and agricultural enterprises by establishing horizontal links between producers who have the opportunity to pool production resources through the creation of agricultural cooperatives, which allows them to jointly perform such separate functions as analytical and marketing. Thus, long-term partnerships are formed between cluster members, resulting in a synergistic positive effect in all areas of economic activity of agricultural enterprises.

In addition, the participation of local authorities and management in the cluster allows to receive support for the creation of production, social and innovation infrastructure, and the established relations between agricultural producers and educational and research organisations provide prompt information and scientific and advisory support for innovative developments. This leads to the conclusion that the participation of small and medium-sized agricultural enterprises in cluster formation allows to increase the efficiency of management through the introduction of innovative technologies and environmental practices, and to ensure access to markets for small farmers.

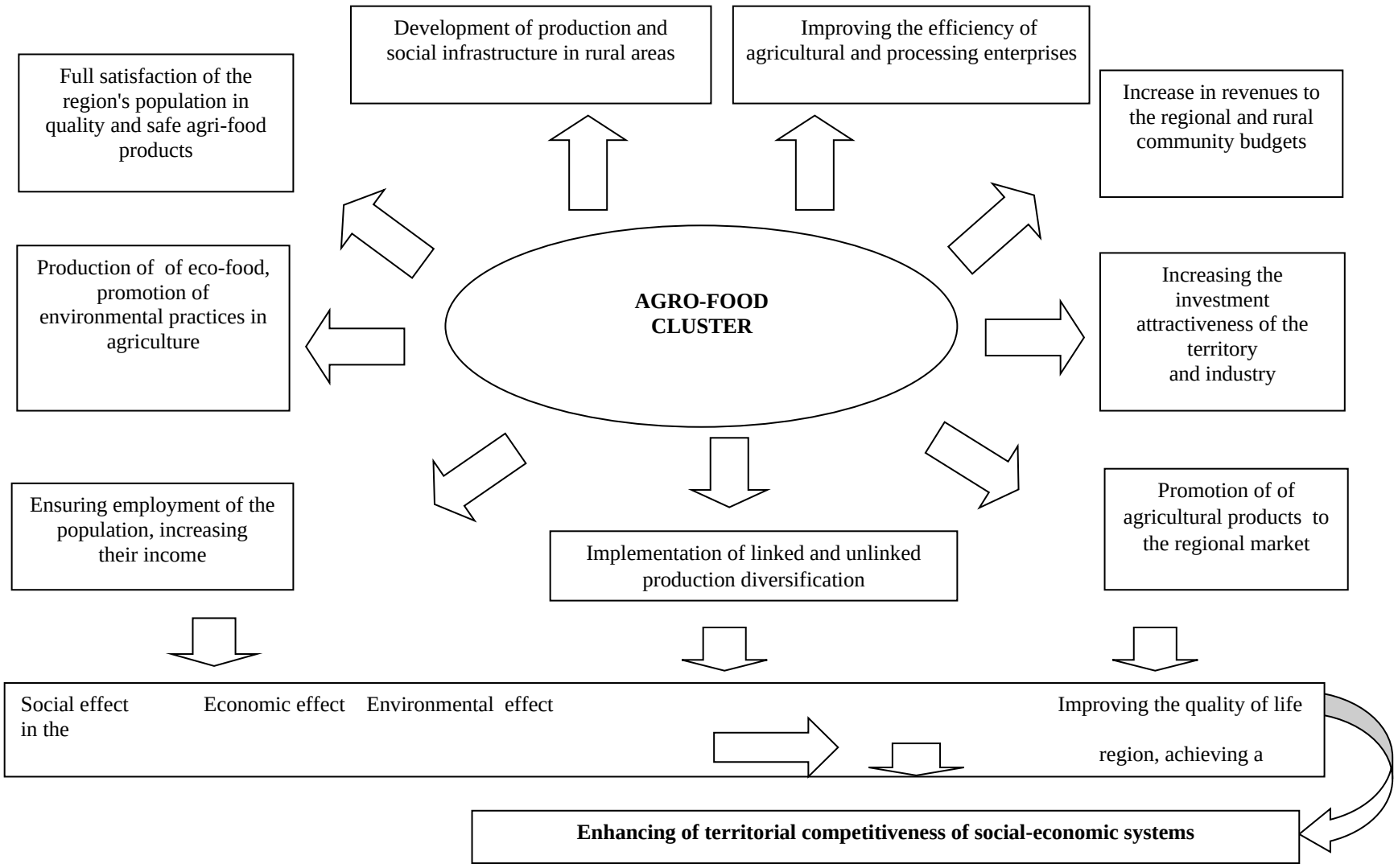

Fig. 1. **Formation of a synergistic effect in agro-food clustersSource: summarized by the authors**

According to researchers, educational and research institutions are key to the development of clusters[5], as these institutions develop innovative products and technologies and ensure their dissemination in the practical activities of business structures. The activities of the above-mentioned institutions within the agri-food cluster allow for a more rapid response to the needs and demands of agribusiness and, accordingly, the development of innovative products, which contributes to the efficiency of innovation. It is universities, research organisations, start-ups, and business parks that determine the cluster's innovativeness and opportunities to improve the technologies for the production, delivery, storage, and processing of agricultural products. It is believed that clusters have a high capacity for innovation for the following reasons: cluster members are more responsive than competitors to changes in the requirements and requests of end users; cluster members have access to unique resources (funding, technology, human resources, information); strong cooperative ties between cluster members allow for the involvement of a significant number of participants (competitors, suppliers, research centres, enterprises from related industries) in the process of creating innovations; cooperation between cluster members

Development of an agri-food cluster focused on adherence to the principles of sustainable development, which involves creating the preconditions for processing all biomass of agricultural products, minimising food waste and food losses, environmental friendliness of products and environmental safety of production.

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Chapter 2. Legal base / policies related to clusters activities

2.1 EU cluster policy

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The EU's approach to the formation and operation of clusters in agriculture is quite specific. In general meaning, the European Commission believes that clusters are a real economic phenomenon which can be observed and measured[1]. One of its definition was provided in "The Concept of Clusters and Cluster Policies and their Role for Competitiveness and Innovation", a document published by the Commission in 2008[1]. Accordingly, a cluster means a group of related economic operators and institutions which are located close to one another and have enough potential and willingness to develop commercial, technological and other cooperation. The group of operators referred to above comprises independent undertakings irrespective of their business size as well as scientific organizations which enable the exchange of knowledge and experience and contribute to the transfer of technologies, the creation of collaborative networks and the dissemination of information between clustered undertakings[1].

Until now the legislator has not yet developed a detailed definition of the agri-food cluster. Instead, he specified its structure in Article 2, Item 92 of Regulation 651/2014 while also acknowledging the compliance of some kinds of aid with the internal market pursuant to Articles 107 and 108 of the Treaty, and defining the innovation cluster.

The latter means structures or organized groups of independent parties (such as innovative start-ups, small, medium and large enterprises, as well as research and knowledge dissemination organizations, non-for profit organizations and other related economic actors) designed to stimulate innovative activity through promotion, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to knowledge transfer, networking, information dissemination and collaboration among the undertakings and other organizations in the cluster.

The legislator considers clusters as a grouping of small, medium and large undertakings as well as advisory bodies or research organizations. A cluster is designed to stimulate economic and innovative activity by promoting intensive interactions, the sharing of facilities and the exchange of knowledge and expertise, as well as contributing effectively to knowledge transfer, networking and information dissemination among the undertakings in the cluster[5]. At the same time, the legislator sees the need for supporting the abovementioned research, development and innovation activities, and considers them to be a crucial EU-level objective. This is also corroborated by the

Europe 2020 strategy which identifies research and development as a key driver for achieving the objectives of smart (based on knowledge and innovation), sustainable (based on more environmentally friendly and more competitive resources) and inclusive growth (with high levels of employment that ensure social cohesion)[3]. Therefore, in order to support it, the legislator came up with the definition of an innovation cluster which means structures or organized groups of independent parties (such as innovative start-ups, small, medium and large enterprises, as well as research and knowledge dissemination organizations, non-for profit organizations and other related economic actors) designed to stimulate innovative activity through promotion, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to knowledge transfer, networking, information dissemination and collaboration among the undertakings and other organizations in the cluster[3].

In accordance with the overarching concept, the cluster policy is developed based on what is referred to as a bottom-up approach. In this context, a dominant role is played by local operators who are involved in the agri-food chain, know the market conditions, and form an integrated part of the economy of the regions they are based in. The legislator realized that they need to be provided with certain aid in order to encourage their setting-up and stimulate their sustainability. The goal of that aid is to eliminate market imperfections related to coordination problems which obstruct the development of operators or pose barriers to their mutual contacts and knowledge flows within the cluster. Also, the legislator found that state aid may support the functioning of clusters with a view to improve collaboration, establish networking and enable learning.

Nowadays agricultural collaboration is among the priorities for the Common Agricultural Policy in the area of rural development. Its particular relevance was noticed by the legislator who specified its role in implementing the "Europe 2020" strategy for smart, sustainable and inclusive growth[5]. It was put in the framework of strategic thematic objectives which are to foster knowledge transfer and innovation in agriculture, forestry, and rural areas. Their specific tasks eligible for certain aid include the need for supporting innovation and cooperation and for reinforcing the relationships between agriculture, food manufacturing and forestry, on the one side, and research and innovation, on the other. The goals identified above fall within the concept itself of the agri-food cluster. Moreover, they imply the eligibility of cluster activities for aid—indeed, pursuant to Article 35 of Reg. 1305/2013, the legislator provides financial support, as discussed above, in order to promote different forms of cooperation involving at least two entities active in the agricultural sector and anywhere across the food chain. However, not every activity is eligible for aid. Namely, the legislator defined the scope of cooperation which, pursuant to Article 35(2) of Reg. 1305/2013 includes the following: a) the implementation of joint pilot and research projects; b) the development of new products, practices, processes and technologies in the agri-food sector; c) cooperation in organizing joint work processes and sharing facilities and resources and for the development or marketing of tourism services relating to rural tourism; d) the development of short supply chains and local markets; e) promotion activities. Aid can be obtained by farmers active in producer groups, cooperatives and cross-sectoral organizations, and is granted for the setting up of clusters and what is referred to as European Innovation Partnership networks As regards the latter, Article 53 of Reg. 1305/2013 views them as a European network designed to promote rural development whose responsibility is to develop a single structure

combining domestic networks, organizations and administrative structures engaged in rural development at Union level. Namely, it may facilitate the setting up of cluster initiatives and pilot or demonstration projects which may relate, inter alia, to the following issues: a) increased agricultural productivity, economic viability, sustainability, output and resource efficiency; b) innovation in support of the bio-based economy; c) biodiversity, ecosystem services, soil functionality and sustainable water management; d) innovative products and services for the integrated supply chain; e) opening up new product and market opportunities for primary producers; f) food quality, food safety and healthy diet; and g) reducing post-harvest losses and food wastage.

The support is intended solely for startup clusters and networks and for existing ones which engage in a new activity. Eligible for support are selected collaboration costs (such as the setting up of a business plan or a local development strategy) related to ongoing activity, including to promotion measures (creation of one's own brand, participation to fairs, expositions etc.).

Although the support referred to above was planned for the 2014–2020 CAP implementation period. The CAP reform does not provide for any changes as to the functioning of and support for clusters as an organizational form of cooperation. Pursuant to Article 77(1) of Reg. 2021/2115, the legislator agrees that Member States may grant support for cooperation under the conditions further specified in their CAP Strategic Plans. Thus, the lack of detailed rules at the EU level as to the creation and operation, and further financing, of clusters results in a wide variation between member states.

In Austria, regarding to EU cluster policy, the Ministry of Labour and Economy runs a cluster platform which has its focus on information and knowledge exchange with organising conferences, seminars, links to research studies and to federal and regional funding agencies for research and business. In addition, it gives a good overview about various cluster activities (AT Clusterplatform, ECCP-Factsheet-AT).

When it comes to agricultural and rural topics the Austrian CAP strategic plan 2023-2027 on the base of the EU-regulations promotes possibilities for direct and indirect cluster development. For example, with an intervention supporting co-operation in thematic networks and multi-actor projects, supporting cluster activities in the frame of the Agricultural Knowledge and Information system (AKIS) or in the digitisation strategy with horizontal and vertical creation of partnerships (AT_CAP_Strategic Plan).

Italy was among first EU countries who had launched Policy of Develepment for Clusters "dei Distretti Tecnologici" Italy – clusters and legislative framework (1991) Law 317/91 (1999) Law 140/99. Following the National Programs of Research (NPR), the Italian Ministry of Education, University and Research (MIUR) defined between 2002 and 2007), started the clusters' (technology districts, TDs) policies. (see figure 1).

TDs are legally constituted by an act issued by the MIUR following the proposal of the Regional Government. A district is formally created by a legal agreement between the Region and the

Ministry (Framework Agreement Programme). Furthermore in 2006 the Agency for the diffusion of technologies for innovation was established (Agenzia per la diffusione delle tecnologie per l'innovazione). Clusters are defined as local aggregations of high-tech activities, made up of geographically concentrated universities or public research centres, firms and local governments, which aim to foster firms' innovation capabilities and local competitiveness. They have flourished above all in Southern Italy regions to overcome structural weaknesses such as the low level of R&D expenditure, the small number of patents do not contribute to the economic, social, and environmental growth of the local systems.

Fig. 1. **State-of-Art of Italian Cluster planning "Distretti Tecnologici"**

Italy, is one of the EU countries with the highest number of clusters organisations, together with France, Germany, etc. Italy is considered as one of the pioneers in cluster formation and creation of cluster policies, with its concept of "*Industrial district*". In general, Italian industrial clusters are considered as one of the pillars of the national economy, contributing with 30% to total national manufacturing exports and gathering mostly SMEs rather than larger companies. They are particularly important for the traditional sectors, such as textiles, furniture, footwear, etc. (OECD, 2014). This high presence of cluster and networking organizations in Italy is also considered as important strength to adapt to the competition coming from the emerging economies.

One of the examples of good practices related to clusters in Italy is presence of "*Confidi*", which are a highly-developed system of local mutual guarantee schemes (MGSs), typically operating among groups of interconnected SMEs in particular sector or value-chain clusters. The first

Confidi in Italy was created in the late 1950s, aiming to increase negotiation power of the members with the financial institutions (OECD, 2014). Nowadays, local clusters are a widespread in Italy, they are also known as industrial districts (*distretti industriali*), presenting local concentrations of SMEs that adopt different specialisations within the various production phases of a particular industry. According to National Institute for Statistics (ISTAT, 2018) in Italy are operational around 150 industrial districts.

In general, industrial (technological) districts (TDs), can be considered as one of the models of Italian cluster. Despite serving as model, we should keep in mind that cluster presents much broader concept than the TDs (Becattini *et al*., 2009). The following are the main instruments used by TDs to support members activities:

- Coordination of joint research projects involving Higher Education Institutions (HEI) and private firms and strengthening the research and development infrastructure (buying equipment or building new facilities);
- Capacity building, such as training of researchers (e.g. scholarships or training courses in the specialised field of the district);
- Providing support to spin-offs and business expansion (including entrepreneurship training, help with patenting, marketing business services for SMEs);
- Provision of the collective services (e.g. joint marketing and export promotion activities), etc. (OECD, 2007).

The current national cluster programme is called "*Centri di competenza ad alta specializzazione*" (Italian Competence Center Programme), it covers the period 2017 – 2020 and it strongly supports cross-sectorial collaboration. Academic institutions and universities are important target groups of a given programme, including as well SMEs, large companies and start-ups. Targeting of research and business actors has an objective to strengthening cooperation between companies and between industry and research, thus fostering research and technology development. The listed actors should aggregate in order to constitute a Competence Center.
Strong focus of the programme is placed on strengthening cooperation structures between companies or between industry and science/research, fostering innovation capacity, fostering research and development activities, technology development and implementation, strengthening innovation ecosystems in specific regions and enhancing the visibility of clusters.

High importance within the national programme is given, among others, to the following measures:

- Events for cluster matchmaking with clusters in and beyond Europe;
- Access to markets including international markets;
- Providing information on clusters in and beyond Europe;
- Promoting new industrial activities and business-related service sectors;
- Developing skills and human resources (e.g. higher education);
- Providing physical infrastructure (e.g. business incubators, technology parks, ICT);
- Funding for R&D/innovation;
- Promoting digitalization and business model innovations;
- Training for cluster management, etc.

Beside national programmes, there are as well regional strategies to support cluster initiatives. Thus, in general, support is provided within national and/or regional and/or European Union programmes. All this information confirm that cluster support is one of the important elements of the Italian economic policies.

Considering in general legislation, the first measure giving an institutional framework for Policy-making targeting regional clusters in Italy was the Law 317 which was approved on 25 September 1991. This law brought new focus, with shift from large companies to SMEs, and it was innovative in terms of concept with industrial district model. In 1999, a new national law on industrial clusters (140/99) was enacted, simplifying procedures and giving more power to the regions to develop their own strategies based on criteria that follow the national criteria but with some flexibility. Further, important step to support clusters development was establishment of the creation of an Agency for the diffusion of technologies for innovation (*Agenzia per la diffusione delle tecnologie per l'innovazione*) in 2006 (OECD, 2007).

Aspect of a concentration of one or more sectors within a given region as well as the emphasis on networking and cooperation between companies and institutions is present as frame for most of the cluster definition. However, it is better to define clusters by relationships and not only membership regional character, since spatial boundaries do not always correspond with political borders (EU Commission, 2008). In Italy regional variations are something that should be taken in consideration, as an example we can take number of business regulation, which varies from 600 in Lombary region to more than 2,000 in Lazio, Sardinia and Sicily (OECD, 2014). Apart from numbers, there is also important differences in the coherence of regulations and the way in regulatory and administrative reform among regions, in business and other sectors.

In general, the national technological clusters are active instruments created by the *Ministry of Education, Universities and Research* (MIUR), with the objective to coordinate and manage national and international projects; to spread the developing policy of local enterprises and to maintain a direct contact with local administration, among which one of the strategic areas is agri-food sector.

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2.2 National policies related to cluster activity

2.2.1 Spanish policies related to cluster activity

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In the European Union (EU) and its dynamic landscape, the concept of clustering has emerged as a powerful channel for economic growth and innovation[1]. Clusters have become a crucial mechanism for local and regional strategic collaboration of interconnected firms, economic entities and institutions that are geographically close to each other. Moreover, this collaboration is also extended to the involvement of institutions and services that provide support, including universities, research institutes, local financial bodies and public sector agencies. This networking creates synergy between several enterprises boosting cooperation as well as competitiveness.

In European regional development policy, the cluster concept has gained widespread acceptance and become a focal point for policy-making. resulting in the proliferation of cluster policies at national and local level[2]. In this context, the EU recognises the crucial role of clusters in driving regional development, improving the competitiveness of enterprises and fostering innovation, especially small and medium-sized enterprises (SMEs), which make up 99% of all enterprises in Europe[3]. The EU's cluster approach lies in a comprehensive set of policies and initiatives designed to implement EU priorities and create new opportunities for SMEs to thrive and better integrate them into the European market. Some of the key policies and initiatives cover a range of policy areas to ensure the well-being, prosperity and sustainability of its member states. According to (2014)[4], the countries of the European Community show a stable innovative development in adopting the cluster initiatives. The European Union (EU) has several policies related to cluster activities, such as EUROCLUSTERS, launched to implement the EU Industrial Strategy, which includes cross-sectoral, interdisciplinary and trans-European strategic initiatives bringing together industrial clusters and other stakeholders to create new business opportunities for SMEs and better integrate them into the European market[5].

Cluster policies and programmes in Europe are based on two main types of policy frameworks. The first approach is the policies or programmes specifically aimed at promoting the growth and formation of clusters, known as national and regional cluster policies. It was reported that a specific cluster policy, either at national and/or regional level, exists in 50% of the 56 countries surveyed in their study[6]. including national performance models (focused on specific industries or value chains), SME networking, the regional development cluster model (more focused on specific

regions) and the research-industry link model. In recent years, different types of public cluster activities have been successfully integrated into this typology of national approaches. It seems that the state is actively involved in cluster building when 'top-down' clustering is available[7]. On the other hand, where no specific cluster policy exists, several sectoral and general policies are used to promote joint ventures between government agencies, businesses and research institutions. These general or sectoral policies cover a wide range of policy subtypes, including industrial policies, regional development policies, maritime or tourism policies, science, technology and innovation policies and smart specialisation strategies. Cluster development is often included in policies, whether explicitly stated or not, but is not their primary objective. Countries in the EU had a broad strategy and had a sectoral policy that served as a substitute for or complement to more focused cluster policies.

Within the framework of the European Union, Spain exhibits a notable existence of cluster organizations across its numerous regions and industries. Spain accounts to 8.3% of all cluster organizations in the EU-27, according to the European Cluster Panorama Report[8]. Each cluster has its own characteristics and focus areas. The Spanish food clusters are classified within the Regional Clusters, there is a region-specific cluster, such as the agri-food cluster in Navarra. Innovation and technology clusters such as Cluster FOOD+i is a non-profit organisation that brings together the food industry sector in the Ebro Valley region, focusing on areas such as alternative proteins, circular economy and sustainable packaging. Sustainable Supply Chain Clusters focus on sustainable innovation through the development of hybrid agri-food supply chains. Export-oriented Clusters focused on exports, such as the agri-food cluster in the province of Almeria. Food Tech Clusters focused on food technology, such as the Aragon Food Cluster and the Foodservice Cluster in Catalonia[8,9,10,11,12].

At the national level, the Spanish Ministry of Agriculture, Fisheries and Food (MAPA) promotes innovation in the food industry through educational initiatives and marketing campaigns. Recognising the strategic importance of the agri-food sector for the economy, the Ministry is also promoting digital transformation in the sector. The Spanish government has outlined several strategies to promote innovation and sustainability in the food sector. These strategies include the Integrated National Energy and Climate Plan, the Spanish Strategy for the Circular Economy and the Strategy for the Digitisation of the Agrifood, Forestry and Rural Environment Sectors are just some of the initiatives that government has launched to promote sustainability and innovation in the food industry.

Government support for food clusters in Spain covers the following areas:

- **Policy development:** The Spanish government is actively involved in promoting innovation in the food industry through training and promotional activities. It also supports the 'Food for Life Spain' platform, which enables public-private cooperation between the main players in the agri-food industry to promote the transfer of scientific, technological and research advances.

- **Funding:** The government provides fundamental support for the agri-food ecosystem in Spain. It allocates funds to support the dissemination of advances in research, science and technology through public-private cooperation in the agri-food sector.
- **Public-Private Partnership:** To support research, development and innovation (RDI) in the agri-food sector, the government encourages public-private cooperation. This collaboration is demonstrated through the Food for Life Spain platform, which is funded by the government to promote the sharing of scientific, technological and research advances13.

The Spanish Ministry of Agriculture also plays a leading role in the startup and promotion of the Spanish Bioeconomy Strategy, which aims to maintain competitive food production while promoting the development of high-value-added products and services in the food and agriculture and forestry sectors. The European Commission initiated the adoption of the European Cluster Memorandum and the European Cluster Alliance, which are the bodies that determine cluster policies at the regional level. Such policies are then implemented in the local community. Conversely, the bottom-up approach involves a dynamic perspective on the evolving needs of clusters and learning, as well as interactions between institutions and firms. In the bottom-up strategy, the business community provides a financial incentive for the development of cluster policies. However, only policies constructed in this way lead to organised and entirely new cluster structures; the ways in which different countries approach cluster policy vary widely.

In Spain, the autonomous communities (regions) are primarily in charge of implementing regional economic development plans. Nonetheless, a broad framework for funding regional development is supplied by the national government. To support development initiatives in less developed regions, the government offers programs like the Regional Incentives Programme and the Inter-territorial Compensation Fund. Furthermore, the government has long-term plans for economic development, such as the Internationalization Strategy of the Spanish Economy 2017–27, the 2030 Industrial Strategy, and the Strategy to Counter Demographic Challenges. These plans are crucial for regional development policies. The government of Spain places great emphasis on the need for multi-level governance and cooperation between the EU, the nation, and its autonomous regions in order to address issues related to regional development and spatial policy. In addition, the government makes use of public investments and the Fondo de Compensación, which the Spanish Constitution designates as the national fund for reducing regional inequalities[1]. Additionally, EU financing is now a crucial tool for the development of Spain's underdeveloped regions. In order to address regional inequities and promote economic development, Spain's regional economic development strategies are complicated, combining national and EU instruments with multi-level governance. It is also important to mention the involvement of Spain's cluster development through the Food Industries Federation (FIAB), which plays an important role in uniting the country's food industry and supporting the dissemination of research and technology through public-private collaboration.

The Spanish government evaluates the effectiveness of its support to food clusters through a variety of metrics and indicators, many of which are linked to the specific objectives of the projects and programmes in place. The amount of money allocated and spent on research and development (R&D) in the agri-food industry is one of the key indicators. For example, the Spanish government

announced that funding under the Horizon Europe programme amounted to EUR 396.3 million and that 454 funded activities were carried out by Spanish entities. The European Union's Common Agricultural Policy (CAP) is another important instrument for funding R&D&I activities in the agricultural sector. The quantity and quality of public-private partnerships are other factors used by the government to measure the success of its efforts to support food clusters. For example, the Food for Life Spain platform is assessed on its ability to promote the sharing of scientific and research advances[14].

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2.2.2 Polish policies related to clusters activity

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In Polish regulations, clusters are defined as geographic clusters of independent entities representing a specific economic specialisation, cooperating and competing with each other along the value chain. Cooperation within the cluster is formalised, implemented vertically and horizontally, and aimed at achieving the set common goals. The cluster is a source of benefits and creates new value for all types of entities participating in the cluster, such as enterprises, universities and other scientific units, business environment institutions, public administration and other supporting organizations[1].

In recent years, Polish clusters have seen an increase in the number of affiliated entities, the average number of members per cluster, growing employment in cluster entities and advances in digitisation. However, most clusters are still regional, and the limited networking of clusters makes obtaining external funding from the European Union initiatives challenging.

The other problematic area is cooperation with universities and R&D units that also need further development. It limits the financial and human resources devoted to infrastructure and innovation development of Polish clusters. Increasing access to national and international funding requires cross-regional and cross-border cooperation between Polish clusters and their further global networking.

Fig. 1. **Cluster classification in Poland**
Source: *Hoińska-Jackiewicz, J., Łata, M., Mackiewicz, M., Wancio, A., (2020) Kierunki Rozwoju Polityki Klastrowej w Polsce po 2020 roku, Ministerstwo Rozwoju Departament Innowacji, Warsaw*

Since 2020, Polish public policy has assumed support for formal cluster initiatives (Fig. 1). However, seed clusters are embraced with the regional policy of local government units. Government policy embraces mainly national key clusters, defined as clusters with significant importance for the country's economy and high international competitiveness; national key

clusters are identified at the national level based on an analysis of five key areas of cluster performance. The evaluation of clusters focuses on cluster: successes, development strategy and action plan, forms of knowledge transfer, activities for public policies, and activities for cluster internationalisation.

Clusters with significant importance for the country's economy and high international competitiveness should show the highest values in five critical areas of functioning:

- **human and organisational resources of the cluster** (infrastructural, financial, management personnel, cluster management system, confirmed quality of cluster management, tangible and intangible resources of the cluster coordinator, resources made available by entities other than the cluster coordinator, financial stability of the cluster coordinator external funding, etc.);
- **the economic potential of the cluster** (sales value, employment, exports, revenue growth rate of enterprises in the cluster, etc.)
- **innovation of activities in the cluster** (enterprises in the cluster engaged in R&D activities, joint research and development projects, protection of industrial property of enterprises operating in the cluster, number of innovations that resulted from collaborative R&D projects conducted in the cluster, the collaboration of start-ups with medium and large enterprises, participation in the cluster of innovation centres, etc.)
- **sustainability of the cluster** (digital transformation of the cluster, activities for a circular and low-carbon economy for the benefit of the local community, reporting by companies on issues related to achieving sustainability goals, etc.)
- **customer orientation** (number of joint products, goods or services of the cluster, cluster members' participation in missions, fairs, meetings with potential partners and other similar events aimed at attracting potential customers, quality certifications, etc.).

There are 20 clusters with the status of national key clusters in Poland. Only one of them NUTRIBIOMED Cluster, represented by Wroclaw Technology Park S. A., embraces the food industry. However, the cluster combines different areas of activity, including food processing, production of nutraceuticals, biomedical preparations and biotechnological processes. The scope of the cluster's activities is vast and also includes food preservation technologies and the introduction of modern bio-packaging systems. The cluster uses the latest technologies, but obtaining the highest quality products in these processes, combining modern biomedical technologies with the knowledge and experience of the specialised entities associated in the cluster is necessary.

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2.2.3 Lithuanian policy related to clusters activity

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Cluster policy in Lithuania is focused on promoting and supporting the cooperation of companies of different sizes, research institutions and other organizations in certain economic or industrial

fields. The development of clusters is directly related to various innovative policy measures, which are based on the aim of increasing the country's competitiveness in the international arena.
Cluster policy in Lithuania focuses on the following areas:

- Promotion of cluster development: the Government of the country and other institutions encourage companies, scientific institutions, and associated structures to unite in clusters in order to cooperate, share knowledge and experience. These activities are supported by incentives such as project financing, subsidies, training, consulting or infrastructure development.
- Research and experimental development: cluster policy in Lithuania aims to promote cooperation between business, industry, public sector and research institutions. Scientific projects can be supported by various financial means financed by the state in order to promote the implementation of innovative technologies in companies.
- Development of human resources potential: the cluster policy is related to education and training programs aimed at increasing the qualifications of human resources corresponding to the field of activity of the cluster. This ensures that companies have the right staff with specialized knowledge and skills.
- Promotion of international cooperation: the cluster policy in Lithuania is aimed at the promotion of international cooperation, which allows companies to develop relations with other countries, gain international experience and adapt to global markets.
- Development of the innovation ecosystem: The Government of the Republic of Lithuania supports innovation ecosystems, where representatives of business, science and the public sector meet, with the aim of promoting cooperation and developing innovations.

Evaluating the clustering process in Lithuania, bigger changes have been observed since 2010. The changes were largely determined by the initiation and implementation of structural fund projects, the main purpose of which was to promote the joining of different companies and institutions into clusters, to increase the maturity of clusters, to promote growth and international cooperation. It was noticed that after the effective promotion of clusterization activities in Lithuania, the highest concentration of clusters and their members was in big cities, e.g., Vilnius, Kaunas, Klaipeda, but later the number of members expanded to smaller cities and towns.

Currently, clusters in Lithuania are most active or associate their activities with the fields of food, production and engineering, information and communication technologies, and energy. A significant number of clusters are intersectoral, so they often assign their activities to at least two or three sectors. Most often, clusters belonging to several sectors are observed, the main activities of which are related to information technology, media and engineering. It should also be mentioned that most of the clusters operating in Lithuania mostly are in the stage of innovative development and only a small number of clusters are considered to have reached maturity. These data force us to pay more attention to the positive development of the potential in predicting the further development of clusters in Lithuania.

In order to more effectively develop the clustering process in the country, the Lithuanian clustering study 2019 was prepared, which indicates the main political and economic measures intended for the development of clusters in Lithuania:

- Proposals for promoting the clustering process;

- Proposals regarding the efficiency of cluster activities;
- Recommended criteria and indicators for evaluating clustering processes;
- Proposals for cluster activity monitoring;
- Proposals for increasing the awareness and prestige of clusters.

In order to develop clusters more effectively in Lithuania, the following basic documents were prepared:

- Lithuanian clustering study 2019;
- Clusters in Lithuania 2019;
- Lithuanian clustering study 2017;
- Lithuanian cluster development concept 2017;
- Models of international development of SMEs, connecting to clusters in 2017;
- Smart networking 2017;
- Baltic Cluster Forum 2018.

Summarizing the cluster development policy in Lithuania, it can be said that since 2010, more attention has been paid to policy formation. Policy formation focuses mainly on the promotion of cooperation between companies and scientific institutions in different fields, the development of the potential of human resources, and international cooperation by increasing the competitiveness of goods and services in global markets. In Lithuania, the Government of the Republic of Lithuania and the Ministry of Economy and Innovation are responsible for the formation of the clustering policy, and the Innovation Agency and other institutions of the country are responsible for the implementation of promotion measures.

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2.2.4 Hungarian policy related to clusters activity

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Recommendations for Establishing Clusters and the Questions to be Regulated According to international experience, successful clusters are best initiated by businesses involved in cooperation. When establishing a cluster, it is advisable to start with the organization of businesses with experience in cooperation, who know each other's work, following the principle of trust. The framework of the cluster is determined by the complexity of cooperation, and accordingly, we can talk about industry-horizontal-supplier clusters or even diagonal clusters organized according to the value chain of a complex activity.

The founding members of the cluster determine the common goals to be achieved, the tools for achieving the goals, the framework for cooperation, etc. It is difficult and perhaps not advisable to determine the organization of the cluster with mandatory elements (best practices). The cluster is an organically evolving network that can adapt to the challenges of the "environment" continuously, flexibly, but consciously. This adaptability is ensured by closer or looser cooperation (interactions) among members in various areas.
Nevertheless, there are questions that all emerging cluster members should consider. Based on a logical system of cluster-specific answers to these questions, taking into account the interests of the members, it is advisable to organize the operation of the cluster.

As it has already been mentioned, we consider clusters as tools created through self-organization of businesses to increase their economic competitiveness. Therefore, we judge that clusters can be organized in any structure.

In economic terms, it is not the current legal associations or contracts that make a cooperation a cluster. However, it is important that awareness and the recognized common interest of cooperating actors determine the direction of cooperation.
Economical entities can cooperate as a cluster-like entity based on implied behavior, verbal or written agreements.

Hungarian law does not define the concept of a cluster or specify its form and content. Formalized cooperation can be based on an agreement defining cooperation or on an organization specified by the Civil Code (e.g., cooperative, association, or economic company). Cooperation based on a contract allows for greater freedom for the parties. The principle of freedom to contract applies to cooperation between economic entities. Accordingly, in Hungarian practice, cooperation agreements and syndicate agreements are typically concluded, and their content must be tailored individually to each specific cooperation. Common elements include:

- The purpose of cooperation
- The scope of cooperation (the areas covered by cooperation)
- The methods and tools by which the parties intend to achieve the established goals

- How individual parties contribute to achieving common goals
- The rights and obligations of the parties involved in cooperation.

In addition to the above, these cooperation agreements typically have a long-term nature. Individual cooperation agreements or contracts typically use terms that are not defined in the applicable laws (Civil Code), so it is particularly important for the parties to jointly define and explain the terms used.

In the case of organizational-based cooperation defined by the Civil Code, cooperating members establish an organization in accordance with Hungarian law, and the form of this organization can essentially be anything: an economic company (with or without legal personality), a cooperative, an association, a foundation, a civil law company.

Recommended Method of Establishing a Cluster
Clusters can choose from various forms of operation, and the simplest method is for the companies in the cluster to regulate important issues related to the cluster's operation within the framework of a cooperation agreement or contract:
We recommend regulating, in particular:

- The common goals the cluster aims to achieve
- Who is entitled to make decisions regarding the cluster and how
    - What decision-making levels exist?
    - Can the composition of the decision-making body change, and if so, how?
    - How can the founding document be modified?
    - How is membership granted?
    - How are shared resources used?
    - Rules for participating in tenders
    - Defining joint projects
    - Making decisions about joint events
    - Resolving potential disputes among members
    - Managing business secrets
    - Compliance with ethical standards
    - Exclusion of members
    - Dissolution of the cluster
- Who and how performs cluster management tasks
    - Rules regarding the ownership relationships of the cluster manager organization
    - What are the tasks of the cluster manager?
    - Who and how monitors their implementation?
    - What is the remuneration for the cluster manager?
    - How are disputed issues resolved?
- Sharing common costs
    - Who, how much, and how regularly must pay common costs?
    - Who and how monitors the payment of common costs?
    - What sanctions apply for non-payment?
- Entry and exit rules, as well as questions related to exclusion

- What are the conditions for entry?
- What are the conditions for exclusion?

It is advisable to document the path to achieving common goals in a separate strategic document.

Cluster Accreditation Criteria

In terms of the method of establishing and the operating structure of the cluster, the Accredited Innovation Cluster competition does not prefer any format, so any solution is acceptable.

However, it is expected, in terms of accreditation, that the establishment of the cluster and the regulation of cooperation at least according to the main aspects mentioned above are documented in writing and that it can be proven that all cluster members have accepted these documents (signature, membership declaration, etc.).

Recommended Cluster Management Solution

The member companies of the cluster are independent, typically cooperating and competing organizations. Therefore, it is advisable for the tasks related to the cooperation of the cluster and operational management to be carried out by a separate company, not by an organizational unit or subsidiary of one of the cluster member companies.

We recommend regulating the relationship between the cluster and the cluster manager under contractual terms. The contract should address:

- The issue of services and counter-services
- Protection of business secrets (for the entire cluster and individual members)
- Communication
- Instructions
- Regulation of cluster representation.

Regarding the form of operation of the cluster manager, there are various solutions in foreign and current Hungarian practice. It is advisable for the cluster manager to operate in an economic company form that is well known to cluster members, easily accountable, and transparent. Depending on the decision of the members, the company can operate on a profit-oriented or non-profit basis. Furthermore, if the cluster manager company is a member of the cluster, it should only perform activities related to cluster management.

Accreditation Criteria

The Accredited Innovation Cluster competition defines clear rules for the organization of the cluster management:

- It must operate in the form of an economic company (whether profit-oriented or non-profit), and
- None of the cluster member companies can exercise majority control in it,
- The company cannot be a member of another accredited innovation cluster.

The cluster will be successful when its members make the most of the opportunities inherent in cooperation. Cooperation is based on reciprocity, meaning that in addition to taking advantage of favorable conditions for themselves, members also offer and create cooperation opportunities.

Within the cluster, cooperation can be at the level of the entire cluster, or at least for a large portion of the members, such as common identity, joint appearance, professional conferences, training, procurement, or sales platforms. In other cases, a few members may cooperate for the achievement of a specific goal temporarily. It is characteristic of clusters that the circle of cooperating members is not constant but changes according to the goals of cooperation, i.e., a cluster member engages in cooperation with different members to different degrees depending on the goals. This diverse interactive cooperation is a characteristic of clusters.

2.2.5 Azerbaijani policies related to clusters activity

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The frameworks and directions of the state policy on the development of regional clusters in Azerbaijan are reflected in various state programs adopted in recent years, government concepts and strategies. For example, according to the state program on the development of viticulture in 2012-2020, clusters should be created in the field of grape production and processing. In the development concept "Azerbaijan 2020: a look into the future" it is noted that within the framework of the development of the economy on the basis of clusters, the construction of a complex of oil, gas processing and petrochemical plants should be provided, and territorial production clusters should be created in the regions of the country on priority areas of the economy. At the same time, the state program for the development of industry for 2015-2020 also reflected the importance of creating industrial clusters. Finally, the Strategic Roadmap for the development of the national economy, approved in December 2016, focuses more on the application of the cluster approach, and the most diverse maps for the development of the sector have approaches to the use of the cluster mechanism. For example, according to the "strategic road map of the Republic of Azerbaijan on the perspective of the national economy", the significant level of low cost of labor in the regions of Azerbaijan compared to Baku forms a great potential for labor-intensive cluster development in the regions. In this regard, the education and training process in the provinces and the training of qualified personnel and the support of cluster establishment initiatives are among the top priorities. Taking into account the fact that university clusters can increase the effectiveness of the "education–research–innovation" chain, it is envisaged to promote the establishment of clusters in some specialized universities, to stimulate the application of scientific results obtained in these clusters to production.

Through which "points of growth" the country's future economic growth is ensured is an important strategic decision. As a result of the narrowing of the value-added capacity of the active capital accumulation model in the new strategic period, the country has two options for the future growth approach:

a. labor-intensive growth approach
b. productivity-effectiveness-based growth approach
Integration into the global value chain, transformation into a productivity–efficiency-based economic growth approach in a time period that is reasonable and logical in terms of the quality and sustainability of economic growth can be a strategic choice. However, the use of a combination of both models in the near and medium term could allow the transition to a strategic choice approach to be realized in a shorter period of time.

In particular, it should be borne in mind that labor in the regions of Azerbaijan is significantly cheaper than in Baku, which creates a great potential for labor-intensive cluster development in the regions. However, the strategic choice is to build a productivity-based growth approach. This requires a high-quality institutional environment, accessible sources of financing, proper segmentation and specialization of the business, and, most importantly, intensive training of highly qualified human capital.

2.2.5.1 Promotion of development in the format of "Education-Research-Innovation" in higher education institutions

Higher education is an important stage in the formation and development of human capital. Its influence on the formation and development of human capital manifests itself in two ways: 1) training qualified specialists who are directly involved in the formation of human capital; 2) direct participation in the emergence, application and transfer of new knowledge.

Specialists trained in higher educational institutions are actively involved in the management of the state and companies, the emergence of Greater added value, economic growth and improving labor productivity. Taking this into account, the formation of a more economically and socially efficient higher education system in Azerbaijan will be supported. To do this, reforms will be accelerated to improve the quality of Higher Education, integrate it into the global educational space, meet the demand for higher education personnel, as well as bring higher education in line with the requirements of the information society and the knowledge-based economy. At present, the level of coverage of young people with higher education in Azerbaijan is low. In the long run, this could hinder the competitive and sustainable development of the country.

Adaptation of highly qualified personnel to the demand of the labor market and international qualification classification, activities to develop a long-term forecasting mechanism, development of mechanisms for creating a differentiated wage and stimulation system in the labor market will be supported.

The establishment of University clusters can increase the effectiveness of the "education–research–innovation" chain. In this regard, in the country, first of all, the establishment of clusters in some specialized universities will be encouraged. As a result of improving the quality of the higher education system, higher quality human capital and intellectual potential will be formed, labor productivity will increase.

The establishment of University clusters will stimulate the implementation of research and improvements, the application of scientific results to production, and the effectiveness of the "Education-Science-production" relationship will increase. Support for clusters is also important for the development of human capital in the regions.

Activities related to the establishment of regional and functional University and production clusters will be encouraged to build a mechanism for the flexible functioning of the infrastructure" education-science-production". The development of a multi-level continuous education system, university complexes, scientific research institutions (ANAS and field institutes) and production and service areas that increase the economic effectiveness of their activities will be supported.

Azerbaijan can achieve the increase of labor productivity in the agribusiness sector by promoting the stimulation of the provision system, production and innovation activities. Training and training centers and agroclasters will be established to provide training to qualified workers in various sectors, to help entrepreneurs generate more profits and develop the activities they need.

Building a supporting system includes improving infrastructure, facilitating and accelerating access to markets through labor training, labor standards, trade agreements, as well as creating conditions for cluster-based development through industrial centers or industrial platforms. Efforts are continuing in all the mentioned areas in Azerbaijan. In the last decade, effective investment projects have been implemented to improve the state infrastructure, various action plans have been implemented to improve the level of development of vocational education and training, including the adoption of a cluster-based development approach in sectors such as agricultural industry, heavy machinery and logistics.

Projects that have already begun to be implemented in the Republic of Azerbaijan will be continued, as well as monitoring will be held to monitor the results of activities in the field of labor productivity. Based on the principles of activity, the future development of the country will be based on New improvement plans. It is necessary to use effective international practices in the process of developing and implementing an action plan to increase labor productivity.

In the operating production facilities, the process of improving and developing human resources skills, training and retraining of the workforce for cluster development will be continued, and various stimulating and encouraging measures will be implemented to improve the recruitment and training mechanism. The establishment of a local employment center by the state to facilitate the employment process in commercial organizations and to establish a flexible mechanism will be considered. The trainings carried out by the center in order to train promising employees who meet the requirements of the labor market in various sectors can be fully funded by the state.

In general, the low level of agro-industrial integration in the country, naturally, contributed to the poor development of territorial clusters in the regions. In accordance with the nature of production, the primary processing enterprises of grapes, cotton, tobacco and natural tea were located in the regions where these products were produced, but they did not lead to the formation of such territorial clusters. Thus, only primary processing processes are carried out at these enterprises.

And the product that has undergone primary processing is either exported or converted into a final product at enterprises located in consumer markets.
Within the framework of the implementation of state programs for the socio-economic development of the regions, the network of the processing industry of agricultural products has been fundamentally expanded, processing enterprises operating on the basis of modern technologies in various fields have been created. Especially recently, large-scale measures have been taken to radically develop a network of textile-purpose processing enterprises, in the production of which a sharp lag has occurred.

Also, since the beginning of the XXI century, the creation of agro-parks has begun in Azerbaijan, which are used in the system of production of agro-industrial products and act as one of the new business technologies based on the territorial cluster approach.

2.2.5.2 Support the formation of a network of agro-parks (including agro-industrial clusters)

Work on the formation of a network of agro-parks and agro-industrial clusters will be carried out at the following stages:
* Planning of agroparks. For the design of agro-parks, first of all, the optimal location and area of the intended agro-park will be determined, after which, based on the analysis of production and market opportunities on the proposed various value chains, the goals of the industries, then the targets on production levels, the type and activities of enterprises (for example, production, processing, storage and support, the main directions of provision of financial services) will be determined. Also, the services of design and architectural companies will be used to prepare the physical location plan of the agro-park.
* Determination of the amount of investment for the agropark network. At the next stage, the need for public investment will be determined and the possible impact of these investments on the economy will be assessed, as well as the scope, scale and characteristics of incentives (including tax exemptions) intended for attracting investors to agro-parks will be determined.
* Preparation of investment promotion document for agropark network. An investment promotion document will be prepared and the existing opportunities for the value chain will be determined, including the benefits that food enterprises located near the agro-park can take advantage of. After that, a list of companies actively participating in priority industries will be prepared. The investment promotion document will allow investors to be invited on the basis of this list, make investments and deepen cooperation with investors.
* Development of an action plan for the agropark network. The implementation stages of the activity will be determined for the realization of investments and obtaining indicators. Investors will be assisted in eliminating the circumstances that impede the implementation of the implementation stages and updated data on indicators will be published.

2.2.5.3 Creation of special industrial zones and clusters on SMEs

SME entities in Azerbaijan face certain difficulties in obtaining a number of services, as well as in obtaining information for production and other various purposes. Such services include utilities,

logistics, laboratory and business services, statistical data on sectors, etc. an example can be given. At the same time, due to the small number of specialized zones or their remote location, entrepreneurs can use services (for example, security service, utilities, logistics services, etc.).) when using them, they are subject to a number of excess costs, which increases the cost of their products and services and negatively affects their competitiveness.

SME entities operating in Azerbaijan can benefit better from joint infrastructure management and access to a range of services. Examples of services that will be provided on the basis of a complex logistics platform built in a special zone are the following:

- laboratory, test-testing services, obtaining quality documentation, vocational training, etc.;
- enterprise management, security service, utilities, reception, switchboard and call center;
- general services such as telecommunications, logistics, postal and financial services, transit systems, guest handling and sanitary facilities;
- recruitment assistance, business center, outsourced management and business advisory services.

Government of Azerbaijan (GoA) supports cluster initiatives and their activities in its national and sectoral policies. It is committed to establish necessary enabling environment until 2026 with the aim to support establishment of clusters, stimulate and incentivize their activities. The key objectives of establishment of clusters are:

- To promote production of competitive products and services in the non-oil sector, create favorable enabling conditions for micro, small and medium business entities in this field, strengthening coordination between them and support development of entrepreneurship;
- Support the sustainable development of the economy, including the non-oil sector;
- Increase the accessibility for domestic and foreign investments;
- Increase the employment of the population in the field of production;
- Increase the competitiveness of micro, small and medium business entities to ensure their access to international markets.

Here are the national policies in the Republic of Azerbaijan that support establishment of clusters and their operation in the Republic of Azerbaijan.

	National policy	**Date of Issue, approved by**	**Relevant articles that support clusters**
1	Azerbaijan 2030: National priorities for social and economic development	Approved with order No. 2469 of dated February 02, 2021, by President of Azerbaijan Republic	Government of Azerbaijan outlines five priorities in its development agenda until 2030. They are: 1. Sustainably growing competitive economy. 2. Society based on dynamic, inclusive and social equity. 3. Competitive human capital and space of contemporary innovations. 4.

	National policy	Date of Issue, approved by	Relevant articles that support clusters
			Great Return to Liberated Azerbaijan Territories. 5. Clean Environment and green growth
2	Social and Economic Development Strategy for 2022-2026 of the Republic of Azerbaijan	Approved with Order No. 3378 of dated June 22, 2022, issued by the President of Azerbaijan Republic	National Priority 1. Sustainably growing competitive economy, Goal 1. Sustainable and high economic growth. It foresees several activities and tasks to increase share of small and medium size entities in the economy. Activity. 1.1.2. Expansion of access to resources, as well as financial resources for small and middle size businesses. With the aim to increase participation of small and medium size entities in development of the economy, cluster initiatives for small and medium size businesses are supported. Development of regulatory framework for Clusters of Small and Medium size entities until 2026 is set as priority task with the aim to increase share of SME in the economic indicators.
3	Approval of exemplary statute for clusters of micro, small and medium size entities	Approved with decree № 1905 of dated 15 December 2022 by President of Azerbaijan Republic	This statute establishes institutional, legal and economic foundations for establishment and enabling operation of clusters of micro, small and medium size enterpreneurs in the Republic of Azerbaijan.
4	Ensure operation of Agency for Small and Medium size business entities in the Republic of Azerbaijan	Approved with decree№ 148 of dated 26 June 2018 by the President of Azerbaijan	It authorizes Tax Service under Minsitry of Economy to establish i) criterion for establishment of Cluster company of small and medium size business entities (SME) as per the valid legislative framework based on international best practice and ii) create registry of SME Cluster company registered as commercial legal entity;
5	Criterion for establishment of clusters of small	Approved by State Tax Services under Ministry of Economy with resolution	Following tax payers can act as a SME Cluster:

	National policy	Date of Issue, approved by	Relevant articles that support clusters
	and medium size business entities	No 1917050000007900, of dated 8 May 2019	Companies having state registration as commercial legal entity as per legislative framework excluding the legal entities having state ownership; Implementation of important decisions are to be coordinated with State Agency for Small and Medium size business entities should be laid down in their Statute; Having deal with at least 10 micro, small, and medium enconomic entities not interrelated with each other and 50% of input and raws materials of goods and products should come from the local producers having membership with that cluster; It also establishes minimum investment limit for the SME clusters for the projects to be implemented as per the economic regions. Activities of which should be established as per the following directions; Creation of new products not being produced in the Republic of Azerbaijan; Creation of products more than 50% of which is imported into the country; Hospitality (hotel, motel, camping, and other services) services.

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2.2.6 Moldavian policies related to clusters activity

Part 1

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Clusters are potential engines of the country's economic growth and innovation, effective tools for entrepreneurial and regional development policies, and they allow the concentration of resources and funding in target areas with high growth and development potential, with spillover and multiplier effects beyond the target localities and/or domains. A cluster is a free form of association and represents a favorable framework for business development, collaboration between companies, universities, research institutions, suppliers, customers, and competitors located in the same geographic area (local, national, transnational). Clusters are geographical concentrations of interconnected companies and institutions operating in a particular field. Clusters comprise a group of related industries and other organizational entities important for competition. These include, for example, suppliers of specialized inputs such as components, machinery, and services, or providers of specialized infrastructure[8].

Cluster is a business model that involves cooperation between small and medium-sized enterprises/entrepreneurs on one hand, and support structures from public authorities, academia, and civil society on the other. The distinctive element of clusters is their flexible organization, with each member performing specific activities based on market requirements and the cluster's strategy.

Economic literature distinguishes several types of clusters based on company agglomerations. The first classification of these agglomerations was made by Markusen in 1996, who identified:

1. *"Marshallian" cluster* – agglomerations of small and medium-sized enterprises with strong relationships, dependent on the synergies produced by the cluster.
2. *"Hub and spoke" cluster* – an alliance between a large company and multiple small companies that provide support services, with the large company responsible for establishing the conditions of cooperation.
3. *"Satellite platforms" cluster* – members of this alliance are subsidiaries of large and medium-sized enterprises, having minimal cooperation among themselves.
4. *"State-anchored" cluster* – agglomeration of state-owned companies that have commercial relationships strictly with specialized suppliers, dependent on public service funding.

The core of the cluster is composed of one or more key enterprises that operate in the same industry and are geographically located close to each other.

The core of the cluster is composed of one or more key enterprises that operate in the same industry and are geographically located close to each other. These enterprises also become the main actors

of the cluster, having the power to create and develop new products, and they possess “know-how”, patents, licenses, etc.

Most entities do not have the necessary resources for continuous restructuring and innovation, thus facing a drastic reduction in competitiveness. Competitiveness can be enhanced only if enterprises are part of regional agglomerations of firms engaged in similar and complementary activities, generically called clusters. Cluster members can jointly address issues related to professional training, programs, branding, marketing, technologies, innovations, legislation, human resource development, etc. The main characteristic of clusters is their flexible organization, with each enterprise performing specific activities based on market requirements and the cluster's strategy.

The cluster also represents an ideal framework for presenting a multitude of companies under the same brand, following a common marketing policy, and leveraging shared resources and competencies. Additionally, within a cluster, “young” companies (start-ups) have the opportunity to “learn” from experienced ones by jointly participating in activities such as information sharing, training, marketing, acquisition of fixed or mobile assets, joint production, sales, and the establishment of shared infrastructure.

The “Community Framework for State Aid for Research, Development, and Innovation” defines clusters as groups of independent companies (innovative start-ups, SMEs) and research organizations that operate in a particular field and region to stimulate innovative activities by promoting intensive interactions, access to shared facilities, exchange of experience and knowledge, and by contributing to technology transfer, networking, and information dissemination.

The foundational principles of cluster formation are:

- *Principle of voluntary participation* – each potential participant in the cluster is free to decide whether to join the cluster or not.
- *Principle of self-organization* – participants independently choose the form of organization, areas of collaboration, directions, and development strategies within the cluster.
- *Principle of territorial localization* – a core principle within a cluster is the concentration of a large number of participants in the same region (city, locality).
- *Principle of a rational balance between cooperation and competition* – entities involved in the cluster undertake joint projects in areas of common interest while maintaining competitive relationships in other areas of activity.
- *Principle of trust* – the most important factor in initiating a cluster is trust between partners. Without mutual assurance and support, no joint actions can be realized. Thus, trust is the force that contributes to the creation and development of clusters.

The main actors of a cluster are:

- *manufacturing and service-providing enterprises;*
- *universities and research centers*, which conduct research activities in the relevant field, capable of adapting and developing market-demanded applications and innovations from which sector firms can benefit;
- *public authorities*, which support and represent activities and projects, provide both financial and institutional strength, contribute to the formulation of policies aligned with the cluster's development goals, and direct the allocation of public funds to such structures;
- *catalyst institutions* and intermediaries such as chambers of commerce, regional development agencies, technology transfer centers, financial institutions, consultancy firms, etc. (fig. 1).

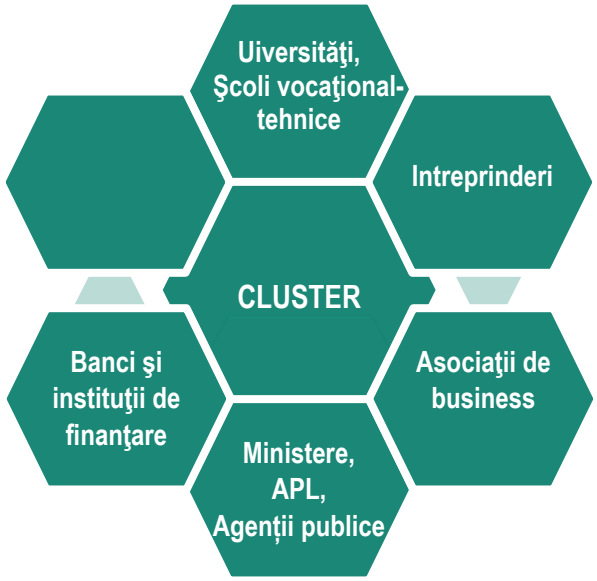

Fig. 1. **Actors of a cluster *[9]**

- In general, clusters are created according to the universally recognized "Triple Helix" model, bringing together the following representatives (fig. 2):
- enterprises – representing the economic core of the cluster;
- universities and research centers – acting as generators of innovative solutions applicable to the real needs of cluster members;
- local and regional public authorities.

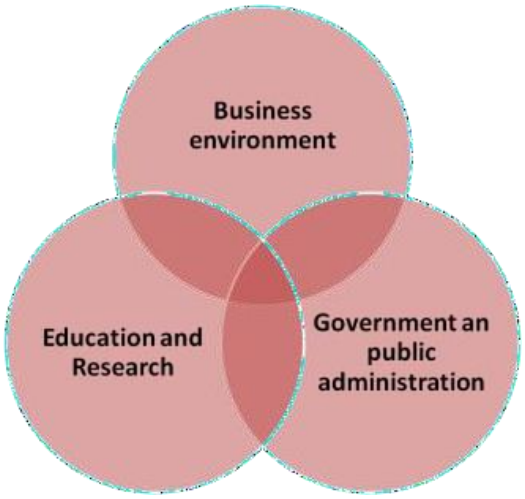

Fig.2. **Modelul clusterului "Triple Helix" [2]**

Benefits of a company's membership in a cluster:

- increased competitiveness and employment rate by connecting people, skills, competencies, and knowledge;
- increased efficiency due to the ease of working in a network with clients and suppliers;
- stimulation of innovation through interaction with clients, creating new ideas and significant pressure for innovation;
- reduction of constraints on SMEs by large companies;
- increased chances for the internationalization of SMEs;
- greater success chances for start-ups;
- ensuring the ability to influence educational profiles to meet the company's requirements for qualified human resources.

Conditions for a Successful Innovative Cluster:

- Trust among members
- Voluntary participation
- Existence of a "critical mass"
- Presence of complementary activities and companies
- Interconnection through a common interest
- Existing, complementary, and demonstrated competencies
- Common development strategy
- Ensuring independence for each member
- Dynamic and open cooperation
- Participants remain competitors in all respects
- Management is ensured by clearly defined structures
- Clear benefits for all members.

The production and transfer of knowledge, as well as the implementation and dissemination of innovations, play a crucial role in regional economic growth and national competitiveness. The successful course of these processes is enhanced by creating an innovative regional interaction network among the main "actors" of innovative development, such as scientific research institutes, universities, and business service providers.

In the Republic of Moldova, although a Concept for the Development of Clustering in the Industrial Sector has been developed, and the notion of a cluster has been introduced into national legislative and regulatory acts, and the clustering model is mentioned in certain sectoral strategies, concrete policies and mechanisms to support the creation and development of clusters are still lacking. It is important to move from recognizing the importance of clusters and expressing intentions regarding their support to concrete tools and actions as soon as possible, to avoid falling irrecoverably behind other countries in using this tool for stimulating economic and entrepreneurial development[9].

The proposed state intervention in the Concept for the Development of Clustering in the Industrial Sector of the Republic of Moldova focuses on revitalizing industrial branches based on the state policy of supporting the development of industrial clusters in the country's economy. This aims to address the issue of declining industrial activity and the reduced share of industrial output in the country's GDP, due to the low competitiveness of most manufacturing enterprises.
The establishment of clusters in the Republic of Moldova is in its early stages. The mechanisms for establishing them are not clearly defined, including the definition of the development concept, the basic elements, and management tools, as well as their effectiveness evaluation[5].

According to national legislation, a scientific and technological cluster is a group of individuals and legal entities created based on an agreement between accredited organizations in the field of science and innovation and/or accredited higher education institutions, other non-profit organizations, on one side, and economic entities, local public administration authorities, patronage associations or professional associations, individuals, financial institutions, international organizations, domestic and foreign investors, on the other side, to carry out activities in the field

of scientific research, education, and technological transfer of scientific results and innovations, and their exploration through economic activity[6].

Main Reasons for the Insufficient Development of Industrial Clusters in Moldova:

- low participation levels from both large companies and SMEs, and the absence of a leader to promote the group's interests.
- lack of cooperation between business sectors, authorities, and research organizations.
- Limited access to business information due to a lack of trust between domestic and foreign partners.
- lack of partnerships between the business community and local authorities due to high bureaucracy and lack of financial support for investment projects.
- insufficient external support and absence of self-financing for modern infrastructure projects by enterprises.

Recent studies indicate that the number of SMEs that have signed cooperation agreements for innovative activities with other enterprises or institutions is very low, representing approximately 14% of enterprises[4].

Approximately 56% of these enterprises are located in the capital, Chișinău[20]. Although location remains fundamental in competition, its role today differs significantly from a generation ago. In an era where competition was largely determined by input costs, locations with important facilities—such as a natural port or a supply of cheap labor—often had a significant competitive advantage. However, science, education, and business often develop along trajectories that are not interconnected, creating a challenging situation for improving competitiveness at global, national, and regional levels. There is a need for organizational and managerial development mechanisms for innovation management that can ensure a higher degree of interaction among education, science, business, and government[4].

Strategic Issues in Cluster Development:

1. **Choosing Locations**: Globalization and improved transportation and communication have led many companies to relocate some or all of their operations to areas with lower wages, taxes, and utility costs. However, these locations often lack efficient infrastructure, sophisticated suppliers, and other cluster benefits. More crucial for maintaining competitiveness is the role of location in innovation. Ignoring this aspect can result in a competitive disadvantage. Location decisions should consider both the total system costs and the potential for innovation, not just input costs. Cluster thinking also emphasizes that it is more beneficial to concentrate related activities in one location rather than dispersing them across multiple sites.
2. **Local Engagement**: Leveraging competitive assets within a cluster requires personal relationships, face-to-face contact, a sense of common interest, and “insider” status. To maximize the benefits of cluster involvement, companies need to actively participate, invest locally, and develop relationships with government authorities.

3. **Cluster Updating**: Updating the cluster should be part of the management agenda. Regular updates ensure the cluster remains relevant and effective in responding to new challenges and opportunities.
4. **Collective Action**: The new agenda for collective action should aim to elevate competition in the private sector by rethinking the role of trade associations, which often lobby governments, prepare statistics, and host social networking functions. Trade associations can drive activities such as establishing university-level testing facilities and training programs, collecting information, exploring environmental solutions through forums, and organizing trade fairs and delegations.

Development of the Cluster Concept in Moldova:

In 2013, the Moldovan Government adopted the Resolution approving the Concept of Cluster Development (CDC) for the country's industrial sector. This concept is based on international cluster development experiences and is an important component of industrial, regional, and innovation policies for advanced economies[1].

Phase One includes:

- Developing policy documents and legislation.
- Creating and implementing a state support mechanism for industrial cluster development.
- Contributing to the social and business environment.
- Developing a "cluster map".
- Preparing educational materials.
- Selecting and training cluster coordinators (facilitators).
- Identifying enterprises interested in cluster cooperation.
- Training cluster managers.

Phase Two includes:

- Developing support policies that illustrate positive results in the development process.
- Tightening participation requirements for state-funded projects.
- Focusing on larger and more innovative projects.
- Monitoring cluster activities that use state support.
- Updating the cluster map.

According to the Concept, machine and equipment production, chemical and electronic industries should be included in the next stage of cluster development.

The state policy implementation mechanism for supporting the establishment and operation of clusters is based on the following main elements:

1. **Legal Framework**: Developing the legal basis for establishing and developing clusters.
2. **Scientific and Methodological Support**: Providing support for the development and implementation of cluster policies.
3. **Cluster Promotion**: Promoting the cluster concept and training key individuals in the cluster formation stage.
4. **Financing Policy**: Developing financing policies for clusters.
5. **Identifying Key Organizations**: Identifying organizations that play a key role in implementing cluster projects.

Priority Areas for Innovative Entrepreneurship and Cluster Initiatives in Moldova include:

- Nanotechnology and new materials.
- Biotechnology.
- Medicine.
- Information technology.
- Production and processing of eco-friendly food.
- Light industry and others.

IT Sector: The IT sector is the most promising in Moldova. Numerous foreign outsourcing companies are integrated into international systems for software development and distribution. Moldovan private IT products are used in the activities of government agencies in various countries, including the USA and the UK.

Challenges and Strategies for Cluster Development in Moldova:

1. **Main Challenges:**

- **Low Participation**: Both large companies and SMEs have low involvement, with a lack of leadership to promote group interests.
- **Lack of Cooperation**: Limited collaboration between business sectors, authorities, and research organizations.
- **Information Access**: Restricted access to business information due to a lack of trust between local and foreign partners.
- **Partnership Issues**: High bureaucracy and insufficient financial support hinder partnerships between businesses and local authorities.
- **External Support**: Inadequate external support and lack of self-financing for modern infrastructure projects.

2. **Policy Framework:**

- The **Concept of Cluster Development** adopted in 2013 aims to enhance industrial sector competitiveness through cluster formation.
- The framework includes the development of policy documents, legislation, support mechanisms, and the creation of a "cluster map".
- Priorities for cluster development include machinery and equipment, chemical and electronic industries.

3. **Sectoral Focus and Benefits:**

- **IT Sector:** Promising with significant foreign outsourcing presence and high contribution to GDP.
- **Nanotechnology and New Materials:** Opportunities for innovation and research-based clusters.
- **Food Industry and Renewable Energy:** Potential for clusters in agriculture and food production.
- **Regional Specialization:** Focus on wine production, garment manufacturing, and sheep wool processing.

4. **Strategic Considerations:**
   - **Location Choices:** Important to consider both cost and innovation potential when choosing cluster locations.
   - **Local Involvement:** Companies must actively participate and invest locally to maximize cluster benefits.
   - **Cluster Updating:** Ongoing management and updating of clusters are necessary for sustained success.
   - **Collective Action:** Trade associations and collaborative efforts are crucial for advancing cluster development.

5. **Supporting Documents and Strategies:**
   - **SME Development Strategy (2012-2020)** (Strategia de dezvoltare a sectorului întreprinderilor mici şi mijlocii pentru anii 2012-2020 (HG nr. 685 din 13.09.2012)[10].
   - **Cluster Development Concept (2013)** (Concepţia dezvoltării clusteriale a sectorului industrial al Republicii Moldova (HG nr. 614 din 20.08.2013).
   - **Innovation Strategy (2013-2020)** Strategia inovaţională a Republicii Moldova pentru perioada 2013-2020 "Inovaţii pentru competitivitate" (HG nr. 952 din 27.11.2013)[10]
   - **Competitiveness Improvement Roadmap (2014)** (Foaia de parcurs pentru ameliorarea competitivităţii R. Moldova (HG nr. 4 din 14.01.2014)[3].

The strategic development of clusters in Moldova is integral to fostering economic growth, innovation, and regional competitiveness.

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Part 2

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The cluster implementation phase is in its early stages in the Republic of Moldova. The main reasons for the insufficient cluster development of the Moldovan industrial sector are the following:

- Lack of leaders representing the cluster's interests;
- Lack of collaboration between the sectors of business, state authorities, and scientific research organizations;
- Limited access to business information as a result of lack of trust between partners both domestic and non-domestic ones;
- Lack of partnership between entrepreneurs and local authorities due to high level of bureaucracy and lack of financial support needed for investment projects.

According to recent studies, the number of SMEs that have signed an agreement on collaboration in innovation activities with other enterprises or institutions is very low-about 14% of enterprises. Out of these, about 56% are enterprises operating in Chisinau.
Science, education, and business organizations are evolving, while often not collaborating. It creates unfavorable conditions for increasing the competitiveness of enterprises, both globally and at the national and regional levels. It is necessary to develop strategies that can ensure a higher degree of interaction between education, science, business, and government.

In 2011-2012 the Ministry of Economy of the Republic of Moldova in cooperation with the Institute of Economics, Finance, and Statistics elaborated the "Concept of cluster development of the industrial sector of the Republic of Moldova", approved by the Government on August 20,

2013 (https://www.legis.md/cautare/getResults?doc_id=135141&lang=ru). The concept of cluster development in the industrial sector of the Republic of Moldova is based on the international experience of cluster initiatives.

The main objective of cluster development in the Republic of Moldova is to introduce and develop the mechanism of economic agents' association for efficient and competitive development of the country's economic sectors.

The concept of cluster development provides for 2 stages of cluster support:
1 Stage – development of program documents and legislative acts. Development and implementation of the state support mechanism for cluster development; development of the "Map of clusters"; development of methodological materials; selection and training of cluster coordinators; identification of enterprises interested in collaboration within the cluster format; training of cluster managers.
2 Stage – development of cluster support policies.
Increasing requirements for participation in state-funded projects; focusing on larger and more innovative projects; monitoring activities of state-supported clusters.
In 2010, a "Concept for the Development of Innovative Entrepreneurship by 2020" was drafted and proposed, the implementation of which resulted in a structural reorganization of the Moldovan economy and accelerated development of innovative entrepreneurship. The Ministry of Economy of the Republic of Moldova has outlined several priorities of the state policy in the field of innovation, among which implementation of clusters with participation of small and medium-sized enterprises is emphasized.

From 2012 to 2014, the Ministry of Economy participated in the project "Cluster PoliSEE: Smarter Cluster Policies for South East Europe". In the project, 11 different countries jointly developed a training platform that aimed at improving cluster policies through joint training and information exchange.

The Republic of Moldova is a participant in a number of international cooperation programs of partners and donors. For example, USAID program is aimed at strengthening product quality, innovation, export promotion, and institutional environment in such sectors as wine-making, tourism, light, and IT industries. Infrastructural development projects (virtual and physical IT-park) focus on the development of the IT industry. An IT Center ("Centre of Excellence in IT") was established on the premises of the project in collaboration with the Technical University, the IT Industry Association, the US and Swedish Embassies, and private companies.
The nearly complete access to the EU market for Moldovan manufacturers due to signing the Deep and Comprehensive Free Trade Agreement (DCFTA) is a chance to carve out a niche in one of the largest and most solvent markets in the world. However, this requires being competitive in terms of product quality, price, packaging, business processes, technologies, and innovations.
The greatest potential for clustering in Moldova is represented in the following sectors and areas of activity:
1. Northern Region
   - Production, processing, and canning of meat

- Processing and canning of fruits and vegetables
- Production of vegetable and animal oils and fats
- Production of dairy products
- Production of prepared animal feed
- Production of non-alcoholic beverages and mineral water.

2. Central Region
   - Production, processing, and canning of meat and meat products,
   - Manufacture of textile products
   - Wood processing and manufacture of wood and cork products;
   - Manufacture of basic pharmaceutical products
   - Manufacture of glass and glassware
3. Southern Region
   - Production of flour and cereals, starches, and starch products
   - Production of bakery and flour products;
   - Production of beverages, in particular, wine made of grapes
4. ATU Gagauzia
   - Processing and canning of fruits and vegetables
   - Production of flour and cereals, starches, and starch products
   - Production of beverages, in particular, wine made of grapes
   - Manufacture of clothing.

There are sufficient economic prerequisites in Moldova, which can create the basis for the local and international clusters development.

The strategy of cluster development in Moldova is defined by:
a) modernization of traditional industries;
b) creation and development of industrial sectors that serve as centers of productive integration of small and medium-sized enterprises;
c) establishing conditions for active innovation activity;
d) efficiency increase of labor, material, and financial resources based on advanced production technologies.

2.2.7 Ukrainian policies related to clusters activity

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Currently, there is no state policy on cluster development in Ukraine. So, there is no generally accepted legal framework. Clusters are occasionally mentioned as tools or goals of economic development in some policy documents.

Thus, the **Concept of the National Programme for the Development of Small and Medium-Sized Enterprises for 2014-2024** states that one of the ways to implement the programme is to develop and implement programmes for the integration of small and medium-sized enterprises into national and international innovation and technology clusters[4].

Later, in 2016, the **Strategy for the Development of Small and Medium-sized Enterprises until 2020** was developed. It states that "the creation of support programmes for clusters should become an institutional component of an effective regional policy for the development of entrepreneurship" [cited in 1]. However, this Strategy was neither further developed nor implemented.

The National Economic Strategy 2030 (2020-2021) includes many development goals, where clusters appear as the main tools for achieving them. This strategy sets specific goals for increasing the number of clusters. Thus, among the tasks aimed at achieving strategic goals we can see the following:

- creation of incentives for cooperation between business entities and higher education institutions, stimulation of corporate social responsibility programmes on the basis of higher education institutions through preferential regimes to stimulate cluster investments to increase high-tech production within the country, commercialisation of scientific solutions of the National Academy of Sciences;
- inclusion of agrarian cluster development concept to the general concept of cluster creation in Ukraine, formation of an effective organizational model of cluster development, development of a regulatory framework that ensures the functioning of agrarian clusters;
- creation of clusters of small and medium-sized aquaculture producers, including farms, to reduce barriers to entry to retail chains;
- establishing a system of awareness of agricultural producers about the benefits of creating economies of scale, including through participation in agricultural clusters;
- compensation of logistics costs for small producers, cooperatives and clusters that are at an early stage of selling their products to foreign markets;
- establishing sales routes for small producers, cooperatives and clusters through the promotion of long-term contracts and/or direct contracts with end users;
- increase the number of new agricultural clusters to 12;
- increase the number of vertically integrated cooperative clusters to 60;
- ensuring clustering in the field of Industry 4.0 at the national and regional levels;
- creating favourable conditions for cluster development;
- building relationships and strengthening cooperation between higher education institutions, research centres and industry;
- integration of Ukrainian industrial clusters with the European Cluster Collaboration Platform;
- creation of scientific and technical clusters with the participation of basic enterprises;
- development of a modern transport and logistics network of multimodal terminals/clusters;
- implementing market clustering through grant support and public-private partnerships;

- creation of innovation clusters involving technical programmes of educational institutions, where knowledge exchange and development of technological solutions for educational institutions (including high-speed Internet and machine learning) will take place;
- creation of five national incubators and 10 clusters of industrial high-tech segments[2.]

The draft **Recovery Plan for Ukraine** (2022) mentions economic clustering as one of the main tasks for the transition to Industry 4.0, accelerating innovation development and cluster production chains, and internationalisation.

Thus, the short-term tasks for the implementation of the Plan include the development of cross-interaction (twinning) between clusters, communities, regions (within Ukraine and with allied countries) through the cross-platform. It envisages state support for the development of the Industry 4.0 sector, accelerating the implementation of the Industry 4.0 concept, supporting the development of cluster production chains and internationalisation[3].

There are a number of other documents at the level of government decrees, but these declarations have never been translated into actual implementation. At the moment, there is no single document or action programme in the country that would directly regulate the development of clusters.

Thus, in **practice, the legal form of a cluster** is chosen by its founders depending on the overall purpose of the cluster creation, its goals and activities, the composition of the founders and members of the cluster, the organisational structure, sources of funding, property, etc.

In Ukraine, cluster initiatives that should be registered as legal entity mainly choose the following organisational and legal forms:

- non-profit organisations: associations, public associations, or civic organisations, etc;
- profit organisations: limited liability company (LLC), joint stock company;
- simple partnership (joint activity without the establishment of a legal entity);
- cooperative;
- hybrid organisational and legal form.

Non-profit organisations

The most common legal form of agri-food cluster in Ukraine is non-profit organisation – public association or public union (80% of registered agri-food cluster initiatives).

The Law of Ukraine "On Public Associations" of 22 March 2012, No. 4572-VI (https://zakon.rada.gov.ua/laws/show/4572-17#Text) provides the following definitions:

- a public association is a voluntary association of individuals and/or legal entities under private law for the purpose of exercising and protecting rights and freedoms, satisfying public, in particular economic, social, cultural, environmental and other interests (Article 1 of the Law of Ukraine "On Public Associations");
- a non-governmental organisation is a non-governmental organisation whose founders and members (participants) are individuals (Article 1 of the Law of Ukraine "On Non-Governmental Organisations").

- a public union is a public association whose founders are legal entities of private law, and whose members (participants) may be legal entities of private law and individuals (Article 1 of the Law of Ukraine "On Public Associations")[5].

In practice, in the Ukrainian context, a public union can act as the governing body of a regional cluster formation. An example of the structure of the governing bodies of a cluster in the form of a public union is shown in Fig.1.

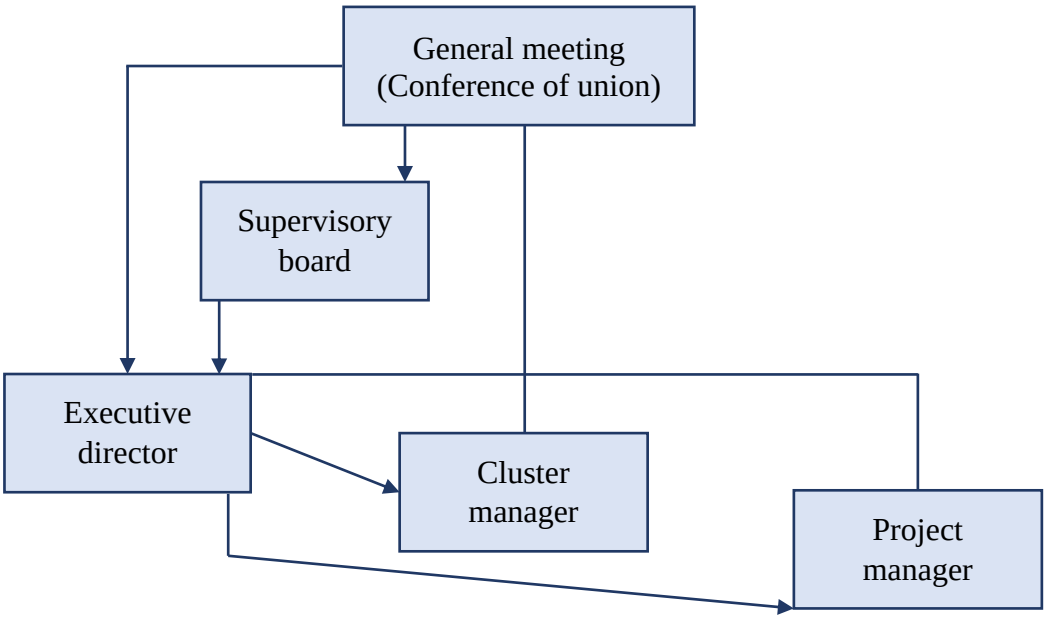

Fig. 1. **Model of Public Union as a Managing Body of a Cluster**
Made by Authors

An example of a Ukrainian agri-food cluster that is registered as a public association is the Ukrainian Organic Cluster (https://organic-platform.org/gs-organichnyj-klaster/), that is a non-profit organisation operating on the principle of an ecosystem in the organic sector of the Ukrainian agri-food industry.

The purpose of the cluster is to unite participants of the Ukrainian organic market and represent their interests.

Its areas of activity include promotion, advisory services and education. The Ukrainian Organic Cluster cooperates with the clusters in Lithuania, Latvia, Poland, Denmark and France.

Profit-making organisations

Among cluster organisations aiming to make a profit, the most common organisational and legal form is entrepreneurial companies – legal entities of private law whose purpose is to make a profit and then distribute it among their members (Article 84 of the Civil Code of Ukraine)[6].

Business companies are of two types:

- business partnerships: general partnership, limited partnership, limited liability company, joint stock company;
- production cooperatives or agricultural cooperatives, agricultural cooperative associations operating for profit.

An example of Ukrainian agri-food cluster registered as an agricultural cooperative is Gorbohory Agritourism Cluster (https://www.horbohory.com.ua), which was established in 2017 on the initiative of local farmers and veterans of the Ukrainian-russian war, local and regional authorities, scientific and educational institutions located in the territory of Semenivka Village Council and Solonkivska community (Lviv Oblast).

The cluster's goal is to ensure the sustainable development of the territory of these communities through infrastructure development, marketing of alternative types of rural entrepreneurship and business within the agritourism cluster.

Its activities are following: production of organic agricultural products, provision of recreational and agritourism services, restoration of authentic crafts production.

Business unions

An union of enterprises is a business organisation created as part of two or more enterprises with the aim of coordinating their production, scientific and other activities to solve common economic and social problems (Article 118 of the Commercial Code)[7]. It is a legal entity. Types:

- associations;
- rporations
- consortia;
- holdings;
- Concerns, other associations of enterprises provided for by law.

An exple of Ukrainian cluster in the form of an economic union is the Association “International, Interregional Agro-Industrial Cluster of Kherson Region “Easten Food Technologies Place” (abbreviated as Ea.F.Tech+) (https://ea-f-tech.com/kratkaya_spravka_o_klastere_ea.f.tech.html) .

The purpose of the cluster is to combine the efforts of cluster members and partners in the framework of project support in the field of growing, harvesting, storing, pre-sale preparation, processing and selling food products by combining commercial offers from the best players in the market into a single agreed commercial package.

The Ea.F.Tech+ cluster is specialized on the supply of equipment (integrated processing lines) for growing and deep processing (canning, freezing, drying, etc.) of food products (vegetables, meat, milk, fish), as well as assistance in marketing finished products.

Joint activity

Under joint activity agreement, the parties (participants) undertake to act jointly without establishing a legal entity to achieve a specific goal that does not contravene the law (Article 1130 of the Civil Code of Ukraine[6]):

- joint activity may be carried out on the basis of pooling of participants' contributions (simple partnership) or without pooling of participants' contributions
- the agreement is subject to registration with the tax authorities if the parties (participants) carry out taxable activities.

The example of Ukrainian cluster established on the basis of a joint activity agreement is the Agrotechnics Innovation and Education Cluster, a form of a public-private partnership that is a multilateral contractual association of business entities without pooling of contributions.

The purpose of the Agrotechnics Innovation and Education Cluster is to bring together leading state agricultural universities, private industrial and agro-industrial enterprises, research institutions, engineering centres, and state and local government bodies to carry out effective research, education, innovation and production activities in the agricultural and agro-industrial sectors of the economy.

These include the introduction of modern agricultural technologies; import substitution through the development and production of domestic energy-saving agricultural machinery and its promotion in domestic and foreign markets; creation of new employements; improvement of the technical level of higher education; technology transfer and implementation of innovations in the agro-industrial sector; and improvement of interaction with the authorities to develop an effective policy to support domestic agricultural producers.

Cooperative

Union of cooperatives means a union, league, association, alliance and other forms of voluntary association of cooperatives by type of activity or by territory in order to create favourable conditions for the activities of its member cooperatives and their members.

An agricultural cooperative union is a legal entity formed by agricultural cooperatives that have voluntarily united on the basis of membership and self-government to carry out joint economic and other activities in order to meet economic, social and other needs.

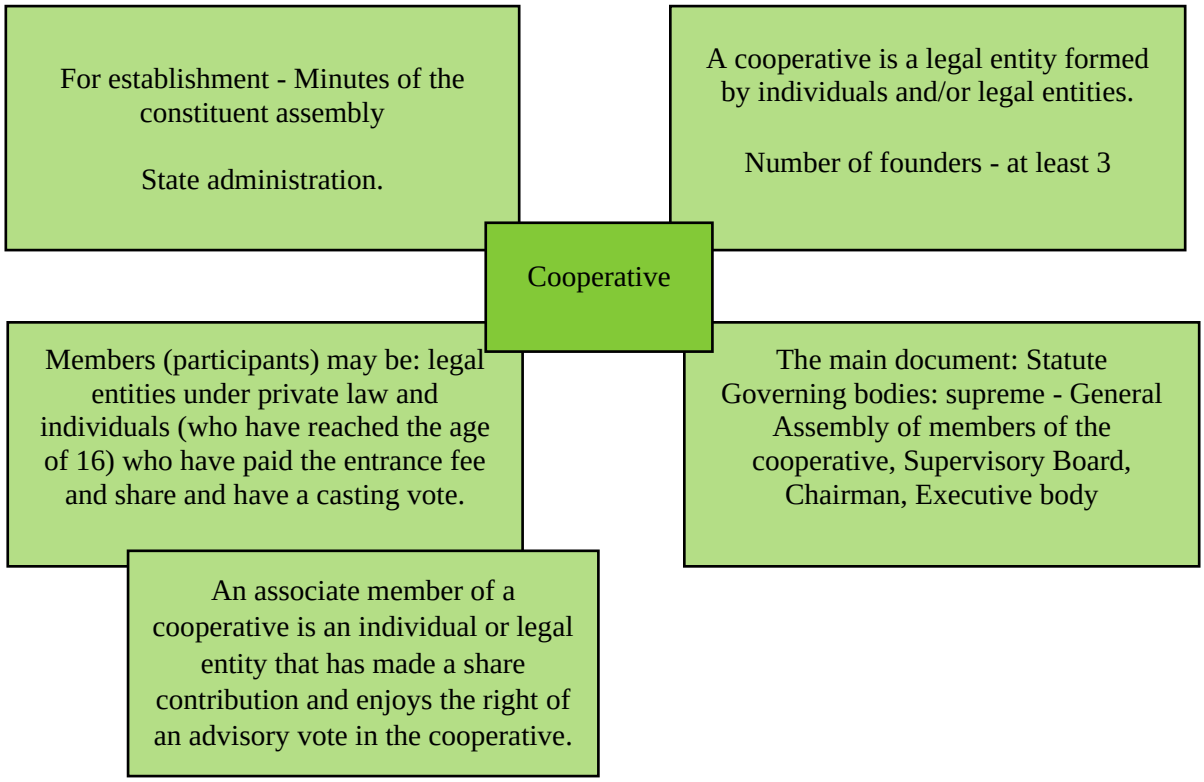

Fig. 2. **Features of the cooperative creation in Ukraine**

Made by Authors

An example is agricultural service cooperative is "Nash Dobrobut" ("Our wellbeing") (https://trade.nash-dobrobut.com.ua/) .

The purpose of the cooperative is to provide services to its members for the sale of products. The cooperative's partners are the NGO "Association of Farmers and Private Landowners of Kharkiv Region" and the NGO "Kharkiv Regional Advisory Centre". In 2019-2020, the cooperative provided services for the sale of grain crops using a stock exchange sales scheme, using the experience of servicing of more than 500 agricultural producers – legal entities. Since 2021, taking into account the needs of small and medium-sized agricultural entrepreneurs, the cooperative has been developing marketing technologies for the sale of vegetable, fruit and berry and other products.

The new realities require rapid consolidation of resources and efforts of business and government, revision of policies and existing tools within the framework of anti-crisis measures, where clusters can and should play an important role.

As stated in the single document of cluster organisations, clusters and cluster associations, "the lack of an adequate regulatory framework for supporting innovation in Ukraine is a consequence of the dominance of raw materials industries"[1]. The change in the country's development strategy

towards high-tech industries should be accompanied by the development and implementation of programmes to support innovation ecosystems, of which clusters are an important part.

Nowadays, a non-governmental organisation, the Ukrainian Cluster Alliance, has been established in Ukraine, which is taking a number of initiatives to ensure the legal and regulatory framework for the development of cluster creation and development in Ukraine. The Alliance has drafted the **National Cluster Development Programme** until 2027, but it has not been approved by the government. Among its other proposals, in addition to the creation of a legal framework, are the development of cluster support tools, the creation of mechanisms for evaluating and monitoring cluster development. In addition, the Alliance proposes to establish a governmental body for cluster initiatives that would coordinate cluster development in cooperation with the Ukrainian Cluster Alliance, and together, more effectively ensure cooperation between different stakeholders.

In general, a successful cluster policy should be based on a comprehensive approach that includes not only legislative changes but also other support tools, such as the development of government programmes for the development of small and medium-sized businesses, programmes focused on the development of industry, innovation, smart specialisation, the creation of infrastructure for clusters, the development of human resources, etc.

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Chapter 3. Cluster Examples

Every UniClaD participating country provided a short description of one or more examples of clusters to learn about experience with existing clusters in different legal, political and geographical contexts, and to show the broad diversity in topics and forms of management.

3.1 Italy

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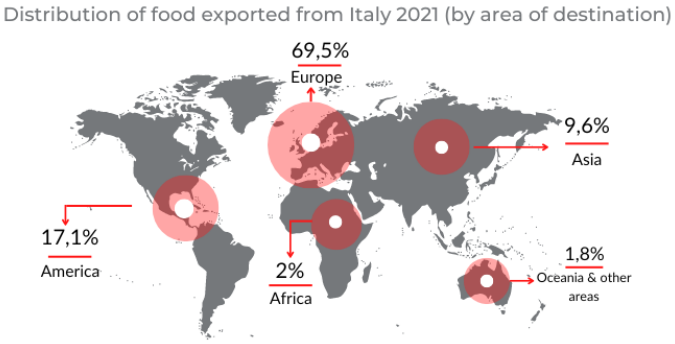
The agri-food cluster in Italy is a vibrant and significant sector of the country's economy. It encompasses a wide range of activities within the agricultural and food industries, including production, processing, distribution, and retail. This case study will provide a detailed analysis of the structure, key players, economic impact, and success factors of the agri-food cluster in Italy.

Agri-food cluster policy in Italy aims to support and promote collaboration within the agricultural and food sectors in the country. Italy has implemented cluster policies to enhance innovation, competitiveness, and sustainability in the agri-food industry[1].

Clusters are groups of interconnected businesses, organizations, and stakeholders in a specific industry. In Italy, the agri-food clusters bring together companies, research centers, training institutions, and other relevant organizations to share resources, skills, and ideas to support the competitiveness of the sector[2].

Italy's agri-food industry is recognized globally for its long-standing food-based culture, traditional vocation for food safety and quality, and its strong presence in the international market[3].

Made in Italy products are widely recognized abroad as synonyms of high quality, safety, and prestige and are highly demanded worldwide. This results in more than 42 bln € worth of exports in 2022 and demand for Italian agrifood products from around the world.



Graph 1. **Food exports from Italy, source: data from the Ministry of Economic Development (April 4, 2022)**

3.1.1 Agri-Food Cluster in Apulia Region -Italy Case of GAL Seb

DISTRETTO DEL CIBO
SUD EST BARESE

Pic. 1. **Logo of Cluster GAL Seb (GAL Sud Est Barese)**

Pic. 2. **Geographical area of the Agri-food Cluster GAL Seb,** source: google map

Topic and Objectives

The GAL Seb as an Agri-food cluster carries out an activity to support and promote the economic and territorial productive development of the Apulian agrifood system, coordinates and manages programs of regional, national and European level.

The purpose of the *Distretto del Cibo* is to support, through scientific and technological excellence, the attractiveness of investments in productive sectors and to contribute to the strengthening of the technical and scientific skills of its members, as well as to strengthen the Apulian agrifood production system and research, nationally and internationally.
It also fosters the development of the production system in the District area, promoting business aggregation around projects that integrate the reference supply chains of each production sector, also linking them with technological research issues.

Stimulate the creation of better market relations for the innovation of agricultural production and the productive fabric also with a view to environmental sustainability.
The SEB Food District's aims are:

- to promote new forms of territorial aggregation between businesses.
- to foster territorial development, cohesion and social inclusion by encouraging the integration of activities characterized by territorial proximity.
- to strengthen food security, decreasing the environmental impact of production and reducing food waste.

- to safeguard the territory and rural landscape through agricultural and agribusiness activities.

Zone of Activity
The Cluster-organisation acts in the province of Apulia Region in South of Italy Austria – regional but is connected to wider networks.

Area of members
By Resolution of the Regional Council Dec. 22, 2021, No. 2200 (BURP No. 22, 02/25/2022), the expansion of the "Southeast Barese Food District" was approved. The new territorial area includes 30 municipalities southeast of the city of Bari falling within the Metropolitan City of Bari and the provinces of Brindisi and Taranto.

Cluster Management
The cluster management acts in the form of a company supported by public authorities.

Activities
The District Program is aimed at the productive improvement of member farms, the development of quality agricultural production, non-agricultural diversification, the promotion of rural tourism, the support of agro-industry. The District Program is the operational tool through which the socio-economic development of agricultural and agri-food operators in Southeast Barese is to be pursued.
The objective of the Southeast Barese Food District Program is to foster processes of reorganization of relationships between the different entities that are part of it. The overall objective is to provide stimulus for the creation of better market relations, innovation in agricultural production and the production fabric also with a view to environmental sustainability. The program is carried out over 3 years by means of a strategy that is structured around four priority thematic areas: supply chain development, quality, innovation and diversification. The specific objectives of the Program pertain to these thematic areas by substantiating themselves in system interventions and coherent business projects, hinged in a network logic that ensures a unified and coherent image of the area covered by the program.
In 2022, the District obtained recognition as a "Food District" from the Ministry of Agriculture, Food Sovereignty and Forestry and registration in the National Register of Food Districts.
Implementation of the three-year Development Program approved by the Apulia Region is in progress.The District is preparing a new investment program to apply for the call for proposals soon to be issued by the Ministry of Agriculture dedicated to recognized food districts

Type and size of the managing organisation
The Southeast Barese Food District was recognized by the Apulia Region on June 4, 2020 with Council Resolution No. 843 (BURP No. 91 of 06/23/2020).

The role of promoter-coordinator of the process of recognition of the District in the initial phase was played by the South East Barese Local Action Group through an intense activity of territorial animation and planning that identified the core promoter of the District made up of agricultural

enterprises and trade associations, signatories of the Memorandum of Understanding. Food Districts, established by the Ministry of Agriculture (MIPAAF) constitute a new model of development and governance for Italian agribusiness. “Distretto del Cibo Sud Est Barese” is a limited liability consortium company.
Cluster Members

Cluster members (2021: 118) are companies involved in agriculture, animal feed production, food processing, food retail, community catering and gastronomy, research, development and educational institutes, food processing SMEs and industries, upstream, downstream industries (machinery, packaging, detergents…).

Number and types of participating organisations
The District includes 264 members as follows:

- 252 enterprises in the agricultural and agribusiness sector.
- 7 trade associations of regional significance.
- the GALs: Sud Est Barese, Terra dei Trulli e di Barsento and Valle d'Itria, Slow Food Condotta Bari as active players in the field of local promotion and development and the University of Bari spin-off Sinagri s.r.l.

Structure of the cluster organisation

Table 1. **Cluster organisation, source: own estimation on the base of cluster manager interview**

Internal and external cooperations	Decision making
To establish the District, the GAL Sud Est Barese set up a working group made up of the GAL's internal staff and external experts who involved all local actors operating in the agricultural and agri-food sector in order to start a new cycle of work centered on a concerted basis. The “Distretto del Cibo Sud Est Barese” was born as a tool capable of planning on a multi-year basis an integrated system of actions that, thanks to the operational participation of businesses, research operators and other development actors, can provide the entire system of businesses involved, sustainable competitive advantages based on organizational methods founded on critical	The Company is administered by a Board of Directors composed of 7 members, of which 4 members represent member companies, 2 members represent trade organizations and 1 member represents those active in the field of promotion, development and innovation. To support the decisions of the Board of Directors, the District has established a Technical Scientific Committee, which performs tasks of analysis, study and support of the district's activities, according to the directives of the President and the Board of Directors. The committee expresses advisory opinions, which are not binding, with the aim of improving the incisiveness of the company's basic choices in the implementation of the

success factors closely related to the vocationalities of the territory.	consortium's purpose in relation to the target territory. The Technical-Scientific Committee consists of 7 members representing: ▪ Dept. of Agro-Environmental and Territorial Sciences (DISAAT) – University of Bari; ▪ Dept. of Soil, Plant and Food Sciences (Di.S.S.P.A.) ▪ University of Bari; ▪ Dept. of Civil, Environmental, Land, Building and Chemical Engineering ▪ Bari Polytechnic University; ▪ Bari Chamber of Commerce; ▪ CREA – Center for Research in Viticulture and Enology; ▪ GAL Terra dei Trulli e di Barsento; ▪ GAL Valle d'Itria.

SWOT analysis

Table 2. **SWOT, source: own estimation on the base of literature research and a cluster manager interview**

Strengths	Weaknesses
▪ Favorable climate and fertile soil, enabling a wide variety of agricultural products to be grown. ▪ Established wine production, especially notable for Primitivo variety. ▪ Diverse range of fruits and vegetables, including cherries, artichokes, and table grapes. ▪ Presence of typical and quality agri-food products. ▪ Presence of areas of agricultural specialization ▪ Growing propensity for cooperation and associationism, also as a function of the development of innovation ▪ High diversification of production chains	▪ Modest propensity for networking among actors and institutions ▪ Structural characteristics of agricultural enterprises (size, aging etc.) that do not favor the introduction of on-farm innovations ▪ Low reaction of value added to investments made in agriculture ▪ Low propensity of entrepreneurs to initiate product and/or process innovation processes ▪ Inadequate levels of education, training and skills of operators ▪ Little or no use of traceability systems of traceability systems

▪ Expansion of the market determined by the high propensity to export and the ability to de-seasonalize the supply of products ▪ Diffusion in the territory of biomass sources to activate agro-energy projects	
Opportunities	**Threats**
▪ Increasing global demand for Mediterranean and health-conscious food products. ▪ Growing interest in sustainable and organic farming practices. ▪ Development of agri-tourism, offering visitors the opportunity to experience rural life and local cuisine. ▪ Expansion of international markets for Apulian products, driven by globalization and e-commerce. ▪ Potential for value-added processing and packaging of agricultural products for export.	▪ Risk of climate change impacts on agriculture, including water scarcity and extreme weather events. ▪ Competition from lower-cost producers in other countries and regions. ▪ Vulnerability to pests and diseases that can affect crops ▪ Prevalence of the large-scale retail sector in power relations within supply chain relations

Success Factors

Several factors contribute to the success of the agri-food cluster in Italy. First, the country has a long-standing tradition of agricultural production and culinary excellence, which forms the foundation for the production of high-quality and authentic food products. Second, the cluster benefits from strong connections between academia, research institutions, and industry, fostering innovation, technological advancements, and knowledge transfer. The presence of dedicated support services, such as business networks, training programs, and financial incentives, also helps SMEs thrive in this sector. Italian experience and clusters importance for the economy confirms that European policymakers cannot afford to ignore their role and should actively explore their potential to modernize and improve economic policies in agriculture, food and agri-industry sectors[4].

In conclusion, the agri-food cluster in Italy is a thriving and vital part of the country's economy. Its structure, characterized by collaboration and interconnectedness, combined with the presence of key players, has resulted in significant economic impact. The success of the cluster can be attributed to factors such as a rich culinary heritage, strong connections between academia and industry, and supportive services for SMEs. Furhermore, Agri-food clusters are the only control room for research and innovation in the agri-food sector to suggest to the Ministries of higher agriculture and to the other competent national and regional institutions the sector's R&I priorities and the related investment needs in research and training. Furthermore, they are a collaborative

and inclusive environment that favors synergies between Industry and Research in the agri-food sector and the development of project partnerships[5].

Acknowledgement
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3.2 Spain

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The agri-food sector in Spain is a significant part of the country's economy generating revenue close to €140 billion and employing more than 440,000 people[1]. This sector contributes to 11% its GDP from all the activities in the food chain[2]. Spain has been identified as having a higher number of relevant clusters, with different regions having their own specialized clusters. Furthermore, food cluster policies have been widely promoted by the European Union and international organizations such as the Organization for Economic Cooperation and Development (OECD)[3].

In Spain food cluster policy have been supporting the development of agri-food network which encompass the entire food value chain, from primary production to the agri-food industry. The regional and local agri-food bring together various stakeholders that carry out their activities in a certain geographic area characterized by high-quality, innovative practices, and a commitment to regional development by increase job creation and regional competitiveness. These clusters also

interconnected food related businesses, suppliers, and associated government entities, universities and institutions working together towards common goals contributing to develop specialized expertise, services, innovation, and skills. In addition, there are initiatives by the Spanish government to also developed A digitalisation strategy for the agri-food and forestry sector and rural areas, with the aim of promoting interaction, knowledge transfer and collaboration between stakeholders, which can lead to the development of new products, processes and services[4].

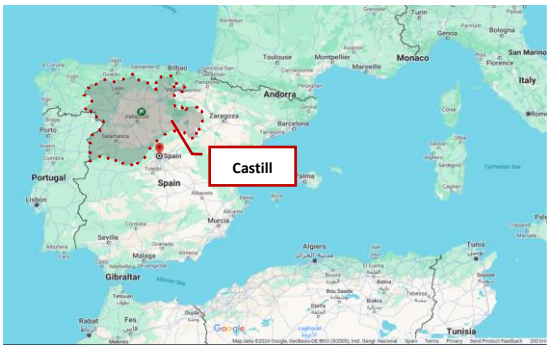
The agri-food cluster in Castilla y León is an important part of the region's economy, accounting for 14.6% of regional employment and 10.4% of production[5]. In terms of production, Castilla y León is one of the main players in the agri-food sector, especially in the meat, dairy and animal feed industries, making the region an ideal agri-food hub for investments and clusters such as the Association of the Food Industry in Castilla y León (VITARTIS), presented as the first example of an agri-food cluster in Spain. The second example is the Agri-Food Cluster of Navarre (NAGRIFOOD), which is one of the leading European groups in the agri-food industry. The agri-food sector is the second most important sector in Navarre's economy, accounting for 5% of the region's total GDP and 14% of its industrial GDP, and its companies account for 15% of total exports. It also accounts for 28,700 jobs, or 9.2% of regional employment[6,7].

3.2.1 VITARTIS association of the food industry in Castilla y León

VITARTIS
Asociación de la Industria Alimentaria Castilla y León

www.vitartis.es

Pic 1. **Logo VITARTIS**



Pic. 2. **VITARTIS Agri-food Cluster geographical area,** source: Google maps

VITARTIS is an eminently business-oriented group of the Food Industry of Castilla y León. This private entity works for the region, looking after the general interest, combining positions with the primary sector and the administration by encouraging innovation and improvement in all areas of the agri-food sector in the region[8].

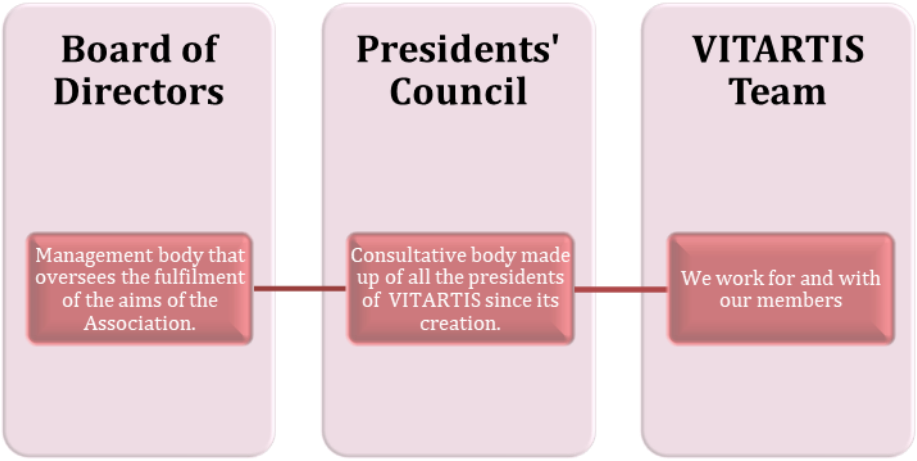
Topic and Objectives

The Castilla y León Food Industry Association (VITARTIS) was constituted on 19 May 2009 and is registered as an Innovative Business Group in the Special Register of Innovative Business Associations (AEIs) under number REAI00097 of the Ministry of Industry, Tourism and Trade in November 2009. VITARTIS is committed to the economic and social development of the region, it gives visibility to a sector that is the hallmark of Castilla y León and the soul of the recovery of the rural world. Represents the sector before the public administration and economic and social organisations. Sustainability, competitiveness and responsibility are the three pillars on which the sector that VITARTIS represents is based. VITARTIS objective is to increase the competitiveness of the Food Industry of Castilla y León, promote and improve the innovation of companies and organisations and to be one of the most proactive actors representing the sector in institutions, public administrations and economic and social organisations.

Zone of Activity

VITARTIS, the Food Industry Cluster of Castilla y León, operates in the region of Castilla y León, Spain, with its office located in Valladolid.

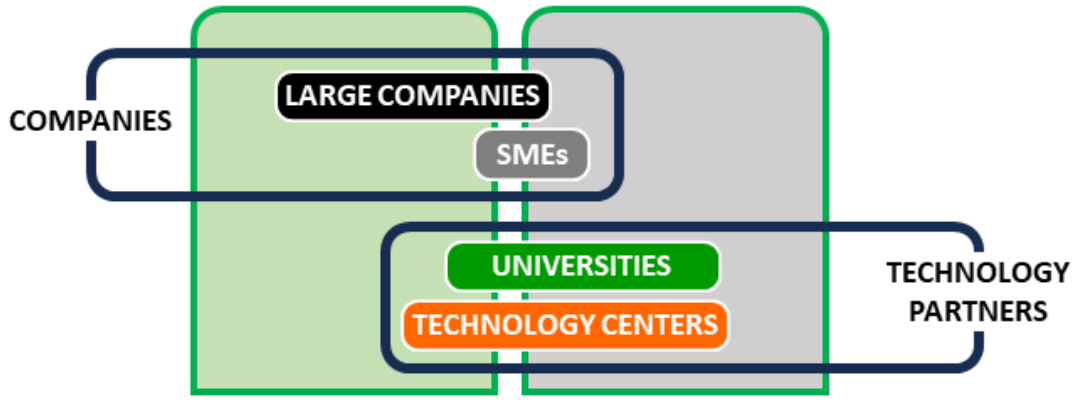
Cluster Management



Graph 1. **VITARTIS Representative bodies,** source: own creation from webpage information https://www.vitartis.es/nosotros/

Cluster Members

VITARTIS is formed by 126 members, the association is made up of 65% SMEs and 35% large companies and institutions.



Graph 2. **VITARTIS cluster members,** source: https://autoconsumo.unef.es/grupo-operativo-alimenta-solar/asociacion-la-industria-alimentaria-castilla-leon-vitartis/

Agri-food industries (SMEs and large food companies) operating in the dairy, flour and derivatives, nuts, sugar, coffee (soluble products), wine, pulses and vegetables, biscuits, dietetics, prepared, frozen foods, canned (vegetable) foods. Meat, additives, hotel and catering, animal feed, as well as in the agro-livestock and food biotechnology sectors.

The main partners of VITARTIS include:

- Agri-food companies in the region: small and medium-sized enterprises (SMEs) and large agro-food enterprises.
- Biotechnology companies
- Technology centres
- Universities that work in the agri-food sector

Cluster Organisation

Since its creation, the number of VITARTIS members has grown significantly, involving entities from different production subsectors (meat, dairy, cereals and derivatives, fruit and vegetables and other profiles such as processing industry, producer cooperatives, second-tier cooperatives. VITARTIS members currently account for 40% of the turnover and employment generated by the food industry in Castilla y León, which means, in absolute terms, more than 3,800 million euros of turnover and more than 14,000 employees. Furthermore, the investment in I+D+I of VITARTIS members reached 60.000.000 €. approximately 60% of this investment in the regional sector[9].

VITARTIS has worked continuously to promote cooperation and the creation of networks, both within the sector and along the supply chain and other sectors. For example, the cluster is currently involved in several projects such as KNOWnNEBs, DELTA and the Go Savefood project, which aims to promote innovation, competitiveness and sustainable economic development in the food industry [7].

SWOT analysis

Table 1. **SWOT, source: own estimations**

Strengths	**Weaknesses**
▪ Consolidated knowledge and expertise of members in agri-food system and practices. ▪ A strong connection with the stakeholders a local and regional level ▪ High-quality raw materials availability for agri-food production. ▪ Certification scheme such as Designations of Origin, Protected Geographic Indications and Traditional specialities guaranteed that highlights the authenticity and quality of traditional products.	▪ Foster collaboration and shared resources within the agri-food sector. ▪ The improvement of vertical coordination and resources in the supply chain and stakeholders ▪ Expansion of international presence in the global marketplace. ▪ Adopting innovative practices in both manufacturing and processing keeps the industry at the forefront of technological advances.
Opportunities	**Threats**
▪ Adding value to artisanal production processes in specialised markets. ▪ Adopt cutting-edge technology to increase productivity and efficiency in the agri-food sector. ▪ Internationalization of the food sector in the Arab market to gain access to foreign markets	▪ The efficient use and recovery of by-products demonstrates a commitment to sustainability and resource optimisation. ▪ The industry's presence in international markets demonstrates its competitiveness and ability to meet global demands. ▪ Consolidation within the industry in response to local, regional and international food policies is an impediment to stability and competitiveness.

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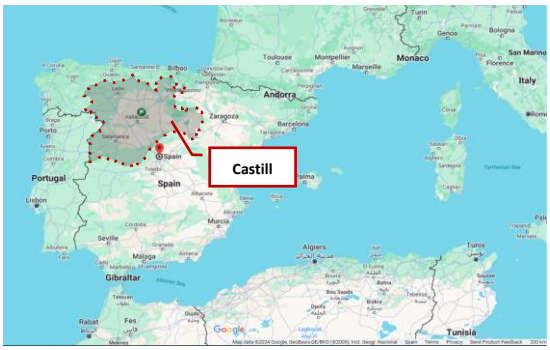
3.2.2 NAGRIFOOD the agrifood Cluster of Navarre

The cluster is described as a benchmark for collaborative innovation, a commitment to food competitiveness. NAGRIFOOD is a non-profit organisation of companies in Navarre, Spain, dedicated to the continuous improvement of the agri-food chain. The organisation is open to all types of food companies involved in the value chain of the sector in Navarre[1].

NAGRIFOOD
CLUSTER AGROALIMENTARIO DE NAVARRA

www.nagri foodcluster.com

Pic 1. **Logo NAGRIFOOD**



Pic. 2. **NAGRIFOOD Cluster geographical area,** source: Google maps

Topic and Objectives
Navarre's agri-food sector is of strategic importance for the balanced development of Navarre and is a source of activity and wealth for the whole region. As a result, the organisation is currently a key player in Navarre's agri-food sector[2]. A general objective of NAGRIFOOD is to ensure the

increase of competitiveness of its members and, consequently, of the sector, through the development of inter-cooperation, open innovation, intra-entrepreneurship and internationalisation. The Navarre Agri-Food Cluster has been awarded national recognition by the Ministry of Industry, Trade and Tourism through the AEI (Asociación de Empresas Innovadores), which is given to clusters whose strategic plan is considered excellent.

Zone of Activity

The Agri-food Cluster of Navarre is located in Pamplona. This location serves as the primary address for the organization, and it is where its activities and operations are based. NAGRIFOOD it is a dynamic cluster where exports have increased significantly, and it holds the second industrial spot in terms of sales, with a significant turnover and employment impact. As part of the activities this cluster is involved in various projects and initiatives. For instance, The PLATSOSTENIBILIDAD project that seeks to increase the competitiveness of companies in the field of sustainability[3]. The European project LifeMcubo, which is focused on the priority area of Environment and Resource Efficiency, with a specific focus on water. NAGRIFOOD is also a new member of the Technological Platform Food for Life-Spain, the largest Technological Platform of the Spanish Agri-food Sector. Other projects are the Termosell40 project related to the development of pilot equipment for the detection of quality problems and INNODETECT, which aims to create a new method for the detection of Listeria monocytogenes in meat processing[4]. NAGRIFOOD organises events such as 'La Noche del Agroalimentario' a new strategic reflection and networking forum, and participates in events such as Alimentaria, a food, drink and gastronomy trade fair.

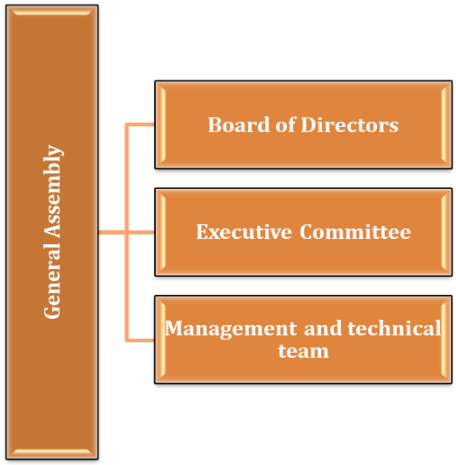
Cluster Management

NAGRIFOOD as an advanced technological cluster is open to all kinds of companies integrated in the value chain of the agri-food sector in Navarre. Regardless of their size or the subsector in which they operate it is open to collaboration with other entities such as business associations, universities, technology and training centres, public and private institutions. The cluster's main priority is to encourage loyal interaction between its members, as well as to establish collaborative and inter-cooperative relationships with other entities, clusters with similar objectives in the sector itself and other cross-cutting sectors such as knowledge, health-nutrition, biotechnology, environment, digital industry, cybernetics or position marketing.

NAGRIFOOD have sufficient capacity to facilitate contacts for its members and the entire sector, promote projects of common interest, broaden the vision of the local agri-food industry and provide information on trends and new habits that facilitate the positioning of the agri-food industry in the region as a strategic and innovative sector within the productive fabric of the region.

Cluster Members

- The General Assembly is the supreme representative body of the Cluster Association, made up of all the members being the body that expresses the will of the members and adopts its agreements by the majority principle or internal democracy.



Graph 1. **The Agri-Food Cluster of Navarre representative bodies,** source: own creation from webpage information nagrifoodcluster.com/nagrifood/organizacion/

- The Board of Directors is the body that manages, administers and represents the interests of the Association, in accordance with the provisions of the General Assembly. Its members hold office for a period of four years and may be re-elected at the end of their term of office.
- The operational body that monitors the Cluster's activity is carry out by the Executive Committee which also support and advice to the Management, promotion, attention and support of Cluster members' initiatives.
- The Management is the body responsible for the execution of the Cluster's Action Plans, the general administration of the Cluster, the harmonisation of internal relations and the coordination of the Cluster's external relations.
- Technical Team is responsible for the execution of the Cluster's production, inter-cooperation and administrative management actions.

Cluster Organisation

The General Assembly meets to discuss and make decisions on important matters concerning the cluster's direction, activities, and strategies. It is a critical component of the cluster's governance structure, ensuring that the interests of all member companies and entities are represented and considered in the decision-making process. Given the nature of such bodies the representatives from each member organization, including various companies and entities involved in the agri-food sector in Navarra, would be part of the General Assembly.

The cluster plays a vital role in promoting and facilitating innovative processes developed by the industry to improve business and covers practically the entire value chain, with an annual turnover at €3 billion, and an additional €900 million from the primary sector. In the Autonomous Community of Navarre, the agri-food sector is the second largest industrial sector in terms of turnover, accounting for 20% of production and a turnover of more than 2.5 billion euros. We are

talking about an ecosystem of around 1,370 companies and 24,000 farms, employing around 25,000 people[4].

SWOT analysis

Table 1. **SWOT,** source: own estimations

Strengths	Weaknesses
▪ Synergies and cooperation between stakeholders in the food chain that contribute to improving the competitiveness of the whole. ▪ Collaborative approach, research and projects to disseminate best practices and technologies. ▪ Cluster representation by well-established SMEs and family farms in the agri-food sector, aiming at excellence.	▪ Management strategies and internal culture and of the cluster members. ▪ Develop a broad innovation ecosystem in the agri-food sector. ▪ National, regional and international policies related to sustainability and clean energy sources.
Opportunities	**Threats**
▪ Collaborative I+D+I projects. ▪ Training in agri-food innovation. ▪ Support a biotechnology sector that allows us to provide the agri-food sector with solutions through genetic improvement. ▪ Expand safety, sustainability certification and quality labels. ▪ Make the cluster more competitive, especially in terms of logistics. ▪ Establish technical cooperation agreements with partners in the productive sectors. ▪ A new economic development model for Navarre in the medium and long term.	▪ Sustainable food development with the necessary resources and a stable financial structure for the production sector. ▪ Consequences and impacts of climate change in the primary sector. ▪ Strengthening the cluster model and network structures. ▪ The new demands of emerging markets in a global competitive framework governed by rules of competition that require knowledge and use of new technological tools. ▪ The complementary and/or subsidiary economic crises.

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3.3 Poland

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3.3.1 Food Cluster of Southern Greater Poland Association

In Poland, a critical condition for cluster development is the existence of geographic and regional industrial clusters. Greater Poland Voivodeship is one of the most economically developed Voivodeships in Poland. It is characterised by a high concentration of foreign capital and increased investment expenditures per capita. It also has a high agricultural culture and a well-developed food industry. Analysis of statistical clusters (industry clusters) in Greater Poland voivodeship compared with the European Union indicates that the production of foodstuffs is located between industrial solid sectors. [6]

In Poland, regional governments play an essential role in cluster development. Regional authorities of Greater Poland, responding to the guidelines of innovation policy in the European Union and Poland, have taken several measures over the years to support clusters and stimulate the emergence of cluster initiatives. Among other programmes, they award vouchers for cluster initiatives and have implemented certification of cluster initiatives in the region. [7]

Stowarzyszenie w Kaliszu KlasterSpożywczy Południowej Wielkopolski http://www.agrocluster.com/ Pic 1. **Logo**	 Pic. 2. **Greater Poland voivodship,** source: https://pl.wikivoyage.org/wiki/Wojew%C3%B3dztwo_wielkopolskie

Among the key players of Polish agri-food clusters that aspire to become national key clusters is the Food Cluster of Southern Greater Poland Association in Kalisz. It is the largest and best-managed food cluster in Greater Poland and includes the most significant spatial extent of the enterprises. The cluster consists of a research and development company and a university. It is recognised, certified and granted with vouchers by the regional authority. Medium-sized

companies dominate the network. It has an outstanding number and efficiency of projects, R&D work, cooperation with science, high participation in industry events, commitment to education and recognition, has a supra-regional character aspiring to a national key cluster, area of use as a tool for the development of economic promotion.

Topic and Objectives

The mission of the Association is to create a solid and stable organisation in Southern Greater Poland that can meet every requirement placed on the agri-food industry. It aims to deepen the links cooperative ties and develop promotional and advisory activities related to enhancing innovation and internationalisation. The main objective is to create joint actions to increase the competitiveness of food industry companies and implement new products, innovative technologies and solutions. The Food Cluster of Southern Greater Poland's particular objectives are to:

- increase in the value of intellectual capital of cluster members,
- create cooperative networks within the cluster and networks of connections in the scope of R&D, logistics, information and accounting services,
- increase in sales of goods and services of cluster members on the domestic and foreign markets,
- use the image of a cluster as an efficient and effective market institution,
- increase public funds for the development of the R&D centre with laboratories, education rooms, a server room, and the headquarters of the cluster.

Zone of Activity

The Food Cluster of Southern Greater Poland includes food additives, confectionery, beverages, and vegetable preparations manufacturers. These entrepreneurs package and distribute condiments, produce machinery and equipment for food processing, and distributors of food products.

The Area of Members

The Food Cluster of Southern Greater Poland members operate on the territory of the Polish voivodships. Some companies operate in markets throughout the country, the EU, Asia, and North Africa (collectively exporting to nearly 70 countries worldwide).

Cluster Management

The Food Cluster of Southern Greater Poland's supreme authorities are the General Assembly of the Association's members, the Management Board, and the Review Board. The consultative and advisory body plays the role of the Scientific Council, which brings together 18 scientists from different segments of science related to agriculture, processing, and services. Cluster membership is declared after declaration and annual contribution.

Cluster Activities

The Food Cluster of Southern Greater Poland focuses on building a system of mutual trust between cluster members and spreading knowledge about the need and possibilities of building methods of network connections and joint technology transfer. All undertakings undertaken by the Cluster's Management Board serve further to improve modern ways of communication between buyers and sellers. They make it easier for business entities concentrated within the cluster to sell

what they have produced and buyers – traders and buyers at marketplaces, owners of wholesale markets and stores – direct contact with producers. These activities strengthen relationships business-to-business (B2B) sector. The cluster implements projects related to strategic consulting, food composition testing and production automation.

Type and Size of the Cluster Managing Organisation

The Food Cluster of Southern Greater Poland is an association funded in 2009, affiliated with the Regional Chamber of Commerce (RCC) in Kalisz, which acts based on the statute. [8] The RCC's member of the Board of Directors was the cluster deputy president and coordinator. The cluster president is a representative of the Poznan University of Life Sciences. The Board of Directors consists primarily of representatives of cluster enterprises.

Number and Types of Participating Organisations

The Food Cluster of Southern Greater Poland has 56 member companies nowadays, one of the biggest in the food sector. The cluster includes 38 enterprises, 11 scientific and research units, 5 business environment institutions and 2 local government units.

Structure of the Cluster

The Food Cluster of Southern Greater Poland was established on the regional initiative 17 companies from the agri-food sector in southern Greater Poland who signed the statute. The links between companies are initiated by their owners. Strong informal connections connect them. A lack of capital ties and close direct cooperation of companies with the R&D unit characterises the network. The role of the network coordinator is diagnosing the needs of enterprises in the network, attracting new companies and promoting the development of existing ones, building the awareness of entrepreneurs, training network managers, improving legal regulations and encouraging investors to start a business in the region. The cluster member is entitled to participate in works and projects, use the cluster assistance, submit applications, opinions and demands, co-decide on the work and action program by participating in the adoption of appropriate resolutions and proposing a legislative initiative, and vote and stand for election to the cluster authorities. Members' obligations are to actively participate in the work of the Association and promote its objectives and program, comply with the statutes, regulations and resolutions, regularly pay contributions in force in the association, and observe the principles of ethical conduct in their activities.

SWOT analysis

Table 1. **SWOT,** source: Author's elaboration based on the materials and interviews provided

Strengths	Weaknesses
▪ Strong representation of food industry companies ▪ Convenient location to crucial resources	▪ Weak representativeness of other than Greater Poland members ▪ Rare spontaneous cooperation of cluster members in R&D

Strengths	Weaknesses
▪ Geographical proximity, which significantly facilitates companies to cooperate ▪ Joint research and development projects ▪ Vicinity of universities and research centres in the cluster industrial area of activity ▪ Enterprises in the cluster engaged in export activities ▪ Enterprises in the cluster involved in R&D activities ▪ B2B orientation ▪ Customer orientation through the implementation of the Virtual Commodity Exchange ▪ Quality certification	▪ Lack of long-term established collaboration with universities or strategic university-cluster research centre ▪ Lack of separate departments dealing with particular key areas and persons responsible for them ▪ Weak access to laboratory infrastructure and demonstration infrastructure. ▪ Weak collaboration with start-ups ▪ Lack of established forms of knowledge transfer ▪ Lack of sustainability reporting ▪ Low number of joint products (goods or services) of the cluster
Opportunities	**Threats**
▪ External funding from regional authorities ▪ 183,600 euro from the European Regional Development Fund ▪ Implementation of an internationalisation programme to expand to Europe, North Africa and Asia markets. ▪ Similar markets and in the same areas of production or services ▪ Participation of local governments and universities in cluster association ▪ Intensive participation of cluster members – enterprises in the cluster in missions, fairs, meetings with potential partners and other similar events aimed at attracting potential customers	▪ Extensive formalisation and bureaucratisation of universities ▪ Lack of development strategy and action plan ▪ Weak capital relationships ▪ Weak financial stability ▪ Lack of continuity of financial support ▪ Lack of well-educated and trained management staff in companies and cluster ▪ Difficulties in communication and lack of information about the activities of the other party ▪ Researchers' characteristics and weak motivations to cooperate with cluster ▪ Weak sustainability orientation towards a circular and low-carbon economy

Success Factors

The critical success factors of the Food Cluster of Southern Greater Poland are: advantageous location to sources of supply and proximity to partners, production and service traditions and work culture and level of knowledge in the field, experience in developing new technologies, expertise and skills of management staff, the ability to monitor the environment, forecast changes and plan strategically, crisis resiliency – the immense increase of sells of long shelf life products during Covid-19 pandemia, a high level of automation in production processes and mutual trust in relations between cluster participants build during the period of olmost 15 years of cooperation.

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[4]*Ministerstwo Rozwoju i Technologii (2022)* Regulamin Konkursu o status Krajowego Klastra Kluczowego z dnia 21 czerwca 2022 r.
[5]*Lista Krajowych Klastrów Kluczowych* (accessed 19.01.2024) https://www.gov.pl/web/rozwoj-technologia/lista-kkk
[6]*Dyba, W. Kania, A., Piniarski, W (2021) Klastry w województwie wielkopolskim 2020, Wielkopolskie Regionalne Obserwatorium Terytorialne, Poznań.*
[7]*Dyba, W. ...Ibidem.*
[8]*Statut Stowarzyszenia,* Klaster Spożywczy Południowej Wielkopolski – Stowarzyszenie, (accessed 20.01.2024) http://www.klaster.kalisz.pl/o-nas/statut-stowarzyszenia/

3.4 Lithiuania

3.4.1 National Food Cluster

Author:
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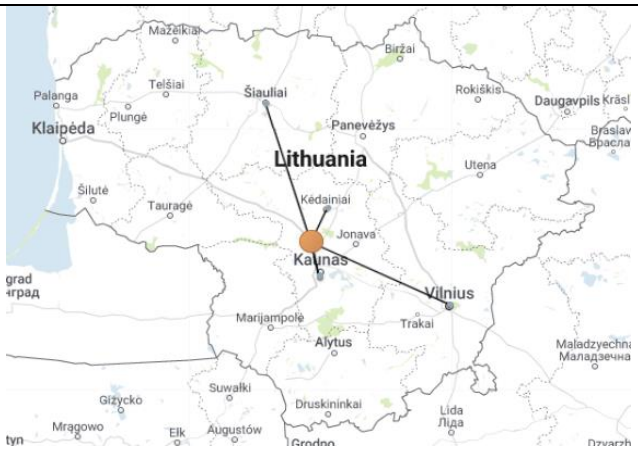
NATIONAL FOOD CLUSTER Lithuania

https://litfoodcluster.eu/en/
institutas@lsdi.lt

Pic. 1. **Logo National Food Cluster**



Pic. 2. **Map of the cluster members**, source https://klaster.lt/en/klateris/nacionalinis-maisto-ukio-klasteris-2/

Topic and Objectives

The National Food Cluster is a network of cooperation between Lithuanian food sector businesses and research institutions which seeks:

- to identify market niches on the basis of which Lithuanian food industry could replace low value-added chains with high value-added chains;
- concentrate human, financial, organisational, infrastructure and technological resources by occupying designated market niches for Lithuanian enterprises;
- organise a continuous process of acquisition of skills, knowledge and information by network;
- participants, enabling them to become active and competitive market participants.

Zone of Activity

The cluster involves different members from the Central, Northern and Eastern regions of Lithuania.

Cluster Management

The National Food Cluster is registered as an association. The management of the cluster is governed by the statutes. The director of the cluster, the board and the general meeting are responsible for the management of organizational activities. The General Assembly is the highest governing body. The board is headed by an elected chairman of the board, the board appoints a director. Each member of the cluster pays an annual membership fee from which the budget is formed. The budget can also consist of project activities, contributions, etc.

Cluster Members

The cluster is a voluntary partnership between businesses and other entities/organisations. Cluster activities are based on cooperation between organisations in a wide range of fields ranging from resource sharing to the development of common products and innovations. Cluster consist of 21 members.

Table 1. **Members of the National Food Cluster**

Research Institutions	Associations	SME's	Farms
LAMMC Institute for Gardening and Horticulture	Lithuanian Association of Berry Growers, Processors and Traders	JSC “Mokslo kavine”	Dairy farmer Milnora Pšibisauskiene
		JSC “Baltic food technologies”	Farm “Serksnas honey”
		JSC “Daumantai”	
		JSC “Dehidra”	
		JSC “Eideka”	
		JSC “Judex”	
		JSC “Melyne”	
		JSC “SatiMed”	
		JSC “Spila”	
		JSC “Innofoods”	
		JSC “Dangaus pupos”	
		JSC “Eco Extractum”	

Research Institutions	Associations	SME's	Farms
		JSC “Kedainiu konservu fabrikas”	
		JSC “Ruta”	
		JSC “Salprone”	
		JSC “Sulte”	
		JSC “Ekosula”	

Cluster Organisation

The National Food Cluster aims to create innovative products, services and solutions based on applied scientific research. These activities develop cooperation between scientific institutions and companies and farmers seeking new products. International cooperation is also being developed, participating in international events and projects. The National Food Cluster is a member of the Lithuanian cluster network.

Graph 1. **Structure of the National Food Cluster,** source: own elaboration

SWOT Analysis

Table 1. **SWOT,** source: own estimations

Strengths	**Weaknesses**
▪ Consolidated resources ▪ Concentrated competences ▪ Higher added value	▪ Lack of human resources ▪ Lack of finance ▪ Demand of external coordinator
Opportunities	**Threats**
PP collaboration ▪ New markets ▪ New services	▪ Ineffective management ▪ Unclear benefit for stakeholders ▪ Unclear long-term strategy

References

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3.5 Hungary

3.5.1 Pharmapolis Innovative Food Cluster

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https://innofoodcluster.hu/	PHARMAPOLIS INNOVATÍV ÉLELMISZERIPARI KLASZTER Pic. 1. **Cluster logo**

Topic and Objectives

The Pharmapolis Innovative Food Industry Cluster was established on June 6, 2008, with the aim of creating a network consisting of legal and natural persons who are founders. These members strive for maximizing the utilization of research, development, and innovation potential along the value chain of the food industry and functional foods, whether on a profit-oriented or non-profit

basis. They aim to increase added value, perform activities closely related to, or supplementary to, this industry, and set the goal of enhancing their competitiveness through synergies among them, utilization of available resources, joint communication and advocacy, as well as effective resource mobilization. Products produced by combining science and tradition, which have been clinically tested, provide the opportunity to live healthier lives, prevent diseases, and recover more easily from illnesses. The cluster recognized that by collaborating in the development of special quality foods contributing to health preservation and utilizing the opportunities for food innovation in Hungary as well as the results achieved, the efficiency of bringing new products to market can be significantly increased and export activities can be enhanced.

The Cluster provides the following services to members: the knowledge and technology transfer provided by the University of Debrecen offers a unique potential. HR and organizational development, food industry development, technology development, Market research, marketing communication, food industry plant and laboratory design, licensing, Technological design and licensing for food industry plants and catering establishments. Food industry plant audit preparation. the Cluster assists in the implementation of various food industry standards, . Operating permit, HACCP system.

Zone of Activity

The Cluster-organisation is active all over Hungary, the Cluster center is based at Debrecen University.

Cluster Management

The cluster management is a non-profit organisation. The executive director of the cluster, the board and the general assembly are responsible for the management of the organizational activities. Each member of the cluster pays an annual membership fee that covers the operation in addition to service and project incomes.

Cluster Members

Cluster members are large and medium sized enterprise and governmental agencies, operating in the food industry.

Members are: www.adalekmentesen.hu, www.agrargazdasagkft.hu, www.agricorn.hu, www.aveasvanyviz.hu, www.bwa-kft.hu, www.baranyipekseg.hu, www.babolnakaft.hu, www.biomi.hu, www.bionanoferm.ewk.hu, www.biopont.hu, www.bonitasktk.hu, www.borakft.hu, www.detkikeksz.hu, www.lizin.hu, www.dragonmax.hu, www.dunapack-packaging.com, www.egertej.hu, www.felfoldi.hu, www.fino.hu, www.glulusfreefrom.hu, www.geminitrade.hu, www.glosterkonzerv.hu, www.gof.hu, www.guttler.hu, www.hajdugabona.net, www.hungarofood.hu, www.hunniakristaly.hu, www.higienikusburkolat.hu, www.izsakiteszta.hu, www.joybyhoney.hu, www.karsol.hu, www.lachemhood.ewk.hu, www.mastergood.hu, www.talajvizsgalo.hu, www.naik.hu, www.norta.hu, www.termeszetesgumicukor.hu, www.abyhungary.hu, www.pa-comp.hu, www.parola.hu, www.pharmacoidea.eu, www.piramisital.hu, www.plasztik-tranzit.hu, www.poloskeiszorp.hu, www.vitalio.hu, www.skc.hu, www.stuhmer.hu, www.szib-ep.hu, www.tejmanufaktura.hu, www.uzemengedely.hu, www.ujchampignons.hu, https://herbasium.hu/rolunk

SWOT analysis

Table 1. **SWOT,** source: own estimation on the base of literature research and personal communication

Strengths	Weaknesses
▪ Academic Collaboration: Located in Debrecen, the cluster benefits from strong ties with local universities, providing access to research, talent, and innovation. ▪ Innovative Focus: Emphasis on innovative food technologies positions Pharmapolis as a leader in this field. ▪ Regional Expertise: Hungary, particularly Debrecen, has a rich history in pharmaceuticals and biotechnology, which can be leveraged for food technology. ▪ Government Support: Potential support from local and national government for innovative and scientific projects.	▪ Limited Market Size: Being in a city in Eastern_Hungary might limit the immediate market size and resources. ▪ Dependency on Academic Institutions: Heavy reliance on universities might limit flexibility and commercialization speed. ▪ Funding Challenges: Sustained funding can be a challenge, especially for research-intensive projects.
Opportunities	**Threats**
▪ Emerging Food Technologies: Growing interest in alternative proteins, food sustainability, and health-focused food products. ▪ EU Funding and Partnerships: Potential for EU grants and collaboration with other European clusters and companies. ▪ Global Health Trends: Increasing global focus on health and wellness, opening markets for innovative food products.	▪ Competitive Sector: High competition from other global clusters and companies in the innovative food sector. ▪ Regulatory Challenges: Food technology often faces stringent regulations which can delay product launches or increase costs. ▪ Economic Fluctuations: Economic downturns can impact funding and market demand.

References

[1] https://innofoodcluster.hu/
[2] *Personal communication*

3.6 Austria

3.6.1 Holidays on the Farm

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https://www.farmholidays.com/en

Pic.1. **Logo Holidays on the Farm**

Pic. 2. **Prechtlhof, © Urlaub am Bauernhof/Bernd Suppan,** source: www.farmholidays.com

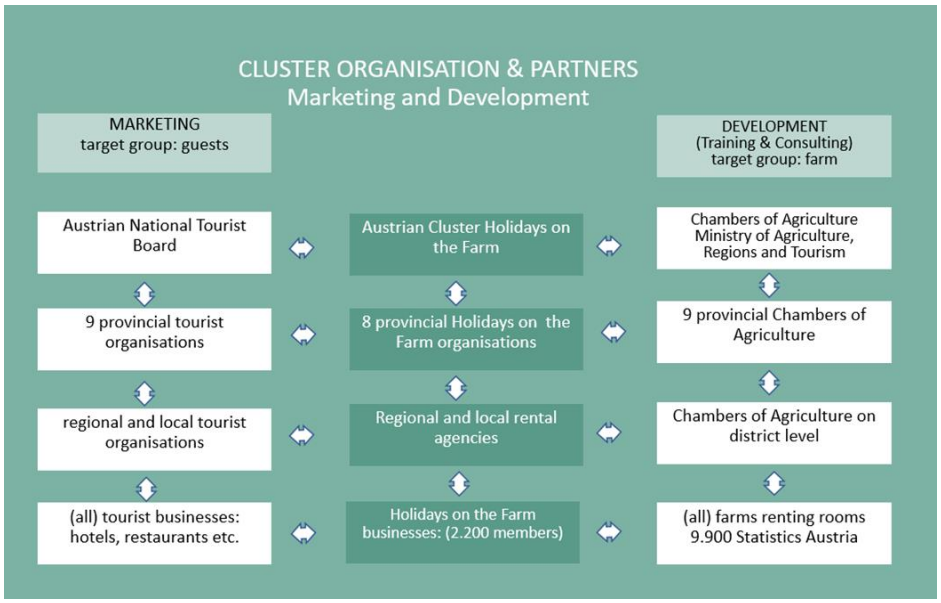
Topic and Objectives
The cluster Holidays on the Farm targets at supporting the development of diversification and additional income of agricultural family enterprises by creating agritourism and room rental. It has marketing duties (target: Tourists) and development duties (target: Farm enterprises). It provides a unique touristic offer with specific focus topics. The organisation should care for the "experience on the farm" and provides tools, services and framework conditions for farm enterprises to participate in tourism activities. It acts as information platform, consulting, quality and marketing support

Zone of Activity
The Cluster-organisation is active all over Austria with eight provincial organisations

Cluster Management
The cluster management is a non-profit and non-charitable umbrella organisation, with eight regional associations.

Cluster Members
Cluster members are family farm enterprises – covering 2.200 farms with 27.000 beds in 2019

Cluster Organisation
The federal cluster-organisation acts as umbrella organisation for 8 provincial organisations. On all levels cooperation and networking happens with tourist organisations, businesses and agricultural chambers. The financing stems from membership fees (2019 € 40, – /bed/year) and – not permanent – from rural development funds. It sums up to ~4 million Euro per year. The expenditures cover marketing, internet, social media activities (2/3) and overheads (1/3). The total added value for the Holiday on the Farm members is estimated with € 45 millions per year.



Graph 1. **Cluster organisation and network,** source: Urlaub am Bauernhof, Clusterbericht 2019

SWOT analysis
Table 1. **SWOT,** source: own estimation on the base of literature research and a cluster-manager interview

Strengths	Weaknesses
▪ Regional organisations and direct contact with members ▪ Regular knowledge and information exchange ▪ Active in using innovative tools ▪ Low membership fees ▪ Quality assessment ▪ Broad offer of services for members	▪ Cooperation with research and education organisations occasion-related not formally ensured

▪ Focus on specific current holiday themes, flexibility ▪ Networking with other regional/national/international organisations ▪ Proven additional value for members, evaluation processes	
Opportunities	**Threats**
▪ Touristic trends for regional specific offers ▪ Growing nature awareness of tourists ▪ Policy supports innovative activities ▪ Fostering personal contact between farmers and tourists and subsequently about agricultural work and life ▪	▪ Funding partly dependent of EU/national subsidies, sustainability endangered ▪ Not resilient against crisis (e.g. COVID) ▪ Legal barriers, e.g. questions of insurance payments or limitations according to national trade regulations, maximum number of beds provided within the frame of Holidays on the Farm: 10.… ▪ Competitive situations (e.g. AirBnB) ▪ Farm security requirements

References

Wiesinger, G., Egartner, S., Wagner, K. Austrian Cluster "Holidays on the Farm" (2020). Presentation at the UniClad Webinar 24.11.2020
Embacher H. at al. (2019). Cluster Bericht 2019. Salzburg

3.6.2 Food Cluster Lower Austria

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***Wagner, K.**, Federal Institute of Agricultural Economics, Rural and Mountain Research, e-mail: Klaus.wagner@bab.gv.at*

Food Cluster Lower Austria Pic.1. **Logo**	 Pic. 2. **Integrated research, © Ecoplus,** source: Example FFoQSI (ecoplus.at)

Topic and Objectives
The Food Cluster Lower Austria comprises a network for the entire supply chain in the food industry to increase innovation force and competitiveness. It provides information and acts as a contact point for the entire value chain of the food industry, from agriculture to processing companies and retail. Objectives are sustainable use of resources, food quality and safety. It supports the companies in setting up cooperation projects and helps companies navigate through the funding landscape. Cares of qualification, dissemination, marketing and internationalisation.

Zone of Activity
The Cluster-organisation acts in the province of Lower Austria – regional but is connected to wider networks.

Cluster Management
The cluster management acts in the form of an agency supported by public authorities

Cluster Members
Cluster members (2021: 118) are companies involved in agriculture, animal feed production, food processing, food retail, community catering and gastronomy, research, development and educational institutes, food processing SMEs and industries, upstream, downstream industries (machinery, packaging, detergents…).

Cluster Organisation
Responsible parties are the Economic and Agriculture Departments of the Lower Austrian provincial government. Ecoplus is responsible for the operational implementation. Activities are financed by membership fees and public money, co-financed by EU funds. Membership fees depending on the size of enterprises, from € 280,- to 1.120,- per year (2021). A Cluster team is accompanied by an advisory board, the Cluster is engaged in national and international networking with other clusters. Different formats of events are installed (Information exchange meetings, quality circles, partner days) Monitoring of activities and impacts and regularly reporting is provided.

SWOT analysis
Table 1. **SWOT, source: own estimation on the base of literature research and a cluster manager interview**

Strengths	Weaknesses
▪ Regional organisations and direct contact with members ▪ Regular knowledge and information exchange ▪ Quality assessment, international certification ▪ Broad offer of services for members	▪ Low number of agricultural enterprises as members ▪ Lack of bigger enterprises as members

▪ Networking with other regional/national/international in all relevant sectors/segments, including research and education ▪ Initiating cooperation projects ▪ Proven additional value for members, installed monitoring, evaluation processes	
Opportunities	**Threats**
▪ Growing demand on regional products ▪ Policy supports innovative activities	▪ Funding partly dependent on EU/national subsidies, sustainability endangered

References

[1]*Wiesinger, G., Egartner, S., Wagner, K. (2020). Austrian Cluster "Holidays on the Farm" (2020). Presentation at the UniClad Webinar 24.11.2020*

[2]*Ecoplus, Niederöstereichs Wirtschaftsagentur GmbH, (2021). Foodcluster of Lower Austria, partnerindex. St.Pölten*

3.7 Ukraine

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Pic.1. **"HorboHory" agrotourism cluster**, www.horbohory.com.ua https://www.facebook.com/HorboHory/?locale=ru_RU

The purpose of the cluster is to ensure sustainable development of the territory of these communities through infrastructure development, the marketing of alternative forms of rural entrepreneurship and business within the agritourism cluster.

Objectives

Support and encourage the development of alternative forms of rural entrepreneurship;
Increase the volume of local gross product,
Creating conditions for generating additional income from serving tourists and holidaymakers and selling local products to them;
Increase of budget revenues; activation of investment processes in rural communities of the cluster.

Location of cluster centre and catchment area (area of activity (regional/national/international) of participating organisations)

The HorboHory agritourism cluster was established in 2017 in the Lviv region. The HorboHory cluster is regional, with all its members operating locally in the Lviv region.

Number of participating organisations

1. Local farmers – farms: "Zahidniy Ravlyk" village Solonka, "Florina" village Sholomyn, "Agrotem" village Selysko, "Radvan Nova" village Myloshevychi, "Malynivka" village Mistka, "Kmytlyvist" Pustomyty city, "Khorosno" village Khorosno, "Harnas V.M." village Khorosno;
2. Karpatsky Vodograi LLC, city of Pustomyty.;
4. FOP (private entrepreneurship company) Rubel;
5. Lviv Regional State Administration;
6. Pustomyty District State Administration;
7. Lviv National University of Veterinary Medicine named after. S.Z. Hzhytsky;
8. Institute of Agriculture of the Carpathian Region;
9. Semenivka village council of Lviv region;
10. Pustomytiv City Council, Lviv Region.

Type and size of the managing organisation (legal status, number of employees...)
The HorboHory cluster was officially registered on 15 August 2017.

Head of the cluster: Milchevych Anton Antonovych
The head of the fund, the customer of the "HorboHory" project: Drevniak Zenovii Romanovych
General project manager: Andriy Zhidachek

Factors of success

The proximity of the cluster to the regional centre of Lviv, the availability of favourable natural and climatic, agricultural and human resources, which allow the development of the production of organic agricultural products, the provision of recreational and agritourism services, and the restoration of authentic crafts.Projects of the Horbohory cluster.

The HorboHory festival is held in the village of Khorosno in the Lviv region. Local farmers present their products, which visitors can taste and buy.

Shop on the farm

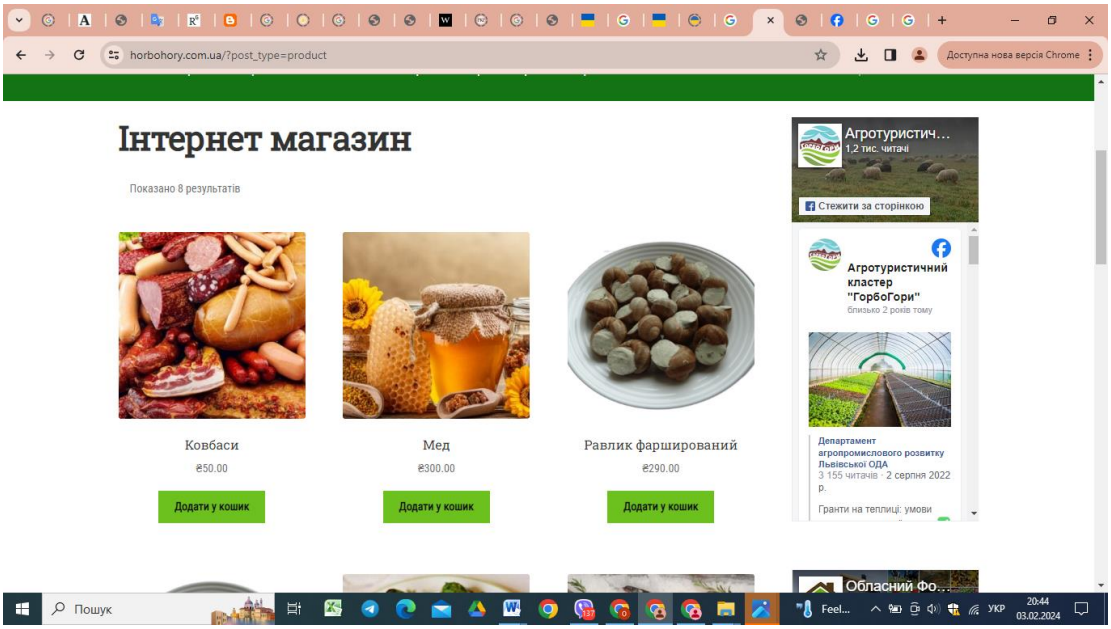
In Horbohory's own shop you can buy products from local farmers. Local producers sell a wide range of products: from the usual vegetables, milk or meat to home-made pies or snails with sauces.

The shop is located at 27 Hrushevskoho Street in Pustomyty, Lviv region

Dairy products produced by farms belonging to the cluster

Types of honey collected in the territory of the cluster

Online shop of the cluster, https://www.horbohory.com.ua/?post_type=product



The following facilities will be built on the territory of the agrotourism cluster
1. Tourist information centre in the village of Lypnyky
2. Tourist camp “Agrosadyba” in the village of Rakovets

Today 5 tourist routes have been prepared, which you can get acquainted with at the following link: https://www.horbohory.com.ua/?p=2194

Table 1. **SWOT analysis oft he agro-touristic cluster Horbohory**

Strengths	Weaknesses
▪ Favourable natural and climatic conditions and proximity of the cluster to the regional centre, Lviv; ▪ concentration of production resources for the production of organic agricultural products; ▪ favourable environmental conditions of the territory for the provision of recreational and agritourism services, restoration of authentic craftsmanship; ▪ the location of the cluster has favourable transport links with Lviv and neighbouring regional centres; ▪ involvement and cooperation with local farmers, a research institution, and a higher education institutions in the region;	▪ Small number of cluster members and insufficient representation of cluster members by type of economic activity; ▪ many architectural monuments in the territory belonging to the cluster are disrepairing; ▪ the cluster's touristic products are not very competitive; ▪ there is no reasonable marketing concept for promoting the cluster's products; ▪ the official web resources need to be improved in terms of information content; ▪ lack of information about the cluster and its products in regional tourist information resources;

▪ promotion of products from local farmers and the territory; ▪ creation of the network of stakeholders in the development of the territorial community and increasing the value of their activities; ▪ initiating projects that provide economic interest for all participants.	▪ the cluster development programme does not receive sufficient support at the regional level; ▪ additional costs for creating safe conditions for tourists along the developed routes are needed. ▪
Opportunities	**Threads**
▪ The region is located in the Carpathian region, which is in high demand for tourism services and organic products; ▪ an international transport corridor passes through the region; ▪ joint cooperation of the participants within the cluster will help to increase the efficiency of organic production and tourism services; ▪ proximity to the border with the European Union creates favourable conditions for attracting foreign tourists.	▪ Growing competition from the neighbouring regions of the Carpathian region, namely, Ivano-Frankivsk region, Zakarpattia, and Chernivtsi region; ▪ the ongoing war in the country reduces the attractiveness of the region for tourists; ▪ limited budget of the country and territorial community to support the development of clusters; ▪ lack of effective marketing measures to increase the attractiveness of the region where the cluster is located.

3.8 Moldova

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3.8.1 Pomuşoarele Moldovei

The Public Association "Berries of Moldova" is a non-profit, non-governmental, non-profit organization created by the free manifestation of the producers of berries.

https://rus.pomusoare.md/ https://www.facebook.com/pomusoareleMoldovei/ info@pomusoare.md Pic.1. **Logo**	 Pic. 2. **International exhibition INDAGRA & INDAGRA FOOD 2023 Bucharest, Romania**

Topic and Objectives

Founded in 2012, it's permanent activity is to help develop the berries sector by promoting legislative changes, organizing training for berry growers, organizing trade fairs at the "Summer Berry Fair" and participating in fairs and exhibitions.

- Supporting the sector and continuously improving the economic activities of its members in the field of fruit production and marketing;
- Promoting sectoral policies in the field of berries;
- Participation in the elaboration of the draft laws and their approval, in the elaboration of the economic programs and the decisions regarding the production and marketing of the berries;
- The representation of its members in the relations with the public, state organizations, with the bodies of the state administration.

Zone of Activity

International, locations of the cluster centre: str. Mircești 84, et. 3, of. 403 mun. Chișinău, R. Moldova

Activities

- Training sessions about modern technologies for growing, harvesting and post-harvesting of berries.
- Facilitate the exchange of good practices by organizing national and international study visits.

- Consultancy on export marketing and facilitating communication between producers and international buyers.
- Organizing and participating in fairs and exhibitions

Cluster Management

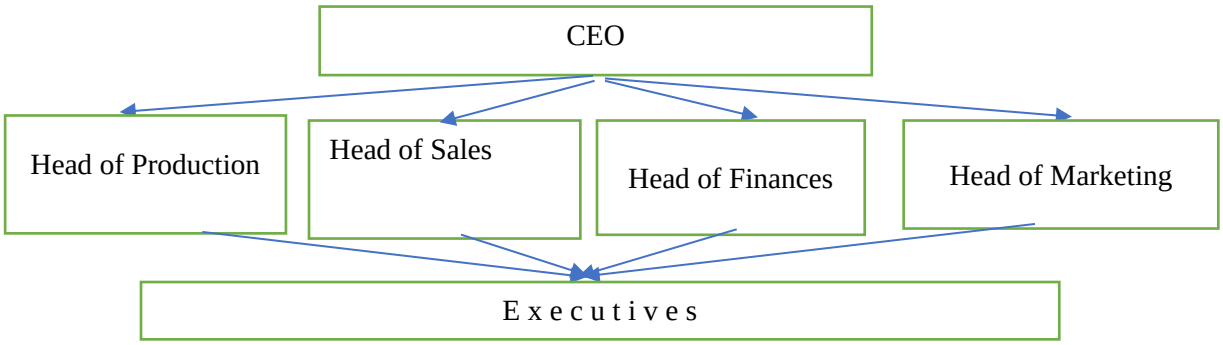
The Public Association "Berries of Moldova" is a non-profit, non-governmental organization created by the free manifestation of the producers of berries.

Cluster Members

The Cluster comprises 70 enterprises and 300 associate members

Table 1. **Cluster data**

ID NO	1012620003829
Regulations	Activa
Physical address	Str.Căpriana 4,204 Chisinău, MD2005
Legal address	Mun.Chisinau,sec.Buiucani,str.Sfatul Tări 32 10
Nr. number of employees	3



Graph 1. **Cluster Organisation**

SWOT analysis

Table 2. **SWOT,** source: own estimation

Strengths	Weaknesses
▪ Guaranteed sales market ▪ Cost reduction of acquiring needed resources (raw materials, materials, equipment) ▪ Possibility of introducing innovations ▪ Unified policy of product promotion ▪ Possibility of using preferential financial resources ▪ Product recognition	▪ Lack of a normative framework on regulation of the cluster policy main directions of the Republic of Moldova ▪ Lack of systemic information and methodological support for business entities; ▪ Low interest of enterprises in clustering due to lack of awareness of cluster's advantages

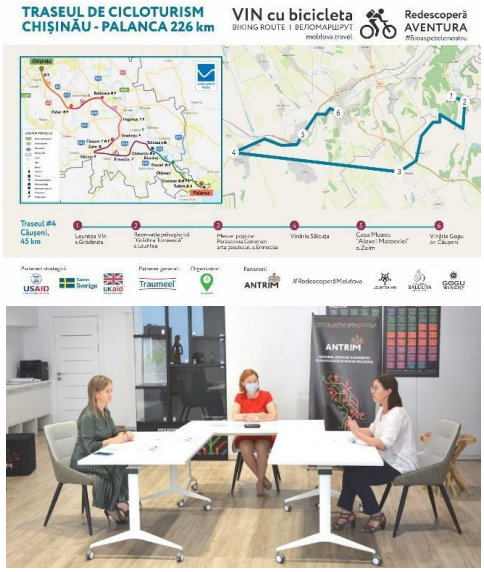
▪ Uniform quality standards for all cluster members	
Opportunities	**Threats**
▪ Political and methodological support for cluster creation and development at the national level ▪ Possibility to involve unemployed population in the production process ▪ Using single storage facilities; ▪ Closer cooperation with higher education institutions within the framework of training modern personnel for the Republic's economy	▪ Subsidy cuts ▪ Global market prices ▪ Weakening of market growth, unfavourable demographic changes ▪ Introduction of foreign competitors with low-value products ▪ Unfavourable shifts in exchange rates ▪ Environmental issues such as climate change, pollution, etc.

3.8.2 ANTRIM

Cluster title: National Inbound and Domestic Tourism Association of Moldova/ Asociația Națională pentru Turism Receptor și Intern din Moldova. The cluster is a non-profit organization representing the voice of the private sector in Moldova's inbound tourism industry, to help the country gain international recognition as a tourist destination & improve the business environment and legal framework for the sector. With the help of strategic partners ANRIM collaborate with stakeholders to create and deliver high-quality services and authentic touristic experiences by supporting traditional Moldovan values when it comes to hospitality, culture, gastronomy and quality wine production.

https://antrim.md/
https://www.facebook.com_ANTRIM
office@antrim.md

Pic.1. **Logo**



Pic. 2. **ANTRIM in partnership with EFES VITANTA MOLDOVA BREWERY SA**

Topic and Objectives

To position Moldova as a leading sustainable tourist destination, recognized for its unique cultural heritage and quality tourism services.

- Promote Moldova's image as a tourist destination
- Develop the profile and image of the Moldovan touristic services sector on the national and international market
- Increase the level of cooperation and collaboration between the business community members regarding the supply of touristic services
- Collaborate with public authorities when it comes to the business environment, legislative matters and general perspectives of the sector
- Promote the Moldovan inbound tourism locally and worldwide
- Improve all aspects of investment opportunities for entreprises in the tourism services domain

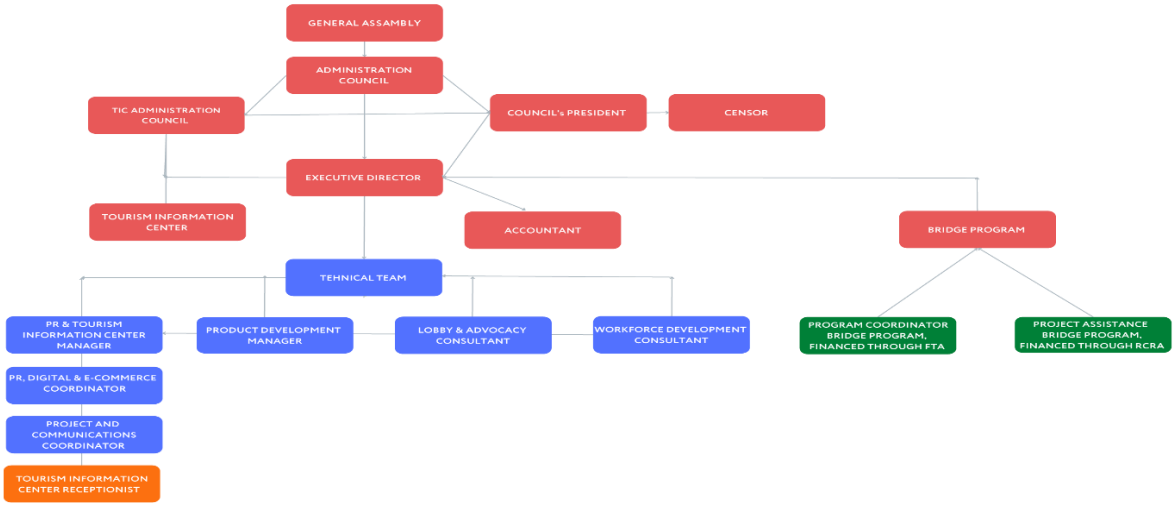
Zone of Activity

International, locations of the cluster centre: Republic of Moldova, Chișinău, bd. Ștefan cel Mare 83, MD-2012, ID NO 1014620000316.

Activities

- Familiarization Tours
- Friendly for Tourism
- The National Network of The Tourist Information Centers Of ANTRIM
- Next Tourism Generation Academy
- ANTRIM Tourism Intelligence Journal
- Moldova Tourism Start-Up Academy
- WFTGA Training
- Summer School

Cluster Organisation



Graph 1. **Cluster organisation and network,** source: https://antrim.md/ 2022

Cluster Members

The cluster comprises 13 travel agencies, 15 wineries, 9 hotels, 37 guest houses, 7 event-organizing agencies, 4 artisans, 9 soft adventure enterprises, in all 94 members

SWOT analysis

Table 1. **SWOT,** source: own estimation

Strengths	**Weaknesses**
▪ International certification; ▪ Lobby and advocacy; ▪ Favorable geographical location and transport accessibility; ▪ Regular knowledge and information exchange; ▪ Active in using innovative tools; ▪ Quality assessment; ▪ A variety of cultural, sports and additional services; ▪ Broad offer of services for members; ▪ Networking with other international organisations;	▪ Large areas of undeveloped territories for the development of a tourism cluster
Opportunities	**Threats**
▪ Growing demand for tourism services; ▪ Carrying out a more active information policy through local media (radio, television, print media); ▪ Reformation of the entire list of names of services offered in three languages; ▪ Development of events with the involvement of the administration, the public and educational institutions	▪ Macroeconomic situation; ▪ Not resilient against crisis (e.g. inflationary, investment, currency, COVID); ▪ Insufficient government support; ▪ ▪

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3.9 Azerbajan

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3.9.1 Background

Evolution of clusters in Azerbaijan has passed through different stages of development in the Republic of Azerbaijan. Associations started to evolve since 2010 with the aim to support incumbents of the same value chain as a part of Government sectoral strategy to study, communicate their issues and deal with them, intervene where necessary. Objective of their establishment was to join incumbents of the value chain under one umbrella and, to provide them with necessary support with export of their products, to raise awareness on the certain topics, to study their issues and raise to government bodies and bring the most recent innovations and changes into their operations. Membership fees are the main source of financing of their activities. Starting 2010, forward and backward expansion of big market players through their value chains went on trend. Big market players started to expand their operation through their value chain through acquisitions and new establishments.

But establishment of clusters and enabling environment for operation of clusters by studying the best practice of EU countries was in the agenda of the country since 2016 as part of their sectoral approach to SME development. The development of enabling environment and regulatory framework for establishment of clusters is prioritized in the main policy document until 2026 which is Social and Economic Development strategy of the Republic of Azerbaijan in 2022-2026. Followingly, exemplary statute and criterion for their formulation has been approved by the Government of Azerbaijan.

Criteria for formulation of clusters is shaped as SME cluster organisations aligning at least 10 micro, small and medium size business entities not being interrelated but 50% of input and raws materials of goods and products of those should come from the local producers having

membership with that cluster. Main areas of activities for SME clusters are prioritized in the following directions;

- Creation of new products not being produced in the Republic of Azerbaijan;
- Creation of products more than 50% of which is imported into the country;
- Hospitality (hotel, motel, camping, and other services) services.

Moreover, one of the criteria for the clusters are their financial capacity to invest minimum investment amount for the projects to be implemented as per the economic regions. Here minimum investment amount differs per economic regions.

3.9.2 Pomegranate Production and Export Association of Azerbaijan

The Pomegranate Production and Export Association of Azerbaijan (PPEAA) commenced its operations in November 2016. Since its commencement, the association has successfully brought together individuals and legal entities involved in pomegranate cultivation in Azerbaijan. Through meticulous record-keeping, PPEAA has effectively addressed existing challenges in the field. Additionally, the association has undertaken agrotechnical enlightenment initiatives to promote pomegranate development, gaining valuable insights through meetings and consultations with both local and international experts in the domain. Recognizing the anticipated growth in its membership over time, PPEAA has established a dedicated Supervisory Inception Commission within the association. This commission aims to proactively address any issues that may arise among existing members. Members of PPEAA are actively involved in the production of various pomegranate-derived products, including juices, syrups, wines, oil, and other seed-based items. The association envisions expanding its product range in the future. Supported by relevant state agencies, the PPEAA continues its operations with confidence. Both the management and members of the association consistently participate in significant events and actively engage in local and international business forums.

ANiiA

AZƏRBAYCAN NAR İSTEHSALÇILARI VƏ İXRACATÇILARI ASSOSİASİYASI

https://www.pomegranate.az/
https://www.facebook.com/aniia.official/
info@pomegranate.az

Pic.1. **Logo**

Pic. 2. **Exhibition stand of PPEAA in Azerbaijan International Agricultural Exhibition in Baku**

Topic and Objectives

The strategic direction Pomegranate Producers and Exporters Association of Azerbaijan (PPEAA) is guided by the pursuit of activities aligned with its overarching goals. The association's endeavors are focused on three principal objectives:

- Promoting Pomegranate Industry Growth: The PPEAA strives to foster the expansion and development of the pomegranate industry in Azerbaijan. This includes initiatives to enhance cultivation practices, improve agrotechnical methods, and encourage innovation within the sector.
- Ensuring Member Welfare and Collaboration: The association is committed to the well-being of its members, both individuals and legal entities engaged in pomegranate production. It aims to create a collaborative environment where members can share knowledge, address challenges collectively, and benefit from the synergy of a united community.
- Facilitating International Export and Recognition: The PPEAA seeks to position Azerbaijan as a key player in the global pomegranate market. This involves implementing strategies to boost international exports of pomegranate products, establishing quality standards, and enhancing the reputation of Azerbaijani pomegranates on the global stage.

To achieve its overarching goals of strengthening and expanding pomegranate production and exports in Azerbaijan, as well as ensuring the sustainable welfare of those involved in the industry, the Azerbaijan Pomegranate Producers and Exporters Association (PPEAA) provides services in the following key areas:

- Technical Assistance and Agrotechnical Support:
  - Offering guidance on best practices in pomegranate cultivation.
  - Providing technical assistance to improve crop yield and quality.
  - Conducting training programs and workshops for members to enhance agrotechnical skills.
- Market Development and Export Promotion:
  - Facilitating market access and promoting Azerbaijani pomegranate products internationally.
  - Implementing strategies to enhance the competitiveness of Azerbaijani pomegranates in the global market.
  - Providing market intelligence and trends to help members make informed export decisions.
- Quality Assurance and Standards Compliance:
  - Establishing and promoting quality standards for pomegranate products.
  - Assisting members in meeting international quality and safety standards.
  - Undertaking quality control measures to enhance the reputation of Azerbaijani pomegranates.
- Collaboration and Networking:
  - Facilitating collaboration among members for knowledge sharing and joint initiatives.
  - Organizing industry events, conferences, and forums to foster networking opportunities.

- Building partnerships with relevant stakeholders, both domestically and internationally.

- Advocacy and Representation:
  - Advocating for the interests of pomegranate producers and exporters at the national and international levels.
  - Representing the industry in discussions with government bodies and regulatory agencies.
  - Working to create a favorable policy environment that supports the growth of the pomegranate sector.
- Research and Development:
  - Investing in research initiatives to advance pomegranate cultivation techniques and product innovation.
  - Collaborating with research institutions and experts to stay at the forefront of industry developments.
  - Encouraging members to adopt sustainable and environmentally friendly practices.

By providing comprehensive services in these areas, the PPEAA aims to create a conducive environment for the sustainable growth of the pomegranate industry in Azerbaijan, benefiting both its members and the country's international standing in the market.

Zone of Activity

International, locations of the cluster centre is N.Narimanov ave 205, Baku, Azerbaijan, the zone of their activity is Goychay district of the Republic of Azerbaijan.

Graph 1. **Goychay district in the map of Azerbaijan;**
source: https://www.azerbaijans.com/content_1361_az.html

Activities

The activities of the Pomegranate Producers and Exporters Association of Azerbaijan are multifaceted and are based on comprehensive cooperation with representatives of the private sector and government agencies in Azerbaijan, as well as international organizations. Cooperation, exchange of views and experience in various areas with local and foreign partners is one of the most important factors for more effective and balanced conduct of PPEAA's activities. In addition, PPEA regularly cooperate with the media and the public to ensure the transparency and reliability of its activities.

Work in the private sector, which is one of the main components of the business environment, mainly consists of the following:

- Identify current issues through regular meetings with private sector representatives and establishment of special working groups to solve these problems and ensure their activities;
- Defining the general goals of pomegranate producers, organization of joint and individual activities on the basis of a plan covering the work to be done to achieve these goals;
- Carrying out the relevant division of responsibilities for the timely and proper conduct of work, regular assessment of the progress of work and preparation of reports on it;
- Goychay Pomegranate Festival

Situated at the heart of pomegranate production, the central Goychay Region serves as the vibrant backdrop for one of Azerbaijan's most enchanting events. The Goychay Pomegranate Festival is a joyous celebration of this wholesome and delectable fruit, recognizing its profound impact on Azerbaijani life and culture. In Azerbaijan, pomegranates hold a special status as the "king of fruits," laden with rich symbolism. Revered for their association with love and fertility, pomegranates inspire numerous songs and poems and is highly associated with values of the nation symbolizing `unity` of nation. Their distinctive form is often mirrored in carpet patterns and wall hangings, with the fruit's skin even used as a natural dye in carpet production. Beyond symbolism, pomegranates play a central role in the nation's cuisine. "Nar Sharab" made of pomegranate juice is branded as Azerbaijan product and offered to foreigners visiting the country as national product.

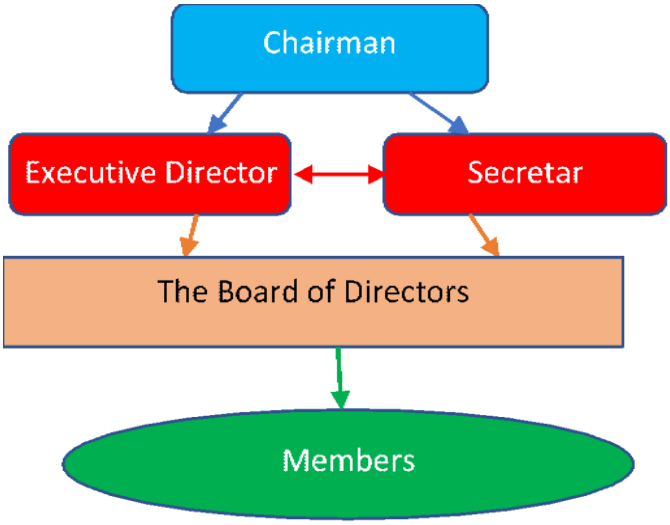
Goychay's unique microclimate and soil composition foster the growth of over 67 varieties of pomegranates. The region has gained renown as the host of the Azerbaijan Pomegranate Festival, locally known as Nar Bayrami. Since its inception in 2006, this annual event has significantly contributed to the cultural and tourist allure of Goychay. Taking place during the pomegranate season in October or November, the festival's exact date is meticulously chosen each year to coincide with the bountiful harvest, creating a festive atmosphere of joy and abundance. Given the nature`s favor in the region for cultivation of best pomegrante variety, several villages of Goychay district is branded such as `Bigir nar` and is offered as best Goychay pomegranate.

In 2020, UNESCO included the Azerbaijan Pomegranate Festival in Goychay on its Representative List of the Intangible Cultural Heritage of Humanity.

Pic. 3. **Goychay Pomegranate Festival;**
source: https://www.bbc.com/azeri/azerbaijan-37885238

Cluster Management

"Pomegranate Producers and Exporters Association of Azerbaijan" is non-governmental public association, created by producers and exporters of pomegranate.



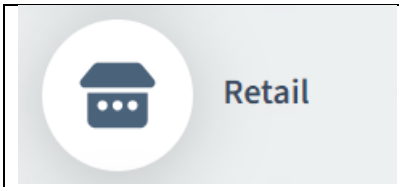
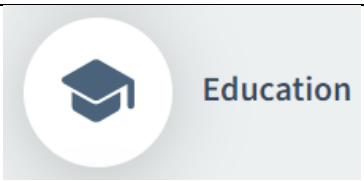
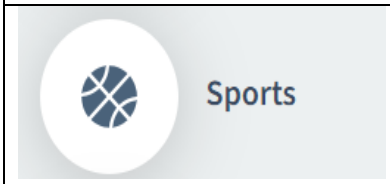
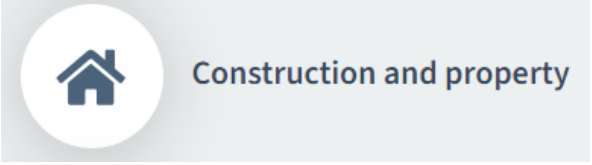
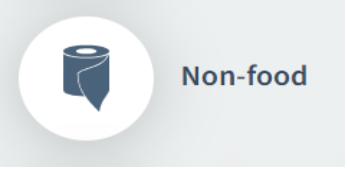
Graph 2. **Cluster Organisation**

Cluster Members

PPEAA currently has 345 members. Of these, 14 are companies, includes Originar, Azersun, Az-Granata, Gilan, Madena, AzNar, Provision Impex, Telli, Mina Shirin, Tovuz Baltia LTD, Gulustan, Kristal-Z, Sabirabad konserv, Mabat, Aladdin farmer, Fidan company and others are physical persons.

Table 1. **Activity fields of AzerSUN – one of the members of PPEA;**
source: https://azersun.com/az

Activity Fields of AZERSUN	
Agriculture	Food
▪ Compound Feed Mill ▪ Azersun Shamakhi Agropark ▪ "Azersun Agricultural Products" ▪ Gazakh canning factory ▪ ASPA Agro ▪ Zagatala Hazelnut Factory	▪ Mamam Chocolate & Bakery ▪ Gafgaz Canning Factory ▪ Shamakhi Dairy Farm ▪ Baku Food & Oil Factory ▪ "Sun Tea" Factory ▪ Azerbaijan Sugar Production Association ▪ Azerbaijan Salt Production Association

 ▪ Al Market ▪ Bazarstore	 ▪ SABISSUN ▪ Azersun Academy
 ▪ "Karabakh" Football Club	 ▪ Central Logistics Department
 ▪ Dreamland Golf Villas & Residences ▪ Park Bulvar	 ▪ Waste Paper Recycling Factory ▪ Paper Towel Factory ▪ Khirdalan Cardboard Factory ▪ Cleaning Products Factory ▪ Azerbaijan Paper and Cardboard Production Plant

SWOT analysis

Table 2. **SWOT**, source: self estimation

Strengths	Weaknesses
▪ Big export and market potential of pomegranate and pomegranate products due to high nutrition value and attractive shape with long shelf life; ▪ Attractive product as health additive and as beverage for mass; ▪ Increased quality of products for exporting ▪ Strong support by government under umbrella of "Made in Azerbaijan" brand; ▪ Support with marketing research; ▪ International certification of products ▪ Access to international exhibitions;	▪ Low capacity to transit to the SME Cluster model of operation; ▪ The main share of exports of products produced by member companies of the association falls on Russian and Ukrainian markets which are in war situation; ▪ Concentration of most of the country's pomegranate orchards in the hands of a few giant producers. ▪ Poor research and innovation capacities. ▪ Poor access international cluster networks.

▪ Dominance over the value chain and availability of strong communication channels. ▪ Strong management skills of team. ▪ Big marketing potential due to `Nar` pomegranate`s high association with nation` value and art.	
Opportunities	**Threats**
▪ The annual pomegranate festival supports the tourism potential of the region ▪ Close big international markets (Russia); ▪ Participation in research and development programs; ▪ State support and subsidies.	▪ Impact of global climate change; ▪ Currency depreciation in countries that constitute the main export market; ▪ Break in the export chain due to the war in Ukraine;

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3.10 Common key aspects

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The cluster examples show the importance of cooperation, making use of synergies, knowledge exchange and transfers – not only among similar actors but also across sectors and spatial and political boundaries. Despite all organisational, traditional and political different backgrounds among the UniClad partner countries some common key aspects are worth to mention. The basis of well-functioning clusters is a clear system of objectives and a comprehensive structure of the management. Mostly there exist a board of directors, an advisory board and a managing team.

Essential are regular information exchanges and involvement of all members. A diversity of members is of advantage – from small to large enterprises, from different production and service sectors, governmental, non-governmental organisations on different levels as well as research and educational institutes, covering all stakeholders in the chain. The members must be aware of additional values generated from cluster activities, they can range from seminars, vocational trainings, improving skills, information exchange, fostering cooperation, networking and innovation opportunities. Quality assurance and certification activities can help in trust building and keep the activities sustainable.

Member fees are common for financing the cluster activities. Often public support is necessary and given and additional money is earned via policy programs or projects. The possibilities for participation in them should be constantly monitored. The cluster activities of course concentrate on a certain territory but networking should go beyond this to gain broader knowledge and chances and to react to external factors may they be opportunities or threats. Therefore, umbrella organisations on national and EU level make sense for widening the horizon.

Chapter 4. How to create a cluster

4.1. Economic preconditions for the creation of cluster

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Currently, two priority areas can be identified for solving the main tasks in the field of agro-industrial complex (AIC): measures to introduce modern developments and technologies into the production process, organizational measures to ensure and allocate resources.

The current stage of economic development is characterized by the active formation of clusters in the innovative, technological and production sectors of the domestic economy. The creation of clusters is initiated by decisions of state structures at the federal and regional levels, as evidenced by the variety of programs and strategies for cluster development of territories. The main targets of these documents are to ensure sustainable economic growth and increase the competitiveness of the region's economy by promoting the formation and development of regional clusters. Accordingly, clusters are assigned multidimensional tasks: innovative modernization of production; activation of business investment activity; development of entrepreneurial infrastructure; formation of human capital; creation of new jobs; improvement of living standards in the region.

Along with the improvement of technologies in the agro-industrial complex at the level of the production process, it is necessary to use systematic approaches to the end-to-end management of agricultural resources in the regions and the country as a whole. Practice shows that the point impact and selective promotion of only a part of enterprises in the field of agriculture does not give global positive changes, and therefore it becomes logical to create and develop mechanisms and algorithms for managing agriculture at the cluster level.

The concept of “cluster” is a complex concept that researchers often study in fragments, as evidenced by the variety of definitions of this term.

Having analyzed modern points of view on the essence of the concept of “cluster”, they can be conditionally divided into three groups reflecting a certain dominant factor in the creation of a cluster (Fig.1).

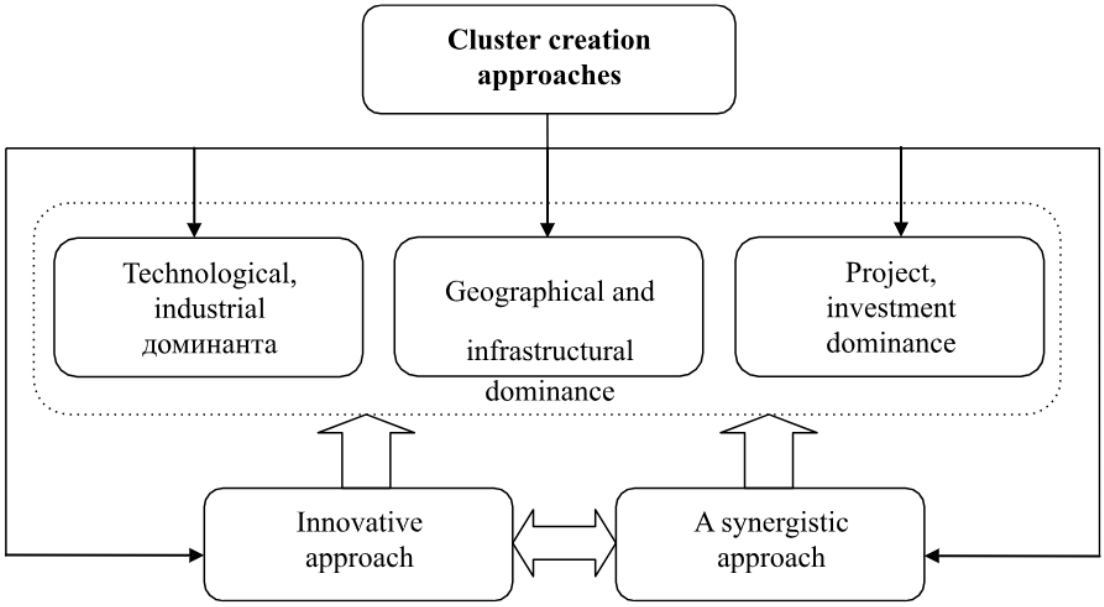

Fig. 1. **Approaches to identifying the dominant factor of cluster creation**

There are various approaches to classifying clusters, while using a fairly wide range of characteristics according to which enterprises are grouped into homogeneous groups (clusters). Clusters of enterprises are most often classified according to such parameters as: geographical location, availability of capital, proximity of suppliers, state of competitiveness, access to specialized services, development of labor potential, availability of specialized educational institutions and research organizations, industry affiliation, etc.

There are various approaches to the principles of cluster formation in the scientific literature. Currently, seven main approaches are described, which are found in practice and represent a combination of various factors, on which, in turn, the choice of a particular cluster strategy is based.

Let's briefly list these models:
The geographical model assumes the construction of spatial clusters of economic activity of various scales, from purely local (for example, gardening in the Netherlands) to truly global (aerospace cluster).

The horizontal model is used to describe cases where several industries are part of a larger cluster.
Vertical model: enterprises of adjacent stages of the production process can be present in clusters. At the same time, it is important which of the network participants is the initiator and the ultimate executor of innovations within the cluster.
The literal model: different sectors are combined into a cluster, which can provide economies of scale, which leads to new combinations (for example, a multimedia cluster).

Technological model: describes a set of enterprises in various industries using the same technology (for example, a biotechnological cluster).

Focus model: a cluster of firms centered around a single center – an enterprise, research institute or training center and consumers of knowledge and innovation[3].

Qualitative model: characterizes in qualitative categories the presence and ways of interaction of firms within the cluster. For her, it is important not only whether firms really cooperate, but also how they do it[2].

Clusters can vary in size, breadth of coverage, and level of development, depending on industries. The nature of industries allows you to change the boundaries of clusters due to the emergence of new industries or firms, as well as as a result of development or changes in business conditions. It should be noted that clusters occur within both developed and developing countries. The difference will be the presence of specialized supplier bases in more developed industrial clusters, the most extensive array of related industries, and deeper connections with consumers[1].

Currently, the formation of industrial clusters should be based on a set of methods. The main ones are:

Analytical method: the study of data on the territory, its natural, labor and financial resources of productive forces.

The method of indicative planning of competitiveness: quantitative and qualitative analyses, existing and determination of prospective competitiveness.

Modeling method: the study of cluster objects by building and studying models of real-life organizations, processes or phenomena.

Input-output method: a study of the circulation of goods and services between industries and other sectors of the economy.

In practice, the formation of industrial clusters, these methods are used in combination, since taken separately they do not reflect the objective economic situation. The analytical method displays the market situation at a specific time (data on enterprises, their productivity, number of employees, etc.). The method of indicative planning is to determine economic priorities. The indicative plan is of a recommendatory nature. The main advantages of indicative planning are the reduction of uncertainty in decision–making. The modeling method is a method that allows you to build models that describe processes as they would actually take place. This method allows you to avoid any mistakes in the future. The input-output method examines data on the circulation of goods based on a set of economic indicators (production capacity, labor productivity growth, output volume, etc.).

In the context of the transition of countries to the path of innovative development, the cluster form of economic organization allows to reduce production costs. Cluster associations of enterprises create conditions in which not many business entities are more competitive together than separately. The main thing that the activity of the industrial cluster is focused on is the opportunity to develop not by inertia, but by innovation. This approach creates the necessary prerequisites for increasing the competitiveness of products when creating a so-called "cumulative innovative product" and, as a result, increasing the level of production and economic activity of each member of the cluster in order to make a profit.

At the present stage of development, cluster theory should be considered as the most adequate to the requirements of regional industrial policy, which allows for stable economic growth and increased competitiveness at all levels of management.

The need for sustainable development of the regions, increasing the social and economic parameters of the development of territorial management systems require taking into account the interests and ensuring consistency of the operating conditions of industry companies that form the potential of the region and largely determine socio-political stability. In the context of local government reform, the interaction of the state, business and various institutional structures as the three most important subjects of economic policy in the territory, as well as the interaction of various companies among themselves, is of fundamental importance. The same effective cooperation is achieved within the framework of industrial clusters.

The cluster approach has developed into an important tool for the formation and implementation of municipal economic policy. One of the ways to improve the efficiency of investment processes in an industrial cluster is to regulate its development by the authorities. The most promising direction of the organization of economic processes in an industrial cluster in a large city is an investment partnership, manifested in the interaction of government authorities, enterprises forming a cluster, and financial structures. Only in this case it is possible to obtain additional benefits that the cluster provides.

Investment partnerships can enhance the competitive advantages of industrial cluster enterprises not only through technological innovations, but also through new regulatory methods based on an integrated approach to the development of these clusters.
The efficiency of the functioning of business entities and industrial complexes based on the cluster approach allows us to determine their economic potential and competitive advantages. In conditions of limited resources, the possibility of obtaining the greatest effect is determined by the concentration of financial and economic resources in a cluster that unites not only business entities, but also the regional economy as a whole. All clusters offer opportunities to increase productivity and support wage growth, even those that do not compete with companies in other regions. Each cluster not only contributes directly to productivity at the national level, but can also influence the performance of other clusters. The cluster approach as a way to achieve competitive advantages allows optimizing the interests of the territory and individual business entities. This advantage of the cluster is achieved by the relative independence of the participants of the association and the emergence of competition among the participants of the cluster itself. To the cluster for the

purposes of financial, innovative, consulting, scientific, technological, engineering and other components include relevant organizations, enterprises, companies and institutions, both as manufacturers and as suppliers of goods and services. Thus, the purposeful activity of the cluster participants is aimed at producing the final products that are best produced by this particular cluster, which is ensured by the internal interaction of the participants and their access to the external environment.

An important effect of cluster development is the stimulation of innovation activity (the cluster is innovation–oriented), which is a strategic direction of the modern economy, and this, in turn, provides economic entities with additional competitive advantages.

The impetus for the development of clusterization of the economy was the work of M. Porter: on industrial clusters, then on regional clusters, where he describes in detail the close relationship between cluster partnership and the competitiveness of firms and industries. According to M. Porter's theory, a cluster is a group of geographically adjacent interconnected companies (suppliers, manufacturers, etc.) and related organizations (educational institutions, government agencies, infrastructure companies) operating in a certain area and mutually complementary.

Porter believes that clusters are associations of firms in various industries that are able to effectively use internal resources. Clusters, on the one hand, are identical to established concepts (for example, domestic territorial production complexes) and, on the other hand, this is a new, universal theory, applying which to any type of economic tasks it is possible to prevent the occurrence of economic problems and thereby minimize risks.

Why should the economy be viewed through the prism of clusters, rather than through a more traditional grouping of companies, industries, or sectors, such as in manufacturing or service? First of all, due to the fact that clusters are better aligned with the very nature of competition and the sources of achieving competitive advantages. Clusters better than industries cover important connections, complementarities between industries, dissemination of technology, skills, information, marketing, and awareness of customer requirements by firm and industry.

Such connections turn out to be fundamental in competition, in increasing productivity and, in particular, in determining the directions and places of organizing a new business and introducing innovations. Most of the cluster members do not compete directly with each other, they just serve different segments of the industry. However, they have many common needs and capabilities, and they encounter many common limitations and obstacles to improving productivity. Considering a group of companies and organizations as a cluster allows us to identify favorable opportunities for coordinating actions and mutual improvement in the field of common interests without threatening competition or limiting the intensity of competition. The cluster provides an opportunity for constructive and effective dialogue between related companies and their suppliers, with the government, as well as other institutions. Public and private investments aimed at improving the cluster's operating conditions benefit several firms at once.

It is advisable to understand a cluster as a stable set of economic entities producing specialized competitive products. However, the concepts of cluster and industry do not coincide. A cluster is a localized component of an industry that is geographically limited. The cluster is characterized by concentration ("increasing the scale of production of homogeneous products within the framework of industrial and economic complexes") and cooperation ("production relations of associations and enterprises for the production of products") of production. This is how the cluster differs from the unsystematic, mechanical complexity of enterprises within the region. The cluster is focused on the production of a comparatively narrow range of specialized products and includes industrial enterprises as a basis. This point of view makes it possible to identify really significant elements and relationships in the cluster, excluding random and insignificant segments.

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4.2 Cluster organization: creation procedure, typical documentation, bureaucratic issues

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A cluster cannot be artificially created, there always must be natural prerequisites for a cluster formation – a geographical concentration of enterprises and organizations based on joint smart specialization in a certain area (30-40 km). If the cluster is created artificially, then it is most likely some other form of union – association of consortium. Many successful clusters work without formalization, that is, there is no single governing body and organizational structure. However, there might be an opportunity to organize cluster economic activity in a legal way. Usually, the

initiative to formalize a cooperation between organizations on the regional level (create a cluster initiative) comes from local business, but it can also come from government institutions, which should also must be supported by business.

Creation procedure

Clusters are not permanent entities; they go through the same life cycles as all other enterprises or organizations. According to I.F. Williams methodology, the process of creating a cluster involves the following phases:

- Phase 1 Initiation;
- Phase 2 Market assessment;
- Phase 3 Cluster formalization.

Phase 1 Initiation

A group of visionaries, who are representing local businesses or government institutions and understand an idea and benefits of cluster union, take the initiative to create a cluster. A group of initiative people is called Ignition Team. The Ignition Team conducts negotiations with key cluster stakeholders to interest them in cluster participation The Ignition Team conduct the idea of creating a cluster presentation, explain the advantages and opportunities that the cluster provides to all stakeholders – businesses and organizations, state and educational institutions, civil society and the environment. In order to create new business connections in the region, the Ignition Team holds individual meetings with influential leaders of companies, chambers of commerce, associations, educational and research institutions, training canters, business incubators, techno-parks, financial institutions, business angels, service and logistics companies, public unions and public organizations, regional mass media, and also holds meetings with city mayors and political figures. The Ignition Team organizes a gathering of all key regional stakeholders – the first public meeting, which is called Constitutional Meeting and invites stakeholders' representatives to a joint discussion. The purpose of Constitutional Meeting is to agree on a common understanding of the future cooperation advantages and difficulties, to discuss the form of public support and certain commitments. The Constitutional Meeting participants discuss the rationale of future cluster specialization and activities, provide and discuss examples of successful international clusters, elect Cluster Manager and main idea of cluster creation, also they are looking for possible sponsor or sponsors through meeting participants who can provide financial support to the cluster during first two to three years. The public announcement of cluster initiative establishment is the main result of Constitutional Meeting. The first phase should last one month or one and a half months.

Phase 2 Market assessment

The Ignition Team and the Cluster Manager conduct market research to justify the idea of cluster creation, namely:

- Statistics of existing regional clusters;
- Information regarding new regional cluster initiatives emerging;
- Regional economic development history. They should search for unique historical objects and cultural heritage (museums, parks) and bearers of unique abilities and crafts, etc;

- Core strategy of the region's economic development: available assets (natural resources, production facilities) and strengths of the region (scientific base and human potential, geographical location);
- Available export markets with high growth potential;
- Cluster's geographical boundaries determination (usually 30-40 km);
- Determine the cluster's competences boundaries – from general to specific, from regional specialization to smart specialization of the cluster;

At this stage, the Cluster Manager holds individual meetings with main stakeholder leaders, and the Ignition Team interviews experts who involved in other cluster initiative realization.

According to the results of the conducted market assessment, the Ignition Team and the Cluster Manager prepare a report of up to 10 pages, which includes:

- Historical prerequisites for the creation of the cluster (specialization, culture and potential of the region);
- Market conditions (unsatisfied demand, potential for supply development);
- Smart specialization (as a basis for the development of cluster products and services).

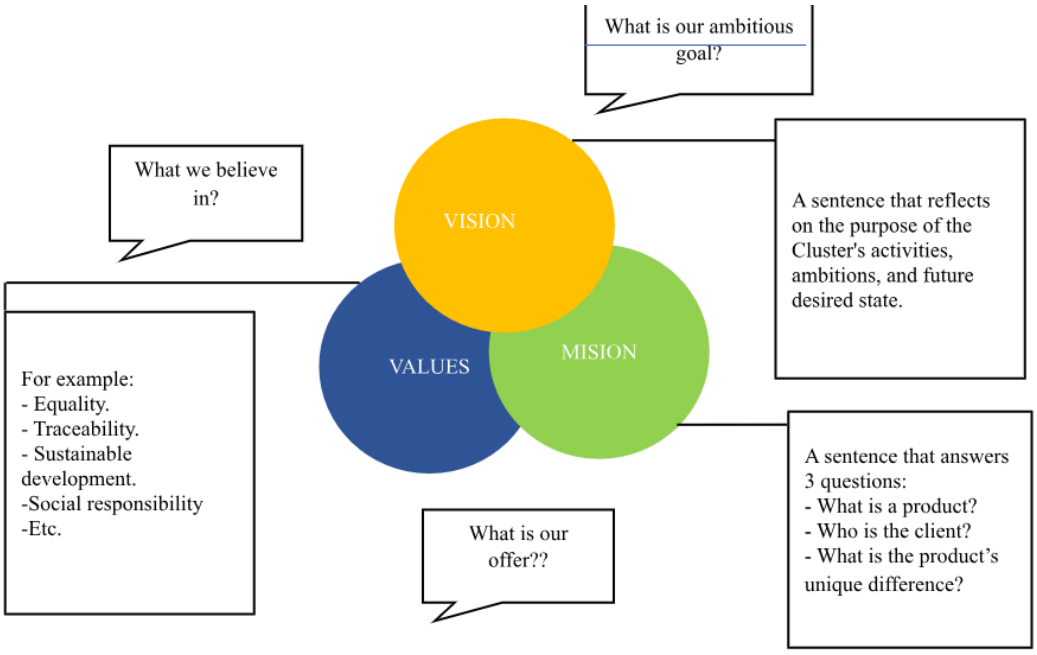
Phase 3 Cluster formalization

At this stage, the Ignition Team and the Cluster Manager organize and conduct a strategic session, the participants of which are representatives of the main stakeholder companies of the cluster.

The result of the strategic session is a business plan that includes:

- History of cluster creation;
- Market situation;
- Smart specialization;
- Strategic idea: vision, mission, goals and values of the cluster;
- Ecosystem: main stakeholders, their roles and connections between stakeholders;
- Cluster products and services;
- R&D;
- Financial model;
- Milestones;
- KPI's.

After the Founding Meeting / Constituent Assembly is held and the Cluster Business Plan developed and agreed with all main stakeholders, the Cluster Charter might be developed on the Business Plan basis. During the Founding Meeting / Constituent Assembly the Cluster Manager (or other person) might be approved as the Cluster Executive Director (or other TOP-managing position), also the highest governing body might be elected, for example, the Supervisory Board. The highest governing body members are usually representing main cluster stakeholders. Based on the Minutes of the Founding Meeting / Constituent Assembly, the Cluster Executive Director organizes the process of the Cluster state registration as a legal entity. After the process of the state registration is over, the Cluster Executive Director and other cluster's team members might be officially hired and start cluster's economic activity.



Graph 1.**The Cluster Strategic Idea**

The main bureaucratic challenges related to the establishment of a cluster are the selection of the appropriate status, compliance with legal acts, specifics of legal acts, selection of management forms and statutes, permits, licenses to conduct scientific research, other compliances to create and sell goods and services.

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4.3 Financing of cluster

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The financial model of the cluster is determined by the specifics of the cluster organization as a form of association and cooperation of enterprises and organizations on a win-win basis. The main differences between a cluster organization and a cooperative, consortium, or other business association are the smart specialization of the region and the research component of the cluster, which affect the ability to jointly produce added value and, as a result, the ability to generate cash flow. The smart specialization of a cluster is an objective factor determined by the historical, cultural and economic traditions of the region where the cluster is located and operates. Instead, the research potential of the cluster depends on the capabilities and potentials of the entities that form the cluster organization.

The financial model of a cluster organization is conditioned by many external and internal factors that have a certain impact on the formation of the model, in particular, such factors may include:

- organizational and legal form of the cluster organization: public association, cooperative, partnership, etc;
- the purpose of the cluster's activities: education, commercialization of research results, stimulation of innovative development of the region, promotion of regional products, association of local producers in order to gain competitive advantages and enter international markets, etc;
- scale of activity: local, regional, international cluster;
- number and composition of participants: government institutions, public and private organizations, citizens' associations, associations, educational institutions, research organizations, research and innovation parks, enterprises, households, media, consulting companies and individual experts, financial and credit institutions, etc;
- type of product/service produced/provided by the cluster organization: trainings, seminars, textbooks, catalogs, patents, consulting, business consulting, branding and marketing services, promotion at the local and international levels, joint commercial activities of cluster members, etc;
- region and geographical location: belonging to a certain region allows you to use the local brand for commercial purposes, location in border regions provides access to international markets, etc;
- the legal regulation of the country and the region affects the financial model of the cluster, as it must take into account taxes and fees, the specifics of doing business in the chosen legal form, etc;
- availability of external funding is an important factor, since according to research by M. Porter and other researchers, in the first 2 years of its existence, a cluster organization is funded by donor funds, while the financial model of a mature cluster organization is transformed depending on the available sources of funding.

The combination of the above factors directly affects the formation of the cluster organization's sources of income, which can be differentiated depending on the purpose and specifics of the activity, in particular

1. grants from national and international donor organizations and foundations;
2. membership fees from members of the cluster organization;
3. income from the sale of products/services of the cluster organization;
4. other income.

1. Grants from national and international donor organizations and foundations: Various local and international organizations that aim to promote cluster development provide assistance to cluster organizations in the form of subventions or grants in the first years of their activities or to support research and innovation activities. There are platforms for communication of cluster initiatives, where information on funding can also be found, for example, EU4Business - European Cluster Collaboration Platform (https://eu4business.org.ua/), or European Cluster Collaboration Platform (https://clustercollaboration.eu/). An example of an organization that supports cluster initiatives is the European Foundation for Cluster Excellence (https://www.clusterexcellence.org/), which specializes in the development and support of clusters in Europe, with the main goal of promoting the efficiency, innovation and competitiveness of clusters in different sectors and regions.

2. Membership fees from the members of the cluster organization:

- fixed;
- % of income.

As a rule, cluster organization members agree on the amount and frequency of contributions during the constituent assembly and record this agreement in the organization's Charter. According to the agreement, the members of the cluster organization pay membership fees in the form of a fixed payment or a percentage of income. The amount of contributions is set by each organization separately, depending on the type of legal form and the scale of the cluster's activities. The amount of contributions may vary depending on the role of the member in the cluster organization and depending on the type of organization, for example, a cluster member research institution may be exempt from paying a monetary membership fee, but its employees may perform certain types of work or provide certain services to cluster members. Another example is when commercial organizations (enterprises) of different sizes participate in the cluster, where each member of the cluster organization pays a certain percentage of the income, which can also be fixed in the agreement between the cluster members.

3. Revenues from the sale of products/services of a cluster organization are generated by cluster members in cooperation, they differ depending on the purpose of the cluster and the industry to which it belongs, for example, European agri-food clusters have the following sources of income:

- sales of cluster products (provided that cluster members conduct joint production activities or jointly sell products under an umbrella brand);
- providing consulting services to both cluster initiative participants and external stakeholders;

- development, organization and conduct of seminars and trainings, conferences, both scientific and practical;
- outsourcing project management services: this service is common in European clusters and can be provided to both members of the cluster organization and external stakeholders;
- income from participation in research and development (R&D) projects.

4. Other income: organizations can be funded by local scientific institutions or local authorities to stimulate innovative development of the region, promote regional products, promote the investment attractiveness of the region, etc. For example, the University of Natural Sciences in Poznan (Poland) is a member of the Leszczyński Smaki cluster. The cluster acts as a regional networking platform that brings together key market participants, acts as a business facilitator, and can also provide project management services to cluster members, among the main tasks of the cluster are:

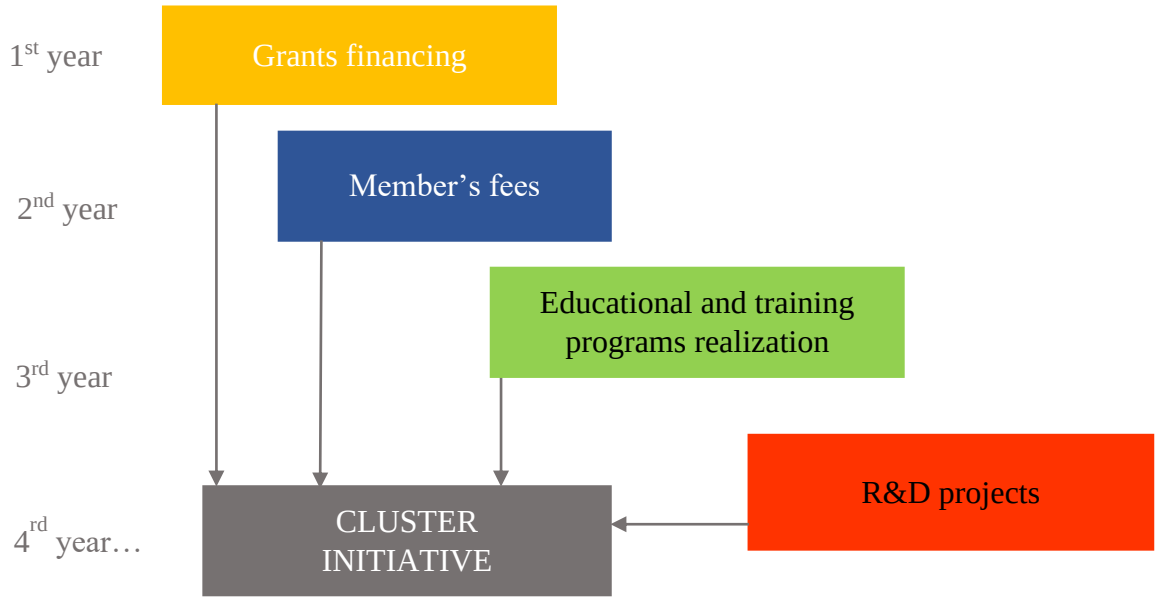
- knowledge transfer;
- development of an entrepreneurial culture in the region;
- dissemination of innovations.

The University of Valladolid (Spain) is one of the initiators of cluster organizations in the region, whose main goal is to promote the region and its products. The University of Valladolid takes an active role in research projects, provides its production and research facilities for use by members of cluster associations such as CARTIF, VITARIS, and the University of Valladolid Scientific Park. The purpose of cluster organizations is to accumulate knowledge, develop innovative solutions, and transfer knowledge and technologies to organizations and enterprises.
The University of Valladolid Scientific Park has its own projects independent of the university, can act as an outsourced R&D department, and the main areas of work of such an innovation cluster and, accordingly, the sources of income of the cluster are:

- development of prototypes (products, inventions);
- development of methods and technologies;
- development of business models and strategic sessions.

The income of a cluster organization may have a different percentage of income sources, depending on the type and purpose of the cluster's activities. The studied cluster organizations in Spain, Italy, Austria, Hungary, and Poland have different financial models. In a generalized way, the financial model of a cluster can be depicted as a sequential diagram, as shown in Graph 1.

According to research conducted within the framework of the UniClaD project among the clusters of Austria, Hungary, Poland, Italy and Spain, the type of activity related to development and research (research and development activities), innovative activity generates the largest % of income in the structure of financial cluster organization flow. However, such activity requires significant investments, both in production facilities – premises, laboratory equipment, and in human potential. Therefore, most often, clusters include scientific research institutions and centers of expertise, or closely cooperate with them.



Graph 1. **The Cluster Financial Model**

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4.4 Support by local authorities and by the State

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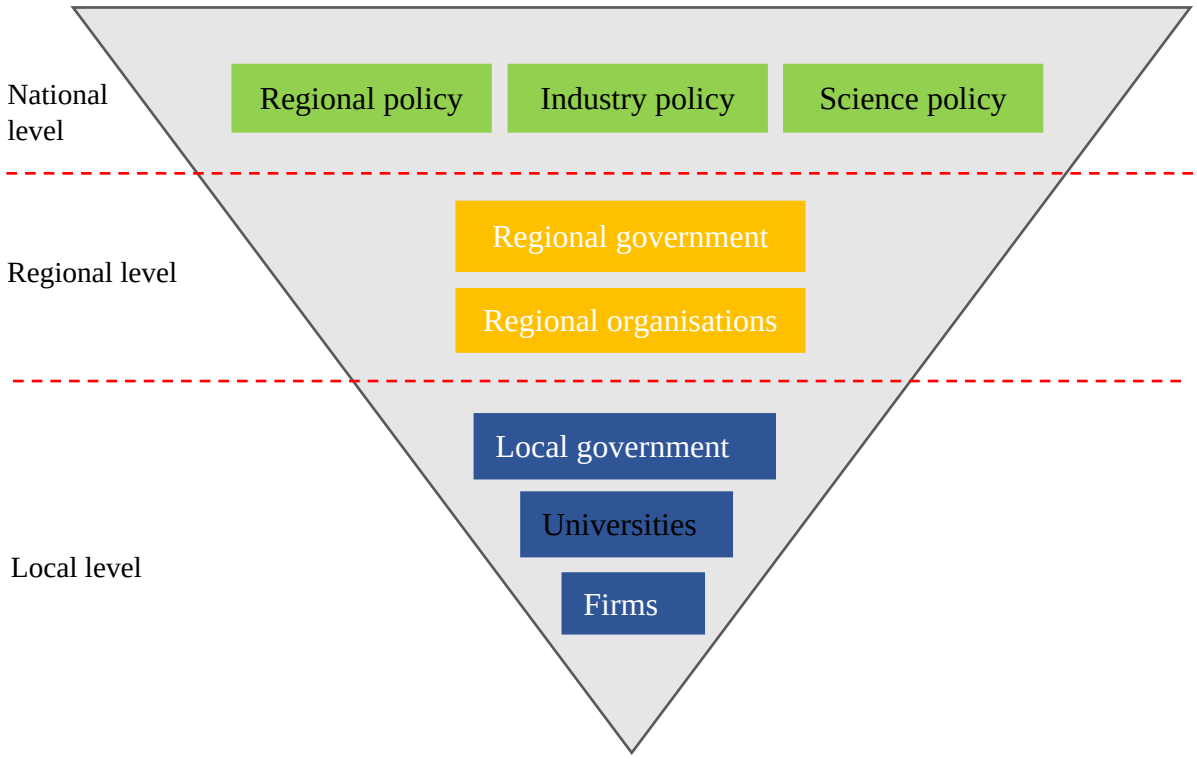
Cluster initiatives in the modern economy are a factor of growth and competitiveness. Cluster initiatives are most common in developed economies that emphasize the promotion of science and

innovation. Each cluster initiative is unique, and its features are shaped by the degree of development of the country in which it emerges.

The initiative to create a cluster can come from companies and institutions operating in a particular region, as well as from municipal or national authorities. According to researchers of cluster initiatives Ö. Sölvell, G. Lindqvist and Ch. Ketels, various institutions and organizations can be involved in the creation of cluster initiatives at the national, regional and local levels, which are schematically depicted in pic. 1.



Pic. 1. **Actors involved in the creation of cluster initiatives at the national, regional and local level by Ö. Sölvell**

Cluster policy is a central point of regional and local policy for many governments around the world. Regional and local cluster policy is based on the assumption that the market is a self-regulating system and that cluster initiatives are based on cooperation and interaction between different market actors. The cooperation of cluster initiative participants is strategic in nature, and its goal is to produce new value.

According to Brodzicki, Szultka, Tamowicz, cluster policy can follow four main models [Brodzicki, Szultka, Tamowicz, p. 16-17]:
Model 1: creation of competitive advantages in key sectors of the economy;
Model 2: increasing the competitiveness of small and medium-sized enterprises;

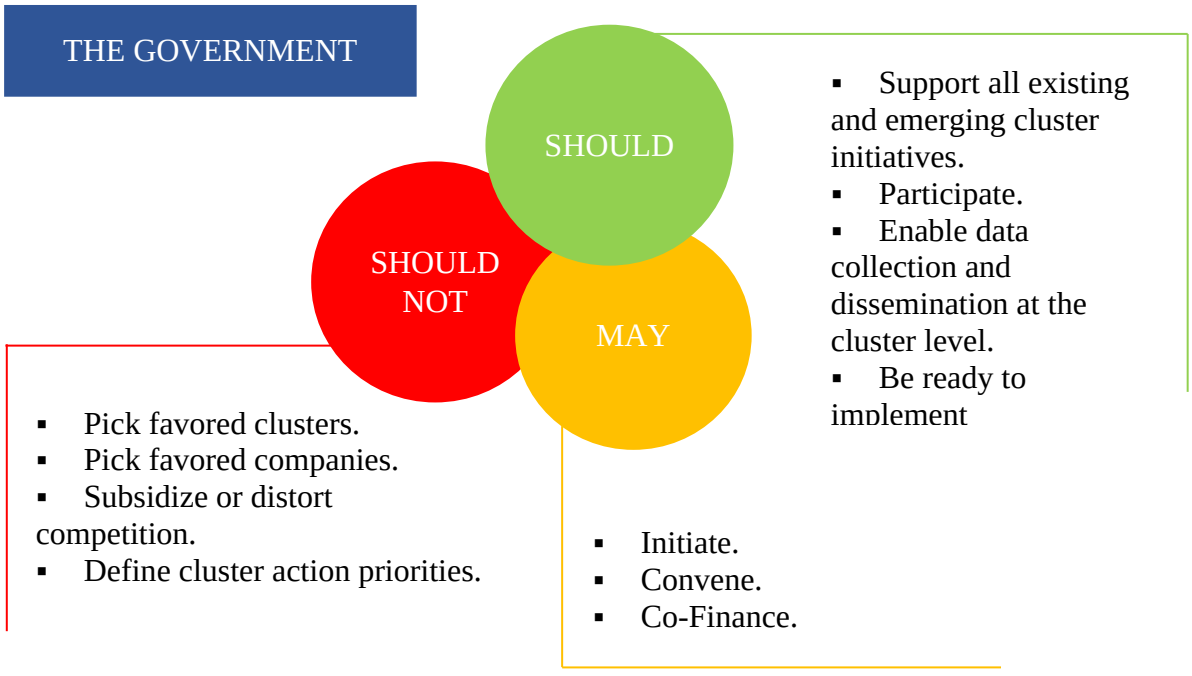
Model 3: increasing the competitiveness and investment attractiveness of the region as a whole; Model 4: innovation and political tasks and consists in bringing science, research and industry closer together.

Cluster policy has many instruments that can support cluster development:

- improving the overall business environment in the region, e.g., reviewing tax policy;
- investing in new technologies, financial and institutional support for IT and R&D centers;
- providing economic data collection and processing services, such as market research on trends, market capacity, and data on potential customers and competitors;
- providing basic infrastructure;
- developing the education sector and providing specialized training for clusters;
- promoting networking and the formation of new links between enterprises [Enright, p. 16-17].

Ch. Ketels believes that the main mission of regional cluster policy is to support the establishment and ongoing operation of a cluster. This mission indicates three aspects of the political influence of regional authorities on the activities of cluster initiatives, which are schematically depicted in pic. 2:

- actions that local authorities should take;
- actions that local authorities could take;
- actions that local authorities should not take.



Pic. 2. **The government's role in cluster initiatives by Ch. Ketels**

Practical experience shows that there is no single model of cluster policy, and each country adapts it to its own needs, economic potential, political environment, and social development. Cluster support programs are a key element of the economic policy of developed countries that have recognized the impact of clusters in stimulating innovation and economic development of regions, they bring together businesses, researchers and communities to jointly overcome challenges and create conditions for successful development. In particular, the experience of the Netherlands is known for its integrated system of support for agroclusters, where the state actively cooperates with communities and enterprises, providing financial support and creating conditions for the introduction of the latest technologies in agriculture. In Sweden, the emphasis is on creating a favorable legislative environment for the development of agribusiness clusters, including improving land laws, simplifying licensing procedures, and creating incentives for agricultural enterprises.

Studies of European clusters in Poland, Hungary, Spain, Italy, and Austria as part of the UniClaD project and analysis of the works of well-known contemporary cluster researchers M. Porter, Enright, I. Ffowkes-Williams, and others show that the process of interaction between the cluster initiative group and local government representatives usually includes the following stages:
1. holding a strategic session and formulating the goals of the future cluster: before starting work on a cluster initiative, the community and local authorities define the strategic goals they want to achieve; this process may include creating new jobs, increasing the competitiveness of the region, developing innovations, and supporting small and medium-sized enterprises, etc;
2. analysis of potential sectors of the local economy that have an impact on cluster development: based on an analysis of economic potential, availability of resources and expertise in the region; this stage involves partnerships between communities, research institutions, enterprises and government agencies;
3. resource mobilization: Local communities contribute to resource mobilization, including financial support from businesses, grants from the state, and active participation in planning and strategy development processes; the state also provides financial support and a regulatory framework for creating a sustainable cluster;
4. infrastructure development: cluster creation involves the development of infrastructure that supports the activities of enterprises in the selected sector, which may include the creation of innovation centers, research laboratories, and business incubators, etc;
5. training and development of a highly skilled workforce is an important part of supporting clusters; the state and communities are investing in educational programs and training aimed at the needs of a particular cluster;
6. encouraging innovation: the government stimulates research and development, and communities facilitate the exchange of ideas and collaboration between businesses;
7. community engagement: open dialogues, community participation, and ensuring the involvement of all stakeholders play an important role in creating successful clusters, etc.

The basis of support for European clusters is a comprehensive approach that takes into account the interests of all stakeholders, from local communities to government agencies. One of the key elements is the active involvement of the state in creating a favorable environment for cluster development, including tax incentives, financial support, training and workforce development.

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4.5. Transfer of innovations within cluster

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In the context of the formation of a new economic system functioning within the framework of the information society, increasing attention is being paid to the issue of cluster formation.

World experience shows the high effectiveness of the cluster approach to modernizing the economy in order to increase its competitiveness. In a broad sense, the cluster approach assumes that each industry cannot be considered separately from the rest. The formation of the basic industry serves as an impetus for the development of supplier and consumer industries, as well as service segments, forming a "cluster of economic activity".

The degree of innovation of the cluster should, in our opinion, be expressed in qualitative and quantitative characteristics reflecting the degree of integration into the cluster of centers for the generation of scientific knowledge, centers for the generation of business ideas, centers for the training of highly qualified specialists; the share of innovative and knowledge-intensive products in the total volume of production and characteristics of the markets for these products.

Generally speaking, about the innovation cluster, it should be noted that innovation is not a separate phenomenon. The emergence of innovation depends on both its corporate and temporal and spatial aspects. Moreover, the study of innovation has gone through several stages. Initially, it was seen as the work of individual innovators – the result was the commercial success of inventions and inventors – such as the invention of rubber by Goodyear; or the Bendix air brake; or the creation

of the Shockley transistor. All these innovations were most often used by one firm – alone or in small groups. The main element of the analysis at this stage was a separate innovator, or an innovator working in the company.

Due to the significant complexity of the economy and technology, the innovation process has also become more complicated, began to cover a wider range of activities, therefore, the analysis of innovation activity has entered a new phase. Currently, the process of innovation is usually considered more as a collective than an individual activity.

The analysis of the current situation in the field of creation and implementation of innovations allowed us to identify five main features of the category "innovation" at the present stage, namely:

Firstly, the degree of the category "innovation". In accordance with the evolutionary-revolutionary approach to the development of economic systems, innovation can be radical and gradual, complex and piecemeal;
Secondly, the commercial component of innovation. If an enterprise or a group of enterprises cannot benefit from the implementation of an innovation, then this innovation, as a rule, falls out of the sphere of interests of the enterprise;
Thirdly, at the present stage, the "working unit" of the innovation process becomes a group of people or enterprises jointly developing an innovative project. The most striking example is research projects carried out by several countries;
Fourth, modern innovations arise and are implemented in the context of an active transition from industrial means of production to post-industrial ones, as well as in the context of changing technological patterns;
Fifth, it is extremely important how innovation, or rather innovative activity, is organized in space, i.e. geographically.

In general, there are *two main approaches to cluster formation* in world practice:

The first is the classic liberal one, proposed in the 80s of the twentieth century by M.Porterom. It was based on the self-organization of economic agents within the framework of the "free market". This approach does not involve direct state intervention by the state, including from the position of supporting the cluster.

The second approach, which is more often called the "poles of competitiveness", is based on a partnership between business and authorities, both central and local. This trend has been developing in France since the second half of the 2000s, due to the state's interest in the global competitiveness of its economy, which is expressed in the provision of various forms of state support.

The study of the clustering process allowed us to draw up a conceptual scheme for the formation of an innovative cluster.

As can be seen from the above, a real cluster differs from an analytically distinguished conglomerate of geographically close enterprises. From our point of view, such a conglomerate can become a real cluster if the following conditions are met:

the cluster's compliance with the harmonization of industrial and trade regional policies adopted by the local innovation community;
active use of new management technologies;
availability of appropriate infrastructures, including information;
the presence of a formal organizational and communication structure that performs self-governing functions and ensures the formation of an innovative community as a subject of development of the territory and society as a whole, acting in partnership with business and government.

As prerequisites for the formation of an innovation cluster, the following can be distinguished:

the presence of scientific potential, that is, the presence of world-class scientists, large scientific centers, university and factory (industrial) science;
the presence of institutional prerequisites that can stand out in the status of a science city, support from the federal budget and various funds, as well as innovative economic development based on the cluster approach – federal and regional support for the idea of forming an innovation cluster, possibly within the framework of the most priority industry;

the presence of political prerequisites, which are manifested in the determination of the leadership to develop innovative activities as one of the strategic priorities of development;

the presence of production prerequisites, namely the level of innovation in the industry of the region as a whole and individual enterprises belonging to the cluster. At the same time, in our opinion, there should be requirements for the level of innovation in the production of all enterprises within the cluster, as a necessary condition for achieving, ultimately, the “pole of competitiveness”.

In order to determine the mechanisms of cluster management, in our opinion, it is necessary to classify them in more detail, which will allow us to identify “control points”. The classification we propose is shown in Table 1.

Table 1. **Classification of clusters**

Classification feature	**The content of the classification feature**
▪ by the degree of uniformity (concentration on the main business):	industry cluster – all enterprises have a similar main business; an intersectoral cluster, when it is difficult to clearly define the main area of activity

Classification feature	The content of the classification feature
▪ by the degree of organizational and economic connectivity:	a group of interacting enterprises that make up unified technological chains and have a single management body; a group of competing enterprises
▪ according to the degree of participation of innovation generation centers:	generating innovations-the cluster is formed on the basis of research centers and universities – innovation generation centers belong to individual enterprises; non–generating innovations – there are no innovation generation centers within the cluster boundaries;
▪ according to the degree of maturity:	emerging clusters; formed (mature) clusters; clusters in the stage of collapse (crisis);
▪ by scale:	The national cluster; regional cluster; industry cluster
▪ by specialization:	product cluster (introduction of innovations related to product changes that increase sales and strengthen the competitive advantages of enterprises), technological (implementation of new methods and technologies of production organization), non-technological (use of new financial instruments, forms of enterprise management, methods of influencing customers, staff training, etc.).

The development and implementation of innovations are closely interrelated with the creation, assimilation and application of knowledge. It should be noted that innovation processes are not only the search and acquisition of knowledge, at the same time it is the transfer of knowledge between all participants. Knowledge can be transmitted in two ways. First, it is the acquisition of new equipment, technology, and samples of finished products. Secondly, the acquisition or acquisition of knowledge can take place in an "intangible" form: patents, licenses, participation in conferences, professional retraining, and higher professional education. In all these cases, we can talk either about the ability to perceive knowledge, or about the processes of knowledge flow.

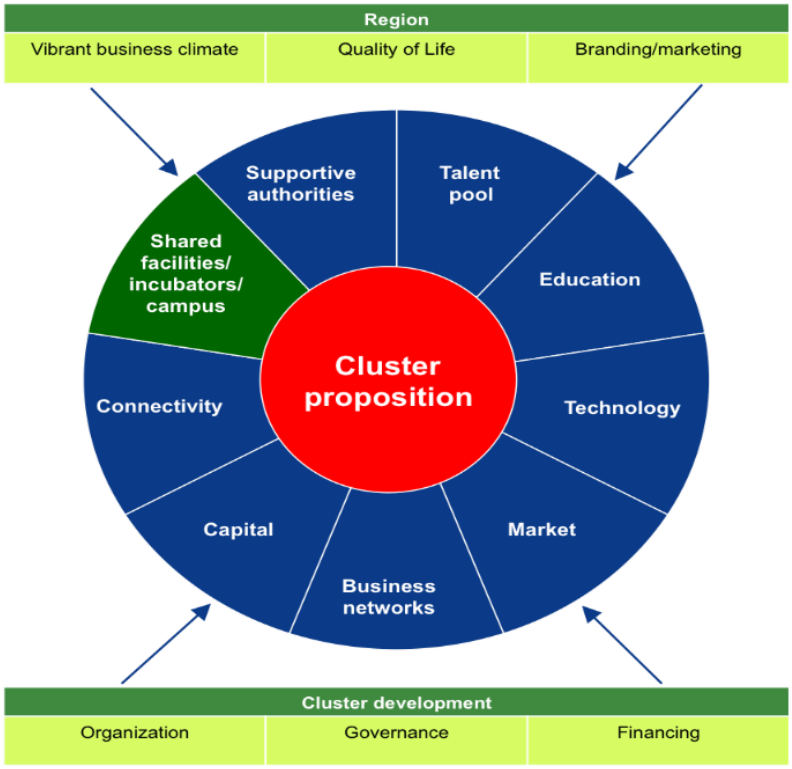
The ability to perceive knowledge is, first of all, the ability and ability to learn, and, therefore, to assimilate and put into practice the knowledge gained. The strategic feature of these processes is the need for very large investments with an unobvious end result.

The final report, which was commissioned by the European Union, notes that technological changes in industries are accompanied by a sharp increase in information flows, which is a prerequisite for successful experiments (R&D). Such research can become the basis for a new vision of traditional goods and technologies. Moreover, at present it is no longer possible to interpret innovations only as obtaining information. The time has come when any information should be perceived as a source of knowledge that is necessary to increase the competitiveness of the company. This knowledge is a strategic factor in the development of production and innovative research. Thus, the generation and dissemination of knowledge largely determine the current state and prospects of the company's development.

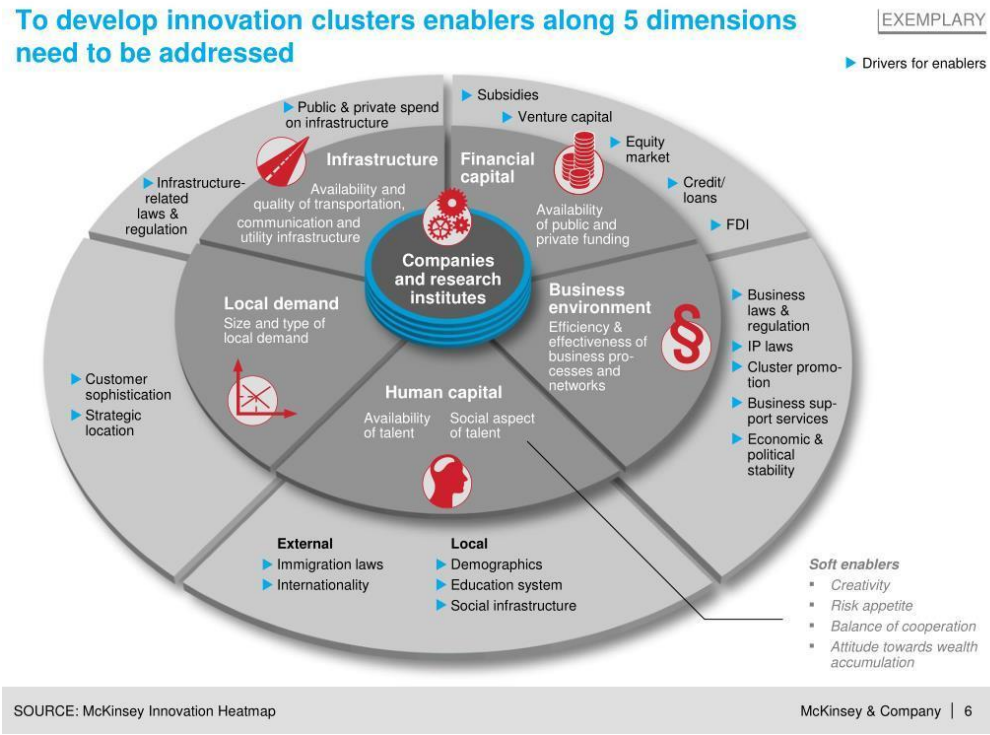
The process of knowledge transfer is a completely normal process for modern civilization. Its essence is that knowledge acquired in a government organization, higher education institution or private company can be used in other organizations, firms or individuals without compensation for the cost of obtaining this knowledge, or this compensation clearly does not make up for all initial costs. This situation becomes possible because knowledge and innovation are partially mutually exclusive and non–competing goods.

The provision on the flow of knowledge and information is of particular value for the cluster and all the structures that make up it. This is quite natural, because a cluster that includes industrial enterprises, research organizations, and higher education institutions can eventually form its own high potential, which exceeds the sum of the individual potentials of all its participants. The increase in potential is the result of joint activities and the effective use of all available resources. As a result, there is a certain synergistic effect: all cluster members benefit from joint activities. Knowledge that can flow freely from one cluster member to another plays a significant role in achieving this result.

The formation of new knowledge and its free flow within the cluster is one of the fundamental factors that are necessary for the transition of the cluster to an innovative development model. It is very appropriate to quote P. Drucker here: “When we apply knowledge to tasks that we already know how to solve, we call it productivity. When we learn to apply knowledge management to new tasks, we call it innovation.”


Region
Vibrant business climate
Quality of Life
Branding/marketing
Supportive authorities
Talent pool
Shared facilities/ incubators/ campus
Education
Cluster proposition
Connectivity
Technology
Capital
Market
Business networks
Cluster development
Organization
Governance
Financing

Source: BCI


To develop innovation clusters enablers along 5 dimensions need to be addressed
EXEMPLARY
Drivers for enablers
Public & private spend on infrastructure
Subsidies
Venture capital
Equity market
Infrastructure
Financial capital
Infrastructure-related laws & regulation
Availability and quality of transportation, communication and utility infrastructure
Credit/ loans
Availability of public and private funding
FDI
Companies and research institutes
Local demand
Size and type of local demand
Business environment
Efficiency & effectiveness of business processes and networks
Business laws & regulation
IP laws
Cluster promotion
Business support services
Economic & political stability
Customer sophistication
Strategic location
Human capital
Availability of talent
Social aspect of talent
External
Immigration laws
Internationality
Local
Demographics
Education system
Social infrastructure
Soft enablers
Creativity
Risk appetite
Balance of cooperation
Attitude towards wealth accumulation
SOURCE: McKinsey Innovation Heatmap
McKinsey & Company | 6

The transfer of innovations within a cluster is an important process that contributes to the development and competitiveness of cluster members. Here are some methods and mechanisms for transferring innovations within the cluster:

Knowledge and information sharing: Clusters provide a platform for the exchange of knowledge and information between companies, research institutions, universities and other participants. This can be done through the organization of conferences, seminars, working groups, forums and other events where participants can share their ideas, experiences and transfer the latest technologies.

Cluster programs and projects: Clusters can organize joint programs and projects aimed at developing innovations. This may include collaborative research and development, technology platforms, innovation competitions, and funding for innovative ideas. Such programs stimulate interaction and collaboration between participants, facilitating the transfer of new knowledge and best practices.

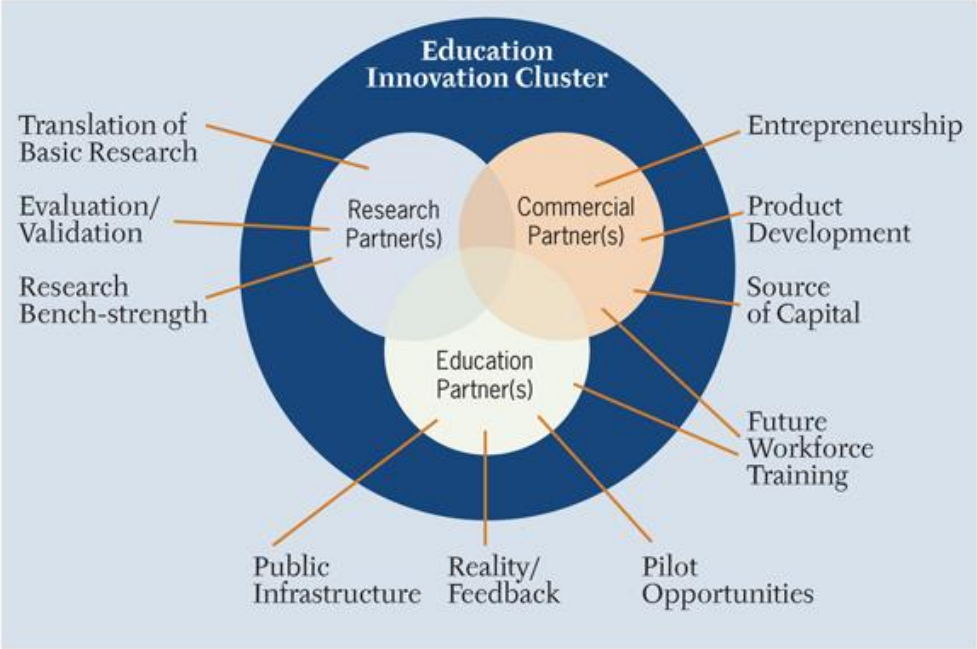
Incubators and Accelerators: Clusters can provide incubation and acceleration programs for startups and young companies. These programs provide access to experts, infrastructure, financing and networking, facilitating the development and commercialization of innovations.

Resource sharing: Clusters allow participants to share resources such as equipment, laboratories, infrastructure, and services. This reduces costs and increases the availability of innovative resources for all cluster participants, contributing to their development and application.

Inter-company training and exchange of experience: Clusters create opportunities for inter-company training and exchange of experience. Participants can organize training programs, workshops, trainings and employee exchanges to develop skills and knowledge in the field of innovation.

Networking and partnerships: Clusters facilitate the formation of networks and partnerships between companies, research institutions, suppliers, customers and other stakeholders. This allows you to share ideas, information, resources and create new opportunities for joint development and commercialization of innovations.

In general, the transfer of innovations within the cluster requires active interaction and cooperation between participants, as well as the creation of a favorable environment for the exchange of knowledge and resources. Support and coordination by the cluster organizers, as well as support from the government and other stakeholders, play an important role in the successful transfer of innovations within the cluster.


Education
Innovation Cluster
Translation of
Basic Research
Evaluation/
Validation
Research
Bench-strength
Research
Partner(s)
Commercial
Partner(s)
Education
Partner(s)
Entrepreneurship
Product
Development
Source
of Capital
Future
Workforce
Training
Public
Infrastructure
Reality/
Feedback
Pilot
Opportunities