

## **New trends in the development of Hungarian clusters<sup>\*</sup>: The case of the Southern Great Plain region**

**Lívia Berkecz-Kovács**

University of Szeged,  
Hungary

E-mail:

livi\_kovacs@yahoo.com

Most clusters in Europe were established in the late 1990s and the subsequent decade. These network collaborations played a crucial role in the European Union as well as in the economic policies of its member states. Initially, the aim was to catalyse the formation of these clusters and to strengthen their organisational and operational backgrounds. Consequently, several such collaborations were able to serve as the foundation for cluster-based economic development programs. The cluster development process has made great progress in the last 10 years, and the focal points have been rearranged in accordance with emerging global trends and economic challenges. The aim of this study is to provide an overview of these changes and to analyse how the Hungarian clusters adapted to these new trends. The paper is based on in-depth interviews conducted within the clusters operating in the Southern Great Plain region of Hungary, and the results highlight the development processes and some geographical features of these networks. In general, the most important change is that fewer dedicated resources are allocated for the development of clusters, resulting in a shift in emphasis toward support for developed world-class clusters operating in emerging industries. International relations, inter-cluster co-operations, and cluster development, non-financial incentives have all gained increased focus. The clusters in the Southern Great Plain region have partly adapted to these changes, but active participation in international markets remains a major challenge.

### **Keywords:**

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<sup>\*</sup> Industrial and service clusters which operating in the Southern Great Plain Region.

## Introduction

In recent decades, the formation and the importance of clusters and their special roles in economic development and innovation policies have received much public attention. The older and more geographically diverse a cluster's operations, the better we can learn its structure, operation, and keys to success.

Clusters play crucial roles in regional economic development and have positive effects on employment, innovation, and knowledge transfer activities. A strong cluster background ensures a favourable environment for the appearance of new regional industries, such as the biotechnology or software industries (Ketels–Memedovic 2008, Delgado et al. 2014). In several industries, such as the automotive industry, small and medium enterprises have become more effective suppliers with the help of clusters. The synergies created by clusters have a favourable impact on the entire region as well (Tiner 2010). The primary effects of clusters on a region's competitiveness include an improvement in productivity, growth in innovation capacity, and the appearance of new enterprises. Clusters also ensure a common forum for universities, research institutes, and enterprises by creating an innovation-subsidising environment in which participants can share information, realise common projects, and contribute to effective knowledge transfers (Lengyel 2006, Ketels et al. 2013). Thus, the role of third-generation universities within the clusters goes beyond the mission of education and research and includes establishing new economic partnerships and absorbing existing knowledge (Kotosz et al. 2015).

The circumstances around the appearance of clusters vary across countries, but in almost every European country, intensive cluster development activities have taken place since the late 1990s. Due to the success of the well-known Silicon Valley and Italian models and given the support of the European Union, member states established national or regional cluster development programs promoting the creation and empowerment of clusters by the end of the 2000s (High Level Advisory Group on Clusters 2007, European Commission 2008).

After this intensive period of support for clusters, European countries, including Hungary, realised that the sustainable development and enforcement of cluster collaborations as dominant players in national and international economics is a major challenge. To ensure the success and long-term sustainability of clusters, these development programs should adopt and define new directions for cluster support. This study focuses on new, emerging directions in European cluster policy and the implementation of these policies in the Hungarian system. The South Great Plain region was chosen as a case study for this analysis due to the large number of clusters that have been created in various areas in this region during recent years. This study has three main parts. The first part is a short literature review showing the variability of clusters following different approaches, and the second part outlines some of the changes to cluster programmes in recent years. Finally, in the third part, the Hungarian cluster support system is described along with some results of

my analysis based on in-depth interviews with cluster managers in the South Great Plain region.

### Literature review

The literature describes several approaches to clusters. The various cultural and economic backgrounds and regulations of different countries, have led to the establishment of clusters in various forms and with diverse characteristics. The early concepts of clusters can be derived from local specialisation activities in accordance with the growing significance of the global-local paradox (Porter 1990, Pyke–Sengenberger 1992).

Almost a decade later, an emerging trend in the relevant literature in both the political and academic fields was to use close-to-synonymous terms, such as ‘industrial district’, ‘agglomeration’, or ‘milieu’ rather than the term ‘cluster’ (Cruz–Teixeira 2010). The best-known definitions of clusters come from Porter and the European Commission, both of who focus on the importance of geographical proximity, strong local collaborations, and complementary expertise (Porter 1998, European Commission 2008); several other authors (Enright 1998, Rallet–Torre 1998, Steiner 1998, Lengyel 2006) share this point of view as well.

In the context of regional development and innovation, it is important to emphasise that industrial districts and regional innovation systems (RISs), which serve the same goals as clusters but in individual ways, can be differentiated according to the level of spatial concentration, business collaborations, policies, and mechanisms. All these concepts have a territorial criterion: industrial districts identify their district members through a sense of belonging, whereas the cluster approach does not have a strictly defined geographic scope. Therefore, the main focus of and success factor for an industrial district is the community of people, whereas the cluster framework focuses on firms, and the only social issue is the success of the associated companies (Ortega-Colomer et al. 2016). The territories of RISs are not limited to certain areas, but are rather integrated into other national and international systems involving more stakeholders. Furthermore, the policies of industrial districts are implemented in predefined areas, whereas the cluster and RIS concepts are incorporated into global production systems (Benneworth et al. 2003, Coe et al. 2004).

Based on Marshall’s analysis, it is widely accepted that agglomeration economies, in which firms are concentrated, have greater social ties and more extensively share information and other assets, in addition to promoting profitability and innovation activity. Up to a certain point, the concentration of a country’s urban system can increase competitiveness and entrepreneurial performance (Marshall 1920, Castells 1996, Komlósi–Páger 2015). Among the success factors of clusters, geographical proximity is considered to play a decisive role, with cognitive proximity having great importance as well. Cognitive proximity supports knowledge transfer activities and the creation of an innovation milieu (Boschma 2005, Broekel–Boschma 2016).

As a result of this diversity of concepts, we can view clusters as umbrella institutions combining different models of co-operation between companies and institutions to establish a single approach promoting innovation and regional development (Porter 1998, Isaksen–Hauge 2002, Ortega-Colomer et al. 2016).

Due to the various concepts and specialties in different local environments, several typologies have been created worldwide. First, we can classify four main concepts: Italian industrial districts, Californian networks, Northern or Scandinavian schools focusing on local knowledge, and Porter's cluster approach based on enterprise-level competitive advantages (Grosz 2005). Many typology theories have appeared based on the extent of clusters' sub- and superordinate relations and the hierarchies or characteristics of co-operation. The lifecycles of clusters also follow many approaches, but they typically undergo the start-up, growth, decay, and transformation steps (Lengyel 2002, Andersson et al. 2004). According to these different approaches, we can differentiate between six cluster types based on corporate co-operation and business environments: vertical production chains, aggregations of connected sectors, regional clusters, industrial districts, local networks, and innovation milieus (Miller et al. 2001). Since the specialties of these organisational structures of clusters differ, the organisational strategies can be heterogeneous as well. A study identified three types of sub-clusters: those influenced by globalisation, those based on politics, and those based on certain resources that are responsible for the highest value-added activities in a given area (Buzás 2000, Andersson et al. 2004).

The Hungarian cluster development process started to bloom in the 1990s due to increasing foreign direct investment from multinational corporations and the support of several top-down approaches. The formation of these clusters was influenced by globalisation and available government resources. Large corporations fostered the establishment of supply chains, and the clusters driven by their interests were vertical collaborations. Consequently, these artificially generated clusters did not foster strong connections between the integrators or other companies (Ricz 2010).

As a result of the growth in newly formed clusters, research in this field became more active as well. The domestic cluster literature mainly focused on evaluating the established clusters, understanding their aims, and mapping the variety of local features, especially for accredited clusters (Lengyel 2010, Lengyel–Rechnitzer 2013, MAG 2012). Several studies considered the related key definitions and trends of clusters, such as spatial proximities, regional competitiveness, knowledge transfers, and agglomeration advantages, typically for a specified territorial scope (Patik 2005, Szanyi 2008). Other authors focused on the special roles and impacts of corporations, universities, and industrial parks in the case of both Hungarian and foreign clusters (Lengyel–Deák 2002a, Kocsis 2012, Lukács 2013, Lippert et al. 2015).

## **Transformation of cluster programs, and development of new focal points**

Several studies have tried to highlight the differences in the structures, sizes, and management of clusters and the most dominant factors in their success (Lämmer-Gamp et al. 2011). Initial financial support was the most dominant means of supporting clusters, but this financial support was not sufficiently effective to form self-acting clusters that were sustainable in the long term. Technical help in the development of management organisations, such as training or coaching, was provided by only half of these programs in 2012, but three years later, these supportive elements could be detected in two-thirds of national and regional programs (Müller et al. 2012, Meier zu Köcker–Müller 2015).

Countries are increasingly including clusters in their policies, and, as a result, cluster programs have visible connections to national or regional specialisation or innovation strategies. Most cluster development strategies focus on the development and international strengthening of existing clusters, although the support of newly formed clusters has recently received some emphasis as well. Within the most important economic sectors, clusters involve dominant actors, and the support of inter-sectoral co-operation between clusters operating in different fields of industry is the focus. Consequently, many cluster programs actively support clusters that catalyse co-operation between fields and provide high value-added services for small and medium enterprises (SMEs) (Lämmer-Gamp et al. 2014).

Internationalisation is presently one of the main goals of cluster programs. Most programs support the development of clusters' international relations and appearances on international markets with targeted aid. Supporting the excellence and well preparedness of cluster management organisations is also important. Cluster organisations are supported by a growing number of programs that offer specific business services to help enterprises successfully face growing market and technological challenges and join emerging industries and inter-sectoral co-operations (Christensen et al. 2012, Kergel et al. 2014, Meier zu Köcker–Müller 2015).

According to a study presented by the European Cluster Observatory in 2015, the major changes and new directions in cluster programs can be summarised as follows (Meier zu Köcker–Müller 2015).

- There are fewer dedicated resources for the support of clusters as clusters play an increasing role in the implementation of development and innovation policies. Consequently, support for clusters themselves has become a less important goal.
- There is more emphasis on support for clusters operating in advanced, world-class, and emerging industries than on support for creating new clusters.
- Support for cluster management excellence is part of nearly every program and has recently become increasingly important.

- Internationalisation has remained a major element of the program, and support activities are assisted by a growing number of actions.
- Many programs have separate budgets for the special support of cluster management organisations in the fields of internationalisation, inter-cluster agreements, and cluster management excellence.
- Non-financial incentives are becoming more common than financial support.
- Most programs fit well and are linked to national and regional specialisation and innovation strategies.

### Cluster development in Hungary

Following international trends, the first clusters in Hungary appeared at the end of the 1990s and at the beginning of 2000s' due to program promoting supplier relationships. Later, the first Széchenyi Plan supported the creation of cluster management organisations (Gazdasági Minisztérium 2000). However, these collaborations did not prove to be strong enough for long-term operations, and, thus, a multi-stage cluster development program was implemented between 2007 and 2013 involving substantial grants. During this period, 191 start-up and 46 emerging collaborations were given financial assistance to the tune of eight billion HUF. By 2015, 34 clusters qualified as accredited clusters, which signified collaborations performing high innovation and export activities and realising important development projects. These clusters involved 1,140 companies, 117,000 employees, and a total revenue of more than 9,500 billion HUF (Nemzetgazdasági Minisztérium Gazdaságfejlesztési Programokért felelős Helyettes Államtitkárság 2013, Colosseum Budapest Kft. 2015).

Studying the structural and operational background of these clusters, we can conclude that Hungary's clusters are quite diverse. In addition to the clusters based on large, dominant enterprises, some clusters rely on co-operation between SMEs. Regional knowledge centres play a key role in the geographical locations of clusters. Many of the member companies of the Accredited Innovation Clusters, for example, operate in a sub-region with an appropriate educational, cultural, and research background for promoting innovation (MAG Klaszterfejlesztési Iroda 2012, Horváth et al. 2013).

The major goal of the cluster development activities from 2007 to 2013 was to support the creation of collaborations that included the most dominant economic and research actors, corporations, and research and higher education institutions. Due to widely available funds, many clusters were founded. Initially, a multi-step support scheme financed the costs of formation, the development of strategies, and management operations. Later, the focus shifted to the implementation of common projects, research, and investment. Based on the European and international trends since 2014, the clear goal is to promote and support international market access for

collaborations that are capable of development and have stable financial and professional backgrounds. The currently available resources aim to catalyse the improvement of cluster management services and promote international market access for these clusters. As an indirect incentive, accredited cluster members are given priority in the evaluation process for economic and research development funds, which means that promoting projects implemented within a cluster is still an important objective.

Since 2006, the European Union has strongly supported its member states in the creation of clusters, and, thus, most member states applied in the economic development and innovation policy the cluster development. The member states' cluster policies vary, but they contain similar elements. Most countries provide financial support, training, and service development subsidies to clusters. The Hungarian cluster development policy contains many similar provisions, but its accreditation, embedded in a multi-stage subsidy system, is exemplary at the European Union level. Due to a strict pre-qualification system, the most important research representatives, innovative SMEs, and corporations can all co-operate in these clusters. These co-operations have effects mainly in knowledge centres, which correspond to the centres of the clusters. The members of these clusters can be rated as more successful and reliable candidates, and the exports and growth potentials of SMEs within these clusters far exceed those of SMEs outside these clusters (European Commission 2008, High Level Advisory Group on Clusters 2007, Colosseum Budapest Kft. 2015).

### **Clusters in the Southern Great Plain region**

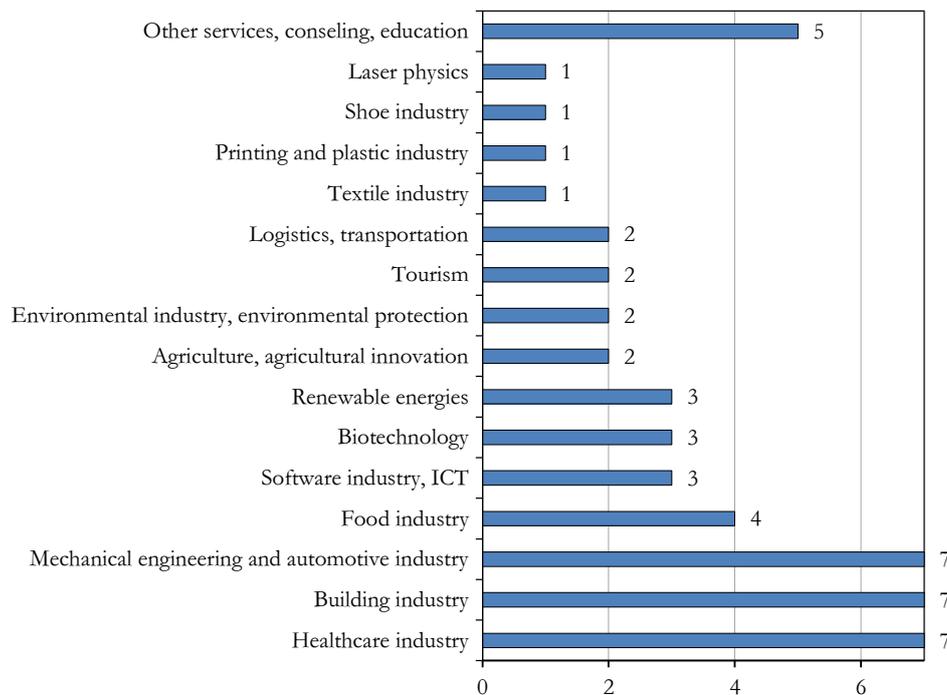
As is the case across Hungary, most clusters in the Southern Great Plain region were created as a result of the Hungarian cluster development programme from 2007 to 2013. New and improving clusters could receive financial support from the Southern Great Plain Regional Operative Programme in 2008 and, again, in 2011. Thus, in 2010, there were 29 clusters in the Southern Great Plain region, above the national average, and 22 new initiatives appeared in this region through 2015. The scientific areas – where the regional higher education and research institutes were based – and the leading industrial sector within the region played significant roles in the establishment of clusters. As Figure 1 shows, the clusters in this region operate in various industries, such as healthcare, the building or automotive industry, and the biotechnology and software industry.

The regional locations and concentrations of clusters also indicate the significant role of each knowledge centre. Most clusters have been established with Szeged as the centre, which is understandable because, in Hungary, larger university towns like Szeged act as islands of modernity. Although such towns have limited spillover effects on their own regions, they provide important knowledge for other advanced regions (Enyedi 2009). In addition to Szeged, Kecskemét and Békéscsaba can be

considered as agglomeration centres. Figure 2 shows the numbers and locations of clusters for cluster centres by sub-region in 2010 and 2015.

Figure 1

**Industrial distribution of the clusters  
in the Southern Great Plain region, 2015**

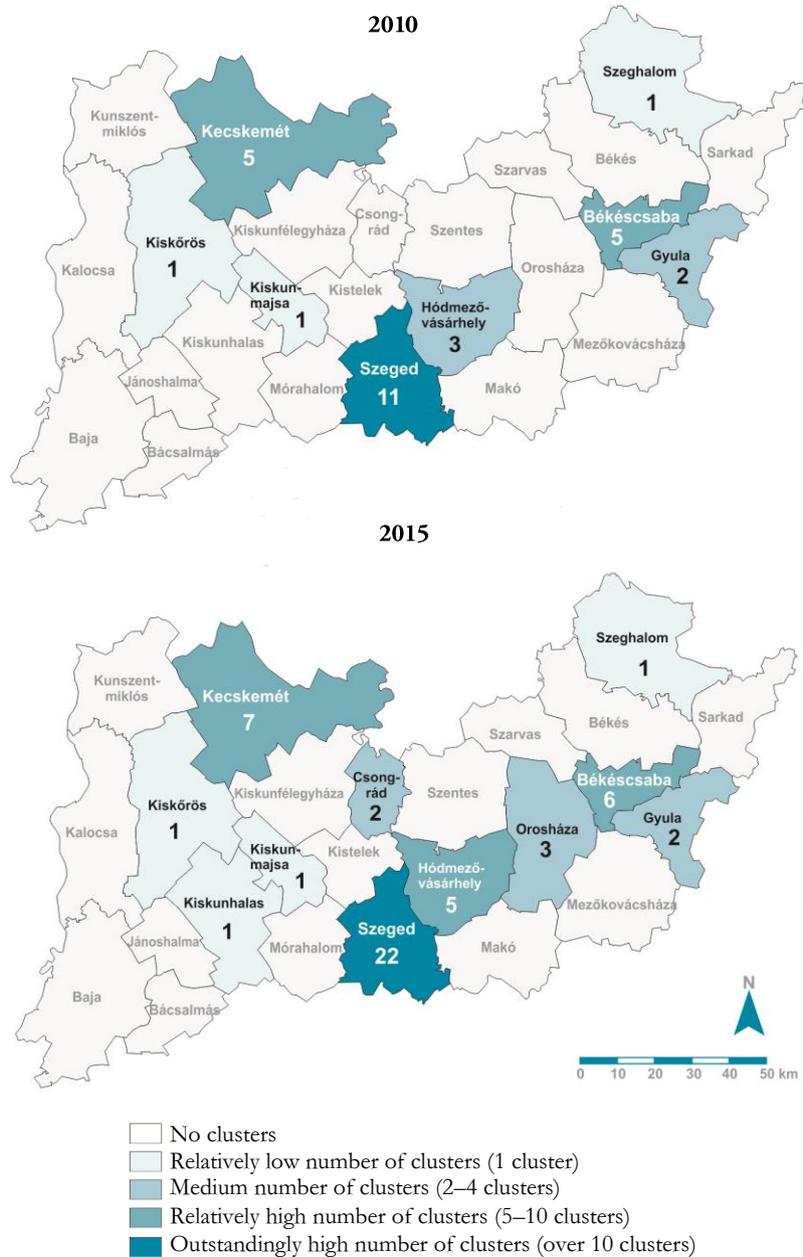


Source: Own calculation based on the database of the South Great Plain Regional Development Agency.

Of the clusters in this region, nine have received the title of Accredited Innovation Cluster. These clusters altogether include 342 members, of which 86% are SMEs. Furthermore, all clusters have a large enterprise as a member. With the exception of two accredited clusters, all of them include different higher education and other research institutions, and local governments work to strengthen inter-cluster knowledge transfers. The net sales turnover in 2013 was 852 billion HUF, of which 34% was generated by SMEs. An important indicator of access to potential external markets is net export sales turnover, which is 287 billion HUF in the case of the accredited clusters in the region. The accredited clusters in this region employ 25,331 people, of whom 2,163 have obtained high-level education. In terms of research and development, 157 industrial properties are under the protection of the clusters, and they employ 45 PhD-level specialists (Nemzetgazdasági Minisztérium Gazdaságfejlesztési Programokért felelős Helyettes Államtitkárság 2013).

Figure 2

**Number and location of the clusters  
in the Southern Great Plain region by sub-region**



Source: Own elaboration based on the database of the South Great Plain Regional Development Agency.

### Analysis of the Southern Great Plain region's clusters

In the course of my qualitative research, I studied the operations, the international and inter-sectoral activities, and the long-term sustainability of the clusters in the Southern Great Plain region with the help of expert interviews. Half-structured in-depth interviews were conducted with 20 cluster managers in 2015. My primary objective in selection was to include networks operating in dominant regional industry sectors or performing innovative activities, and, thus, I interviewed managers from 20 of the 51 clusters in the region. For the purpose of comparison with respect to some aspects of this examination, I also considered my previous in-depth interviews carried out in 2010 among 17 cluster managers in the region.

In my 2015 analysis, I included clusters that were established or strengthened after 2010 instead of clusters that only slightly operated or did not operate at all since the 2010 analysis. The table below contains the list of clusters included in 2010 and 2015.

**Clusters included in the research**

	2010	2015
1.	AIPA Cluster	AIPA Cluster
2.	ArchEnerg Regional Renewable Energy and Construction Industry Cluster	ArchEnerg Regional Renewable Energy and Construction Industry Cluster
3.	South Great Plain Biomass Utilisation Cluster	Biotechnology and Pharmacology Innovation Cluster
4.	South Great Plain Sustainable Development Service Cluster	South Great Plain Regional Food Chain Safety Cluster
5.	South Great Plain Innovation and Consulting Cluster	South Great Plain Thermal Cluster
6.	South Great Plain Transport-Development Cluster	Industrial Research Building, Innovation, and Technological Transfer Cluster
7.	South Great Plain Regional Construction Innovation Cluster	Goodwill Biotechnology Cluster
8.	South Great Plain Regional Textile Cluster	Havaria Environment and Health Technology Cluster
9.	South Great Plain Thermal Energy Cluster	Hírös Supplier Cluster
10.	South Great Plain Green Engineering Technology-development Cluster	HÓD Industrial Cluster
11.	Construction Technology Development Cluster	Körösvölgyi Environmental Technology Cluster
12.	Goodwill Biotechnology Cluster	Hungarian Clinical Study Cluster

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	2010	2015
13.	Havaria Environment and Health Technology Cluster	Hungarian Open Innovation Cluster for Construction Industry
14.	Hírös Supplier Cluster	'Rose' Southern Great Plain Hungaricum Cluster
15.	HÓD Industrial Cluster	Sárrét Metal Cluster
16.	Software Innovation Pole Cluster	STEPP Hungarian Laser Cluster
17.	3P Plastic, Packaging, and Printing Cluster	Software Innovation Pole Cluster
18.		Zsótér Service Cluster
19.		3D Creative Innovation Cluster
20.		3P Plastic, Packaging, and Printing Cluster

In this study, I focused on the following questions related to benefits of the local environment, added value, cluster management, international activities, and the future plans of these clusters.

*Can the region's clusters rely on the local environmental benefits?*

The surveyed clusters are (relatively) geographically concentrated since, on average, 70% of the cluster members operate in the region, although they cooperate closely and effectively with members outside of the region. Most of the clusters included in this analysis rely on local advantages. They try to involve local business actors, research and educational institutes, and, in some cases, even local governments to embed themselves into the surrounding economic and social environments. Only three cluster managers stated that local relations do not influence their activities, as they are geographically independent and are carried out at a national or international level.

*What added value does a cluster provide its members, and how is this value strengthened by cluster management?*

As Figure 3 shows, according to the region's cluster managers, the major added value of clusters is generating common research and development projects and providing project funds. Furthermore, the managers also appreciate that clusters generate knowledge transfers between members, increase competitiveness, and help members reach international markets and co-operations. Moreover, a national survey found the same result, namely, that according to cluster managers and members, the two most important advantages for cluster participants are the option to co-operate and easier access to tendering resources (Colosseum Budapest Kft. 2015).

Figure 3

**Major added value of the clusters for their members,  
by the number of opinions among the region's cluster managers, 2015**

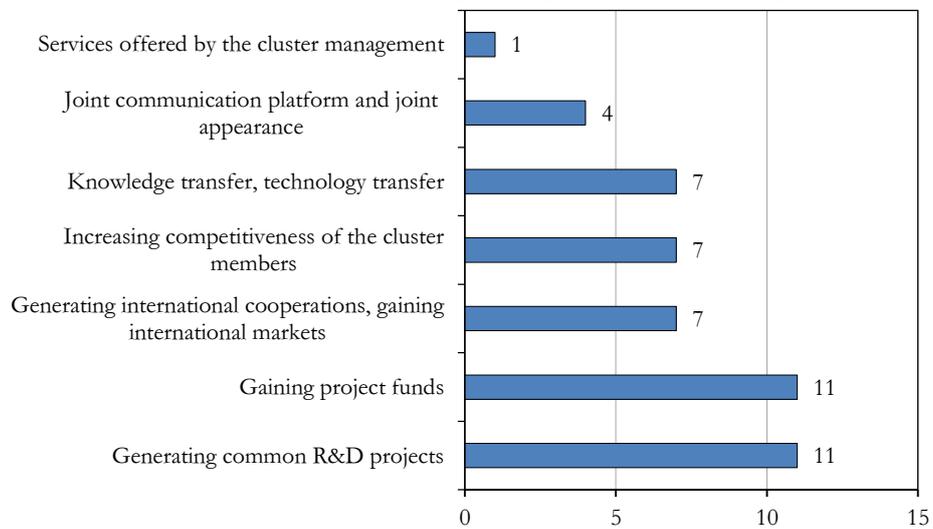


Figure 4

**Services offered by cluster managements**



Cluster management organisations constantly develop services for members by taking members' claims, changing projects, and market conditions into account. According to Figure 4, since 2010, clusters have provided widespread and diverse services for their members, such as organisational and communication tasks, networking, consulting, and fundraising. Since 2010, positive progress has been made in the fields of internal and external communication activities, benchmarking clubs, training programs, and fundraising activities, as clusters are increasingly ensuring these services for their members. The service of international networking was introduced after 2010 and has become increasingly important to clusters. To gain and maintain market advantages, clusters need to concentrate on export markets as well, and they need to understand the models of well-functioning international clusters. The services provided for cluster members in 2010 and 2015 are shown in Figure 4.

Although there are no internal monitoring systems for measuring the performances of cluster organisations, the national accreditation process and the European Cluster Excellence Programme are considered the two most important measurement systems. These systems provide feedback on the performance of the management and the cluster that serves as a guideline for future development. Nine of the clusters examined in this analysis gained accreditation, one achieved the Gold level of the Excellence Program, one achieved the Silver level, and one achieved the Bronze level.

*How typical are inter-sectoral and international co-operations among regional clusters?*

The potential for inter-sectoral or international co-operation is only slightly utilised by the clusters in this region. Thirteen of the clusters involved in this analysis perform no inter-sectoral activities at all, and initiatives in this direction have been made in only seven cases. More than half of the studied clusters have made serious efforts to understand international relations, primarily by following European models initiating the promotion of a cluster and its international relations. Six clusters have foreign relations exclusively due to cluster members, which are not quite as effective on the cluster level, and two clusters have no international relations at all.

*How do the clusters view their future operations and objectives regarding their financing and sustainability?*

Considering the cluster organisations' changes and development, they have clear, well-defined visions of the future. They plan common research and development and innovation projects, and many have set a goal of becoming internationally

visible so that they can implement international projects and enter international markets. Several clusters aim to optimise inter-sectoral and inter-cluster co-operation in order to improve their competitiveness.

With regard to cluster financing, five cluster managers said that, without project funds, the operation of their clusters would not be sustainable. However, most of the interviewees believe that membership fees, revenues from services, and other activities would finance their clusters' operation. However, without external resources, these clusters would be at risk of failing to develop because they cannot achieve self-sufficiency through their own activity and, thus, require external help from both a financial and a professional point of view.

One cluster manager's answer confirmed this statement: *'In case the central support is not available, clusters have to operate on the basis of foreign models. The members have to invest in operations, but an appropriate business plan is needed for that. No evolutionary phases can be skipped, but an external source is needed for that.'*

Some interviewees indicated that cluster maintenance does not depend on direct project resources but on the economic environment and the positive effects of other forms of support: *'The cluster that has viable products will stand on its ground. Support of international presence would be necessary. Clusters are quite varied. Fifty percent function well, have objectives, the other ones are created just to gain funds. That is why non-financial support is preferable, to exclude source hunters.'*

Non-financial support was not listed among the tools of national cluster development programs between 2007 and 2013, although most regional cluster managers would probably appreciate such support. They considered an international presence, networking activities, and a common communication platform to be the most important tools, but their jobs would be significantly helped by the provision of infrastructure, low-interest loans, and operative mentoring activity, too. The clusters' financial statuses are not sufficiently stable, and the major difficulty that the managers face is the creation of a financial background and the maintenance of the constant activities of cluster members. As the generating effect of project sources in the creation of clusters is indisputable, the cluster managers believed that external financial and non-financial support should be provided to achieve successful operations and development.

Unfortunately, the clusters of the Southern Great Plain region do not yet have strong international connections, and, thus, need significant development in this field. As the new trends indicate, one of the most important directions and goals is to reach international markets and to enhance international and inter-sectoral relations. External financial sources very important for this kind of development, but cluster managers are more open to non-financial support, such as services for international relations and networking.

## Conclusions

Clusters have positive effects on regional and economic development and innovation, for which many international examples are available. Because of these examples, most European countries began to develop intensely clusters, and an adequate number of functioning clusters have been established. Beyond enhancing cluster establishment and strengthening clusters, the focus has increasingly shifted towards the support of self-sustaining, internationally competitive co-operations. To achieve this goal, non-financial support, professional management organisations, and the enhancement of internationalisation are of great importance. In Hungary, the same directions can be observed in cluster development programmes; until 2010, these programmes focused on the creation of organisational and operational backgrounds, services, and the initiation of joint projects, whereas, over the next 5-6 years, the focus shifted to ensuring long-term financial and professional sustainability, the creation of international relations, and the achievement of international visibility. In the case of accredited clusters, there is a high expectation for the establishment of professional cluster management to perform high value-added common innovation activities and to shift towards international markets. The examples of the Southern Great Plain region show that the members of the most well-functioning clusters found opportunities through co-operation and that, in accordance with international trends, the project management organisations are trying to enhance their international and inter-sectoral co-operations and will be focusing on these activities going forward.

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