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**Faculty of Economic and Social Sciences**  
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**The Impact of Organizational Collaborations on the  
Marketorientation of Innovation in the Hungarian Innovation  
Clusters**

– Theses of the Doctoral Dissertation –

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## 1. THE OBJECTIVE AND STRUCTURE OF THE DISSERTATION

Business professionals active in the most diverse fields and research of the most various fields of science have long been interested in the analysis of the efficiency of interaction between organisations. The expectations and possibilities of innovation in our days also demand the examination of these topics. As a result of the appreciation of the importance of inter-organisation cooperation and the significance of innovation I have chosen domestic *accredited innovation clusters* - a milestone in the field of innovation - the subject of my dissertation, as this "form of network" is one of those forms of organisation promoting cooperation that are capable of having an impact on the innovation activity of their members.

In addition to increasing the members' efficiency in innovation and on the markets, clusters may also serve *broader community-related purposes*, however, one of the main goals of my research is – taking the approach of innovation marketing – is examine *whether clustering strengthens the market orientation of innovations*. I examined how the clusters can facilitate the understanding of the market changes, the acquiring, dissemination of market information and its integration into the innovation processes. In addition to the above, I also looked at they can support the successful entry of new products and services on the market, and to what extent and how they can help on the whole the connection between the increase of customer value and technological developments.

It is especially the small and medium-sized enterprises for whom clusters may provide a favourable organisational framework, as they facilitate the concentration of the sources of research and development, the efficient use of these, joint appearance on the market and entry into international markets. However, it is important to know what abilities and skills are necessary to have for a small company in order to be able to exploit such benefits. *In line with that, a further goal of my research was to map those strategic and innovation abilities the development of which should be an important focus for the cluster management and the cluster member organisations as well as the organisations striving for becoming members*. Furthermore, in the case of cooperation it is important to know those corporate characteristics that affect the intention of joining a cluster, thus determining the cluster's future growth potential.

For the efficient operation of clusters it is important to find about the cooperation within the clusters, as within the clusters these are formed in a quite diverse manner and on several levels and on a wide platform. *By exploring the network of relations* between the actors of both the business and scientific world *my research may provide substantial assistance* for having information about the number of stakeholders – cluster management and the cluster member organisations – as figuring this out represents a substantial challenge for researchers and its handling require professional skills and special expertise from the management. Indeed, relations within the clusters start up from a different basis right from the beginning and represent various challenges for the management organisation depending on whether clustering is built on already existing interactions, whether competitors, large companies, foreign-owned undertakings could be among the members, whether the organisation is of horizontal or vertical nature, whether the members associate rather on market basis or the cluster is strongly knowledge-oriented, with an intensive presence of universities or researchers.

I have selected such models and dimensions to perform an analysis of scientific value of such network of relations and to explore the complex relations within clusters for the sake of adapting the results identified in a wider circle that are suitable for describing them and later on for serving as the basis for measuring these relations. To this end, I used in my research the *relationship marketing orientation, strategic abilities and proximity models* presented in international literature, I adjusted these to the *cluster environment*, and *I have interpreted the dimensions of these in the context of the relations and interactions within the cluster*.

*Furthermore, I analysed their interrelations with the cluster characteristics and their effect on innovation and the market orientation of the cooperation in place.*

In view of the above, therefore, the field of research of my dissertation is to examine the *accredited innovation clusters in Hungary, their features of operation, management tasks, including the marketing management activities, concretely, the exploration of the factors that affect the cooperation arising within the cluster.* The main issues raised in my research are as follows:

- *Which environmental factors stimulate and which hinder the formation and operation of clusters?*
- *What solutions does cluster management use to support the flow of in relation with and cooperation? What information, cost and risk allocation practices are typical?*
- *How do the domestic innovation clusters use their own network resources?*
- *What are the levels of cooperation, and what specific characteristics can be used to describe the domestic clustering process?*
- *What background doo the domestic innovation clusters ensure for asserting market orientation in the innovation processes? Furthermore, which features of relationship marketing orientation, strategic and innovation abilities and proximity models characterise intra-cluster relations and cooperation? Also, to what extent is the impact of these asserted in the marketing orientation of intra-cluster cooperation?*

## **2. TOPICALITY OF THE SUBJECT**

In today's economy, the significance of innovation is unquestionable. Referring to the results of empirical research Shukla (2009) concludes that for 90 percent of the business organisations the improvement of innovative abilities is a high-priority objective mentioned among the first ones. This may be underpinned by the opinion of Baporikar (2014) that since innovation has a life curve the same way business processes, products and solutions, the individual innovative results are able to ensure a competitive edge only temporarily, therefore, the permanent renewal of innovation is necessary for ensuring that the innovation process is present continuously.

Although the significance of the innovation activity is beyond doubt, significant differences may be observed in the interpretation of the notion – from the point of view of organisational conditions, corporate and economic competitiveness. For instance, Grübler et al. (1999) – in conformity with everyday association – often interprets innovation in its technological context, as it presents technological expertise as a determining element of long-term sustainable productivity and economic development. At the same time, however, innovation is a significantly more complex notion than that.

*The interpretation of the concept of innovation started with the work of Schumpeter (1939), according to whom innovation means the new combination of production factors.* He differentiated between five fundamental cases: creation and introduction of a new product; creation and introduction of a new process and production procedure; penetration into the new market; finding a new source of procurement, and creation of a new organisation. (Schumpeter, 1980, cited by Pataki, 2020). The definition and the types reflect that emphasis was put on novelty in all cases.

In the interpretation of Schumpeter (1980, cited by Bögel in 2008), innovation is closely related to production, and the core activities of companies. At the same time, Schumpeter's theory (1980) finds it important that this new type of combination, meaning innovation, is typically not the result of the development of well-proven processes, but of a radically new approach, which often comes from organisations outside the market structure and causes the existing market conditions to deteriorate. Consequently, Schumpeter (1980) calls innovation "*creative destruction*". This duality of creation and destruction (*and this way linking it to the*

*radical market competition and indirectly to market orientation*) is the central element of Schumpeter's theory of innovation. This idea, however, is being criticised in many respects by newer theories, however, he does not claim either that this duality survives in the entire innovation. According to Schumpeter (1980) the process of the spread of innovation following an S-curve: the example of the first application quickly spreads, then, reaching the maximum of market saturation, it is replaced by the fine-tuning of slow innovative solution, not requiring a radical change.

In addition to the initial interpretation of Schumpeter, it is also important to highlight the *Oslo manual*, widely spread in Europe (OECD, 2018), which provides the interpretation of the notion of innovation and the basis of the measurement of its efficiency. According to the manual "*innovation is a new or enhanced product or process (or the combination of these), which significantly differs from the earlier products or processes of the organisation, and all of these are available for the potential users (product), or have been introduced into the organisational activities (process)*" (OECD 2018, p. 22.). It is important to stress that earlier editions included marketing and organisational innovation into the notion of innovation, in addition to product and process innovation (Pataki, 2020). Consequently, my dissertation does not use the definition from year 2018 as the basis, but the year 2016 (OECD) definition, which says that "*innovation is the introduction of a new or significantly improved product (goods or service) or procedure, new marketing method, or new organisational method into the business practice, work organisation or external relations*".

In order to categorise the characteristics of innovation Baporikar (2014) made a series of attempts for definition: pointing out the deficiencies of the individual definitions, he adds a series of new elements to the definition. The starting point of his activity is the definition according to which innovation means "changing an existing thing by introducing something new". (The New Oxford Dictionary of English, 1998, cited by Baporikar, 2014).

Although this general formula may be applied universally to all organisations and all developments, it does not reveal the essential features of innovation. For instance, it leaves open the question of *the extent of change*, which is even more important as Schumpeter (1980) generally means a radical, disruptive order of magnitude by changes reaching the stimulus-threshold of innovation. However, Baporikar (2014) thinks that the extent of change is partly relative (i.e. what is minor for one company could be radical for another one), and also, changes of larger dimensions may be broken down to smaller units. The definition used as the starting point does not refer to that essential component either that the purpose of the change is to *increase the consumer value*. In this sense innovation may never remain merely a theoretical activity, and in all cases it must bring about practical value important for consumers, as it is practical value that differentiates *innovation* from *invention*, where the latter means only the exploration of something new without meeting the criterion of usefulness (Mckeown, 2008), and from *change* or *creativity*, which may play an important role in the process of innovation, but in themselves they do not contain any reference to consumer value either (Baporikar, 2014).

Adjusting the thought of consumer value into the concept of innovation leads to the question of the *interest of the organisation*, as for the organisations the value recognized by the consumers is useful if it also manifests in the use of the product or service, thus contributing to the growth of the organisation. Usefulness interpreted from the aspect of the organisation also appears at Drucker (1985), who interprets innovation as the targeted and organised effort of the organisations to make changes and to identify the business opportunities brought about by the changes. Therefore, the organisation must be able to manage innovations: to efficiently differentiate between good and bad ideas, to expand the knowledge of the organisation, to handle the innovation cycles and to understand the impulses arriving from the environment (Drucker, 1985). Lazonick (2004) also supports the existence of a relationship between

organisational innovation and organisational knowledge. In his opinion, innovation is nothing else than a type of the organisation's collective learning.

By integrating all these features – by integrating the extent of innovation and its effect on the buyer value and organisational interest – the new definition of innovation formulated by Baporikar (2014) is as follows: "*Innovation is the process of small and big, radical changes built on one another concerning products, processes or services, as a result of which the organisation introduces something new, which creates value for the buyers and expands the knowledge of the organisation.*" Baporikar (2014, p. 343)

It is worth observing that Baporikar's (2014) definition of innovation (1) is more detailed and broader than that of Schumpeter, (2) emphasises its process-nature instead of the duality of pointwise destruction – construction, and (3) regards it as part of the existing market structure instead of interpreting it as a disruptive phenomenon arriving typically from outside the structure. Although in my research I find Baporikar's definition (2014) important, it has to be mentioned that other sources significantly extend it by areas concerned by innovation, in addition to product, process and service:

- Shukla (2009) identifies *product innovation*, which means the issue of new or significantly improved product or service, *process innovation*, which is to be interpreted as the introduction of processes previously not existing, or operating only with a lower level of efficiency, the *innovation of the supply chain*, which is the improvement of the transformation of input necessary for production, and *marketing innovation*, which is about the radical renewal of the marketing elements (Katona, 2006).
- The Humanitarian Innovation Fund (n.d.) groups the areas of innovation by the analogy of the marketing mix (Borden, 1964). The organisation adds to the 4P of innovation, i.e. (1) *product innovation (product)* and (2) *process innovation (process)*, the (3) *position innovation* (which means the novel interpretation and method of use of an already existing product and service) and (4) *paradigm innovation*, which refers to the radical reformulation of an organisation or the entire sector. The latter inserts back the theory of creative destruction proposed by Schumpeter (1980) among the categories of innovation.

In addition to the areas concerned by innovation, innovations may be grouped according to their extent, speed and expansion. It is apparent from the categorization that advancing from gradual innovation to technological, economic paradigm shift we gradually get to the increasingly powerful impact of innovation that also affects the operation of the sector (Freeman & Perez, 1988):

- *Gradual innovation*. Improvement of solutions in the mainstream of the sector. Gradual innovation is less the result of the r+d activity, rather arises from the learning of the organisation through activity and use (Greenacre et al., 2012). Foxon (2003) found that although the bigger organisations potentially have more potent r+d possibilities - having access to more extensive resources - than their smaller competitors, still they are rather interested in gradual innovation in order to maintain their imbedded state into the ruling market structure. The application of gradual innovation rarely results in sudden market changes, but on a relatively stable market it is able to improve productivity, effectiveness and competitiveness.
- *Radical innovation*. Structural change of well-proven solutions. Typically, these are innovations coming from outside the hierarchy of the concerned sector and from the result of research-development, whose source may be a smaller company, or just as well a university research centre. According to Greenacre et al. (2012) radical innovation does not necessarily have a market-deteriorating effect (as it may be a replacement of an existing solution by a better one, which is welcomed by the existing market structure), but even if it is disruptive in nature, its direct economic effect may be significant if the innovation has an effect not in itself but through a whole group. As smaller companies

are less interested in maintaining the market status quo and should be calculated with significantly lower organisational and structural costs in the adaptation of the innovative solutions, radical innovation typically is typically within their toolkit. For the bigger companies to be willing to adapt to the new situation brought about by the radical solutions, according to Winskel & Moran (2008), central intervention (state, legal) may often be necessary. Those conglomerates that want to use the weapon of radical innovation despite the risks and costs, often chose the solution that independent innovations set up subsidiaries or semi-autonomous organisational units in order to control while keep away from themselves the effects of radical innovation (Stenzel, 2007).

- *Technological system innovation*. This type of innovation changes the technological environment. Technological system innovation is a complex phenomenon, made up of a series of radical and gradual innovations that put pressure parallel on the organisational and management practice, typical of the sector (Greenacre et al., 2012).
- *Technological/economic paradigm shift*. It affects the sector significantly more than system innovation. It changes the ruling circumstance not only on the technological and organisational level, but also has a disruptive effect on the parameters of value chain (on the usual supplier and pricing structure, production methods, distribution system, etc.).

Independently from the type of innovations of various extent and apparent in various areas, connecting innovation with *buyer values and market orientation* is inherent - and has key importance - in the development of the innovation models, the definition of innovation as a notion and its interpretation. It can be concluded that *both the consumer value, and the marketing and process innovation* played an important role in the change of the basic definition observed over the years and it is apparent that certain activities and elements of marketing management were given special attention in the work of the individual experts.

In line with that, the development and change of the innovation models should be analysed with a focus on its effect on their network and buyer components of those, as the development of the individual models draws the recognition that *customer value* must be integrated into the concept of innovation and that innovation may serve to increase *customer value*, if it is based on extensive *network connections*. *From the aspect of the topic under my review I can regard the above as the cornerstones determining the conceptual development of innovation.*

### **3. THE DEFINITION OF CLUSTERS**

A generally accepted definition of a cluster in the economic sense is not available. According to Hamdouch (2007) as many authors there are, as many, more or less, different definitions exist, which have not yet been synthesised by the scientific community for the time being (Steiner, 1998 and Rosenfeld, 2001) – moreover, Martin & Sunley (2003), when it comes to clusters, outright mention a "chaotic concept". If we disregard the minor differences, two motifs play the leading role in the definition of clusters: the first definition-generating element is whether or not the *geographical* parameter is found important; the second is whether or not it focuses on the *innovation potential* of activities or sectors (Hamdouch, 2007).

#### **3.1. Definition of clusters by taking a geographical approach**

The first attempt to define clusters scientifically is attributed to Porter (1998), whose effect on the spread of cluster-related ideas in political and economic life cannot be overestimated. At the same time, however, according to the author, the basis of his work concerning clusters is the observations of Marshall (1890), preceding him by a century. According to his early definition "A cluster is the critical mass of specific sectors concentrated in one place and

*reaching unusual competitive edge*” (Porter, 1998, p.78). This definition is not complete without the description of the characteristics of clusters, which supplements the parameter of geographical concentration with the significance of the relations between the organisations.

Mills *et al.* (2008, referred to by Muro & Katz, 2010) also applies an approach built on geographical concentration, who defines regional clusters as follows: *”Regional innovation (or sectoral) clusters are the geographical concentration of interacting undertakings, suppliers, service providers and agents playing the role of coordinators operating in a defined area and such affiliated institutions as universities and institutions of public education [...]. through facilitating such processes as a common labour market, supplier specialisation or knowledge transfer; sectoral clusters are useful for the most diverse companies and regions by improving the local and innovation potential, encouraging entrepreneurship and ultimately helping productivity and the improvement of wages and employment..* (Muro & Katz, 2010, p. 11.).

Porter’s (1998B) initial definition attracted a number of critical remarks pointing out that despite its attractiveness for offering easy understanding, the boundaries of a cluster are hard to draw along this definition. Another concern is that empirical analyses did not prove that advantages arise from efficiency, which Porter (1998) attached to the clusters. As a response to criticism, he reformulated the definition of clusters by emphasising regionality: *”the geographical concentration of the competing and cooperating undertakings of a specific sector, related and supporting sectors, financial institutions, service providers and cooperating infrastructure (background)institutions (education, vocational training, research), and entrepreneurs’ associations (chambers, clubs) based on their innovative relations”* (Porter, 2000, p.16, cited by Deák, 2002, p.104.).

As an alternative, Porter (2000) suggested a significantly more lenient definition: *”Clusters are defined as the relationship between companies in geographical proximity, operating in the same industry, liaising with one another and the institutions related to them that are linked through their similarities and complementary abilities. The geographical dimension of the cluster may be a single town, an entire country, or a complete group of neighbouring countries.”* (Porter, 2000, p.16.). The reformulation of the above definition expanded the geographical boundaries of a cluster, further removed from Marshall’s concept (1890) of sector concentration and shifted the emphasis towards the interaction between the participating members. This approach raises the question: along which dimensions the cooperation of the cluster members differ from vertical integration (i.e. Porter’s model of the value chain) and from horizontally different sectors, which are close geographically (Hamdouch, 2010, 2007)? A further question is the nature of the relation between the cluster members. In the model suggested by Porter (1998, 2000), the essence of the relation between the members is an *informal relationship* ensuring efficiency and flexibility, which, however, fundamentally contradicts the formal relationship systems, facilitating innovation, deemed to have utmost importance by the industrial and innovation networks. What’s more, Porter (1998, 2000) explicitly attaches a low level of importance to the innovation potential of clusters (Hamdouch, 2010, 2007).

### **3.2. Definition of clusters by taking a network approach**

Following up on the cluster-related research of OECD (1999), in addition to the geographical approach to clusters proposed by Marshall/Porter, a network type of description of clusters focusing on the value chain has also appeared: *”A cluster is fundamentally a value generating production chain of production companies strongly dependent on one another (and their specialized suppliers), knowledge development organisations (such as universities, research institutions, design companies), the liaising institutions (brokers, consultants) and consumers.”* (OECD, 1999, p.5.)

This description refers to the formal nature of the relation system, although does not deny the existence of informal relations between the individual members of the organisations. Compared to Porter's (1998, 2000) approach, the OECD clusters are extremely open: *"In the knowledge-based economy the clusters of innovative companies form groups around the sources of knowledge. They use sophisticated infrastructure to expand, share and exchange knowledge and they are characterised by the high concentration and efficiency of relations between the entrepreneur, investor and research spheres. Clusters may take a number of forms, subject to technological and business specialisation. In most of the cases their operation can be geographically limited, within which they maintain relations with the bigger regional, national or international innovation systems. In a globalising world dynamic clusters play an increasingly important role in the ability of countries to attract capital, which contributes to the development of technological expertise, raising the interest of investors contributing to innovation, and utilising the benefits stemming from the international mobility of professional labour force."* (OECD, 1999, 5. o.)

One of the interpretations of the OECD model leads to making the clusters completely independent from the physical relations between the members and supposes a *virtual global learning environment* built on virtual technology (Passiante & Secundo, 2002). The completely open networks, free of geographical limitations, can be interpreted along such extension of the model, which may play a role in particular in the research phase of innovation (Nooteboom, 2004), although according to some sources the strengthening force of previous or existing physical relations is also necessary in knowledge transfer (Dahl & Pedersen, 2004). At the same time, Owen-Smith *et al.* (2002) points out that a physical relationship must not necessarily go hand in hand with geographical proximity. The physical distance between the cluster members leads to the concept of *global innovation networks* (GIN), which means the sharing of the research-development functions of large companies internationally and the existence of production and research centres intertwined across borders on the structural level – the latter satisfies the definition of *cluster* in all respects.

This approach was adopted by the European Union as well: *"a cluster is a group of independent undertakings (innovative start-ups, small, medium-sized and large companies as well as research organisations) operating in the same sector and region, whose purpose is to facilitate innovation through strong cooperation as well as by sharing the resources, experience and knowledge and to spread technology, information and social capital within the group."* (Lex Europa, 2006)

### **3.3. Definition of innovation clusters**

The pattern of my research was formed by domestic innovation clusters, and for this reason I found it important to analyse the nature of the individual definitions, as - independently from which approach we take from the above two - the basis of the definition of innovation clusters roots in the general clusters. After studying the literature, we can come across it in three types of approach: general, research networks and creative fields.

For the *general* definition of innovation clusters, Preissl & Solimene (2003) proposes the following formulation: *"A cluster is a group of organisations dependent on one another, which contribute to the implementation of the innovations of an economic sector or industry"* (Preissl & Solimene, 2003, p.61.)

In spite of its simplicity, the definition contains important elements. First of all, the cluster has an *innovation focus*. Secondly, although it does not rule out explicitly the benefits offered by geographical proximity, it does not suppose that the members belong together in a specific agglomeration, as the development of communication technologies allows the integration of the competencies into clusters *independently from geographical distance*. Thirdly, the

definition follows a *sector-based organising principle*. Fourthly, the innovation created by the cluster *provides benefits* not only for individual members, but for the *whole cluster*, due to which the cluster members may be seen as the elements of the innovation network and of the resources contributing to the creation of innovation and of the creative process. Fifth, according to the definition, *all kinds of organisations* may belong to a cluster, even if they do not have explicitly strong R+D potential by themselves.

The critical remarks on the definition of Preissl & Solimene (2003) highlight two points: it does not cover the informal relations within the cluster and leaves out of consideration those actors who do not directly contribute to the creation of innovation but affect its conditions (for instance, the underlying investor/financial groups, legal institutions, legislators). As some of the latter have geographically bound relevance, it is deemed to be the insufficiency of the definition that in the cluster's dynamics the members' locality is not taken into consideration.

Nooteboom (2004) applies a social/cognitive approach to understanding innovation clusters and networks and identifies the *research networks with three elements of these*:

- (1) Embeddedness, which incorporates *institutional* embeddedness (i.e. exposure to the regulation, tax or, as the case may be, legal environment), *structural* embeddedness (which has a connection with cluster parameters, such as its size, stability, etc.) and *relationship* embeddedness (whose essence is the strength of the cluster members' social and business relations).
- (2) *Cognitive distance*, which roots in the idea of subjectivism. In line with that, the individual members do not interpret reality at absolute value, but interpret it per person (per organisation) subject to their personal experience, which differs from the others' reality.
- (3) Clear distinction between *research* and *utilisation*. *Research* means the development of new abilities, while *utilisation* means the efficient use of the existing abilities and resources. Although both factors are necessary for the success of the organisation, the distinction between them is also very important as they require the fulfilment of contradicting conditions: utilisation requires the stability and standardisation of the organisation, while research requires the loosening of existing structures, the reformulation of elements and the disregard of standards.

According to the suggestion of Nooteboom (2004), the operation of clusters, embedded in an external environment, following the subjective objectives of the individual companies, follows the cyclic steps of research and utilisation. At the same time, according to the idea of *scaled clusters and networks* the steps of research and utilisation may take place at the same time: while the cluster members strive for utilisation in the individual geographical regions, elsewhere the cluster may open up for new relations serving the purpose of innovation. Moreover, as Hamdouch (2007) observed, it is also frequent that a cluster operates in a research mode for a long time and invests into innovation while "outsources" the functions of utilisation in another region – for instance, the Silicon Valley technological cluster keeps high-tech development at home, while outsources the production basis to Asian locations.

Hamdouch (2007) finds the theory of research networks suitable for making a clear distinction between *clusters* and *innovation clusters*: while clusters operate in the utilisation mode of the cycle, innovation clusters operate along the logic of the research phase.

The *creative fields* theory suggested by Scott (2006) may be specified by using three definitions supplementing one another: "*The field of creative forces may be used to describe any social relationship that would shape or influence human ingenuity and thus serves as the soil for innovation. In line with that, the field is rarely motionless in time and space as innovation generated by it has a reactive effect on it, through which the organisation itself and the logic of operation will both change*" (Scott, 2006, p.3.).

*”More specifically, the creative field includes all such economic efforts and organisations on any level of geographical locality, which facilitate development and bring about such a change that would induce growth”* (Scott, 2006, p.3.).

*”Even more specifically, the creative field appears in all such industrial activities and related social phenomena which cause such geographically definable interaction networks to appear which generate business and innovation results. The organic element of the definition is that the field and its impacts on business innovation continuously influence one another.”* (Scott, 2006, p.3.).

Although the theory of creative fields overlaps with other attempted definitions of clusters and innovation clusters at a number of points, according to Scott (2006) the concept is broader than that: it does not exclude culture from among the elements significantly influencing the clusters and strongly emphasises the reactive and interactive nature of the innovation process.

In my dissertation I regard innovation clusters as a network phenomenon building on *knowledge networks and cooperating innovation systems*. Their spreading and strengthening have a favourable effect on converting open innovations built on a broad knowledge basis and R+D results into market success, from the aspect of market orientation of innovations.

#### **4. EMPIRICAL RESEARCH**

In the course of studying literature it turned out that one of the keys to the success of innovative undertakings is that they should be members of such networks that facilitate access to information and knowledge and cooperation with the actors of the innovation chain (Bell & Zaheer, 2007; Zaheer & Bell, 2005; Koka & Prescott, 2002). And as I have already mentioned, among network arrangements, clusters were given increased attention in the course of the last two decades. In Western Europe and in developed market economies cluster oriented developments have been given preference as early as since the 90’s. In our country a long-term cluster development concept started in 2007.

In the process of domestic clustering, accelerating in recent years, we can find numerous examples of both success and failure. The most successful clusters have already gained a foothold on the international stage, while others came to a halt in their development, did not receive accreditation or discontinued. It is an important task to find out the reasons for being successful and for failure, and to draw the conclusions, both in respect of the work of market players and government regulations as well as cluster management. A number of analyses addressed the positive impacts of clusters on micro and macro level competitiveness, however, it is still a question what impression the already operating clusters leave behind and through that to what extent they encourage undertakings, the actors of scientific life and the research organisations to exploit the *cooperation possibilities* embedded in this form of organisation.

As I have already mentioned, in my doctoral research I strived to select reliable measurement models that have already been substantiated with accepted results published in literature as well as secondary research results. The main criterion for me was to *get to know the operation of domestic accredited innovation clusters from multiple viewpoints as well as their practice* of supporting cooperation. To this end, I applied the criteria of the *grounded theory* research method.

As I have indicated several times, the *main course* of my research was directed at the background the domestic innovation clusters ensure for *asserting market orientation in the innovation processes*. For this, among others, we have to examine the information flow within the clusters about existing and potential buyers and users; as well as the integration of that into the innovation decisions.

My scientific work also addressed the ways the domestic innovation clusters utilise their *own network resources*, and the *competencies necessary* for the realisation of market orientation within the networks operated by the clusters.

#### **4.1. Summary of the relations between the factors identified in qualitative research**

In the first, qualitative phase of my survey I managed to get into contact with *19 accredited innovation cluster management organisations, 4 innovation clusters not accredited any longer, and MAG Zrt., the Cluster Development Office responsible for the operation of clusters - (2 interviews)*.

In compliance with the principles of the Grounded theory, in order to have a better understanding of the research problem in the further phases of elaborating the theory even more companies have been involved, typically, the member organisations of the clusters but such institutions as well that had a relation with the accredited innovation clusters under review, but are not members of those. In this phase of the research I managed to reach *40 accredited innovation cluster member companies* and an additional *5 non member companies* including consultant organisations, universities, organisations operating on market basis, university research institutions, and financial consulting organisations.

Based on the results of the primarily qualitative research, I came to the following conclusions:

- Innovation clusters are relevant forms of organisation from the aspect of examining the *opening up of innovations and their market orientation*. They ensure a platform for cooperation wider than networks, and through participation in joint projects facilitate the creation of an atmosphere of trust, representing the precondition of knowledge integration.
- In the course of their cooperation the *members may help each other in the market utilisation of innovation ideas*, or the other way round, finding R+D ideas and solutions adjusted to the market opportunities and user requirements that are naturally affected by the internal organisational abilities of the specific companies.
- Owing to the opportunities arising from joint membership, *cooperation* may be deepened between the entrepreneurial sphere and the related institutions, and the – intra or inter-sector– cooperation of the clusters opens up additional space for exploiting the innovation potential.

My above described results are based on primary, qualitative research and highlighted the factors that affect the cooperation emerging in the domestic accredited innovation clusters and how these directly or indirectly influence the extent to which the innovations become market oriented:

- It may be concluded that the *clusters' own characteristics* (composition, industry-special characteristics, etc.) determine and affect the coordination and operation abilities of cluster management. In my research I found that the *sector-specific features* are very strongly manifested in the vision of the individual clusters, the criteria they use in admitting members as well as in the solutions and forms of cooperation they apply.
- Through the measuring of the member companies' *strategic and innovation competences*, those knowledge and management competencies may be identified that the organisations carrying out the individual cluster management tasks need in order to be able to manage and coordinate the cooperation existing (or to be built) between the member companies. In the professional interviews my assumption was confirmed according to which the successful operation of a cluster mainly depends on how *competent the cluster management is in creating an interacting and cooperative environment*.

- My qualitative research highlighted that *the relation marketing orientation scale may be applied* in exploring the relationship orientation of domestic accredited innovation clusters and in identifying that among its six factors foreseeably the most critical success factors are *trust, attachment, and communication*. As a consequence of the former, if member companies are characterised by a strong relation marketing orientation, it would affect the cooperation built by the member companies and thus indirectly innovation.
- The interviews also reflect that clusters *should not only be seen as an arrangement of geographically closely located companies, but also as a close innovative relationship system built in the interest of technological and knowledge exchange*, whose basis is clearly determined by the close proximity of the relations. In the analysis of this factor, relationship, organisation, institution, technological, social and cognitive proximity must also be addressed.

Based on the results of qualitative research I have analysed the following hypotheses and sub-hypotheses in further quantitative research:

- **H1: The external sectoral factors correlate with the internal abilities of member companies, and this way they affect cooperation within the cluster.**
  - *H1a: In the healthcare industry the competitive effects, while in the IT industry, both industry and competitive effects are more common.*
  - *H1b: Environmental factors affecting the member companies also influence the cooperation within the cluster, among which the impact of technology push is more typical.*
  - *H1c: In the case of member companies a strong correlation is apparent between the external factors and the internal abilities.*
- **H2: The dimensions of proximity in relations significantly affect the motivation of members to join, and consequently they determine the opportunities of the clusters to expand.**
  - *H2a: In the case of the clusters analysed, proximity cannot only be interpreted based on geographical criteria but also in terms of the dimensions of proximity in relations.*
  - *H2b: The relationship marketing orientation apparent in the case of member companies correlates with the dimensions of proximity in relations.*
  - *H2c: A closer proximity in relations provides a more favourable medium for asserting the dimensions of relationship marketing orientation.*
- **H3: The member companies' strategic and innovation abilities strongly influence intra-cluster cooperation.**
  - *H3a: The dimensions identified during the qualitative research are suitable for surveying the member companies' strategic and innovation competencies.*
  - *H3b: Strategic and innovation abilities influence innovation through cooperation.*
  - *H3c: The market orientation of companies with strong abilities is also stronger.*
- **H4: The extent of relationship marketing orientation influences the extent of the cooperation market orientation apparent in the cluster.**
  - *H4a: The relationship marketing orientation scale is applicable to explore the relationship orientation in the case of the organisation types under review.*
  - *H4b: Among the dimensions of relationship marketing orientation the most critical success factors are trust, attachment and communication.*
- **H5: Out of the factors of market orientation the effects of inter-organisation coordination and information flow are more significant in the case of cluster member companies.**
  - *H5a: The extent of intra-cluster cooperation and market orientation jointly influence the market orientation of innovations.*

## 4.2. Main elements of quantitative research

The results of the research of the literature and of the revealing qualitative research phase underpinned the questions my research focused on as well as the analysis phenomena. Thanks to the application of the Grounded Theory, the analysis categories have also become more clearly defined. In the quantitative questionnaire the goal was to conduct a statistical analysis and substantiate or discard the *relationship between the individual factors, i.e. sectoral impacts, strategic and innovation competencies, relationship marketing orientation, proximity in relations, market orientation.*

In my quantitative research I examined two main target populations.

- *One of the target populations* was the clusters' management organisations, which *during this time acquired or extended their accreditation title.* This population contained a cluster management organisation consisting of *27 elements.* My sampling frame was the *database of the Cluster development office.* The questioning took place by using a combined method, both *personally,* and *online.* The sampling method was census.
- *The other target population included those organisations* that during this period *were the members of an accredited innovation cluster.* This approximately covered *900 organisations* (profit oriented, non-profit, state). My sampling frame was the *databases and websites* of the individual accredited innovation clusters. The questioning took place by using a combined method, both *personally,* and *online.* The sampling method in this case was the *snowball* (there was such a cluster manager whose recommendation I used to reach the cluster members), and *full sampling* (all the companies included in the database received online access to the questionnaire).

In the statistical analyses I determined the acceptability of my hypotheses by using the main component method, factor and cluster analysis, as well as t-value and separated  $\beta$ -test calculation, which are described below.

Thanks to the cluster analysis, I could characterise the cluster members appearing in the sample, which proved that different actors in the analysed industries consider different effects important. It is important to highlight that the dominance of the four main industries in the sample - IT, health, environment and energy - influenced the final results. Depending on the cluster analysis, I can only partially accept my sub-hypothesis H1a (*In the healthcare industry the competitive effects, while in the IT industry, both the technological complexity and the dynamic change of the environment effects are more common*) because in the terms of results the importance of the competitive environment did not appear as a significant setback in healthcare, however, in the IT industry, both technological and competitive effects are more characteristic.

Based on the results it may be concluded that in the case of cooperation, *the dynamic change of the environment* ( $0.328, p < 0.01$ ), and *technological complexity* ( $0.250, p < 0.01$ ) have a *moderately strong correlation* with the R+D cooperation activities. I used the separated  $\beta$  test to analyse how strong the relation is between the total value of the cooperation activities and the total value of the sectoral effects ( $t = -3.038, p < 0.05, r = 0.204$ ). The analysis showed a moderately strong relation, which confirms that the sectoral effects and the cooperation activities have a connection. Subject to the above, *I have accepted only partly* the second sub-hypothesis of my first hypothesis, i.e. *H1b sub-hypothesis*, as among the environmental impacts, in addition to the technological environment, the dynamic change of the environment also determines the intra-cluster R+D-related cooperation activities.

The third sub-hypothesis of my hypothesis, i.e. *H1c*, is also *partly acceptable*, as apparently there is stronger than medium correlation between the factors reviewed – *information dissemination, product development, internal innovation, reaction, innovation ability, proactivity abilities* (it takes a value between  $r = 0.206$  and  $0.641, p < 0.01$ ). It is only between

the technological effects and the product development abilities of the companies included in the sample where a stronger relation is observable ( $r=0,641$ ,  $p<0,01$ ).

Building on the individual analyses, *I accept my first hypothesis (H1), according to which the external sectoral factors correlate with the member companies' internal abilities, as it can be concluded that this is what they adjust their strategic and innovation skills to, which also affects the quality of the intra-cluster cooperation.*

*I have accepted the first sub-hypothesis of my second hypothesis (H2a), as, thanks to the cluster analysis and correlation analysis, the cluster members included in the sample can be characterised. Based on the results it may be stated that upon the entry of the member companies the criterion of joining a cluster is not only geographical proximity, but in the case of the majority organisational and institutional (1.282 factor weight), and social factors (1.042 factor weight) also play a role in that.*

As a result, for further correlation analysis I also accepted the second sub-hypothesis of my second hypothesis (H2b), as the abilities identified by the relationship marketing orientation scale (empathy and common value, trust and attachment, reciprocity and communication) are important for the various dimensions of proximity in relations to evolve (*between the value of  $r= 0.284$  and  $0.494$ ,  $p<0.01$* ).

In order to verify the third sub-hypothesis (H2c) I analysed the relations between proximity and relationship marketing orientation. Based on the separated  $\beta$ -test it may be concluded that there is a moderately strong correlation (0.387) between them with 0.000 significance. This made me draw the conclusion that those organisations that keep in sight those criteria of the proximity in relations I analysed (except geographical proximity) better assert the defined dimensions of relationship marketing orientation in the area of cooperation. Thus I also accept my third sub-hypothesis.

As a result of the above analyses it has been proven that *H2 hypothesis is acceptable, as the dimensions of the proximity in relations significantly affect the members' motivation to join a cluster and thus determine the clusters' opportunity to expand.*

Examining the above-described dimensions of the member companies' strategic and innovation abilities, thanks to the main component analysis, the factor structures used by the individual factor groups became apparent. Based on the KMO indicator (0.840) and the Barlett-test ( $\chi^2=2398.961$ ,  $Sig=0.000$ ) the criteria of conducting a main component analysis have been met. Based on the eigenvalue and the elbow criterion I took into consideration those variables in the case of which the eigenvalue was higher than 1 as a result of that, and based on the explained variance ratio (76.47%) I accepted the six-factor solution. Thanks to the analysis I have accepted my H3a sub-hypothesis.

As a result of the further correlation analysis it can be concluded that the strategic and innovation abilities affect cooperation, which influences the quality of the innovation projects to be implemented. Therefore, *I could also accept my second sub-hypothesis (H3b), as it has become apparent also based on the separated  $\beta$ -test that the totality of abilities and the cooperation activities (in total) have a poorer than medium correlation ( $r=0.285$ ,  $p<0.01$ ), which also proves that a certain type of relation is apparent between the two groups of factors.*

Looking at the total abilities ( $r=0.462$ ,  $p<0.01$ ), and both the internal ( $r=0.442$ ,  $p<0.01$ ), and sectoral abilities separately ( $r=0.442$ ,  $p<0.01$ ), a moderately strong correlation is apparent with the market orientation indicator. All the above substantiated the third sub-hypothesis of my third hypothesis (H3c), which I have accepted.

Thanks to the above analyses, the third main hypothesis has been verified, that is, the H3 hypothesis, i.e. *"The strategic and innovation abilities of member companies strongly influence intra-cluster cooperation" is demonstrable in the sample.*

In order to analyse the H4a sub-hypothesis I have conducted the main component analysis based on the KMO indicator (0.813) and the Barlett-test ( $\chi^2=2398.961$ ,  $Sig=0.000$ ), the criteria

of which have been met. Based on the eigenvalue and the elbow criterion I took into consideration those variables in the case of which the eigenvalue was higher than 1, and as a result of that and based on the explained *variance ratio* (74.27%) I have accepted the four-factor solution.

Based on the above, *I could only partly accept the H4a sub-hypothesis*, which concerned the applicability of the relationship marketing orientation scale, because of the preliminarily set 6 factors, the statements were true for 4 factors (empathy and common value, trust and attachment, reciprocity and communication) in the case of cluster membership.

From the four defined dimensions during the separated  $\beta$ -test *communication* received the highest value. The difference between the mean value of the communication dimension (5.43) and the value of the *subsequent reciprocity* (5.34) *is also statistically significant*. In the third place we can find the *emphaty and attachment dimensions* where we can also see a significant difference between *the reciprocity* value in front of it. The lowest rating was given to *trust and attachment* (4.04), which was also significantly lower compared to the dimensions before it in the evaluation.

Based on these, I can only *partially accept my second sub-hypothesis* (H4b), according to which "*Among the dimensions of relationship marketing orientation the most critical success factors are trust, attachment and communication*". Because the evaluation *proves the importance of communication*, but trust and attachment are at the lowest level. All this can also be explained by the fact that each of the other dimensions influences the development of trust and attachment, for example, if reciprocity is not met within the cluster, it will sooner or later lead to conflict.

To test the fourth main hypothesis, it was important to examine the relationship between relationship marketing orientation and each dimension of market orientation. It can be said that between *relationship marketing orientation and market orientation a moderately strong correlation* ( $r=0.672, p<0.01$ ) is apparent, which proves that there is a relation between the two groups of variables, thus market orientation is stronger in the case of member companies with higher relationship marketing orientation. As a result, *I have accepted my H5b sub-hypothesis as well*.

All in all, I could accept only partly the main statement of my fourth hypothesis, i.e. "*The extent of the relationship marketing orientation affects the extent of cooperation market orientation apparent in cluster*".

In the case of the first sub-hypothesis of the fifth hypothesis (H5a) I have examined the relation between the *cooperation activities and the market orientation levels*. The analysis came to the conclusion that each market orientation dimension has a relation with one of the cooperation activities. In the case of sales activities moderately strong positive correlation is apparent both in the case of buyer orientation ( $r=0.234, p<0.05$ ) and competitor orientation ( $r=0.473, p<0.01$ ). In the case of explicitly R+D activities more forceful correlation is apparent in relation with buyer information ( $r=0.415, p<0.01$ ) in the relation between buyer orientation and the organisations. Along this analysis *I have accepted my H5a hypothesis*.

In relation with the H5 hypothesis I describe the individual dimensions of market orientation that I calculated as the simple arithmetic mean of the values of the *5-4-2 variables* measured on the seven-grade scale linked to the specific factor, and I calculated the value for the overall sectoral effect also as the simple arithmetic mean, calculated for the complete scale (*12 statements*). The results show that of the three dimensions determined *buyer orientation and inter-organisation buyer information* were given the highest value. The difference between the average value of the dimension (5.38) and the coordination of the organisations following that (5.36) is not significant. This may also be explained by moving certain elements of the inter-organisation coordination to the buyer orientation factor as a result of the factor analysis. The lowest value was attached to competitor orientation (4.61), which is significantly lower than

the value of inter-organisation coordination, preceding it in the evaluation. Subject to this *I have accepted my H5 hypothesis as well.*

Both the research of the literature and my qualitative and quantitative analyses confirmed that a relation is apparent between the factors identified (sectoral effects, organisational abilities, relationship marketing characteristics, proximity dimensions and the market orientation of cooperation). It may be concluded that the clusters represent an actually good background of cooperation in terms of the market orientation of innovations.

## 5. THESES

My dissertation in the first place seeks an answer to the question whether the market orientation of innovations may be strengthened in the case of domestic accredited innovation clusters, as such platforms may be created in such clusters in which the r+d+i capacities may be concentrated and exploited more efficiently through cooperation and knowledge integration.

To this end in my research I examined how the clusters can facilitate the understanding of the market changes, the acquiring, dissemination of market information and its integration into the innovation processes. I also analysed what strategic and innovation abilities the clusters-member organisations have and, owing to all these factors, in the case of intra-cluster cooperation to what extent the market orientation of implemented innovations is asserted. Naturally, it was important to mention those factors as well that affect successful cooperation, which significantly influence both intra-cluster relations and relations between the member companies.

After the research of literature, following the principle of grounded theory, in the form of multi-round professional interviews I conducted discussions with cluster management organisations, member organisations, consulting organisations and the representatives of the domestic cluster development office. Based on these I have explored how the individual organisational and relation abilities are connected to cooperation. Thanks to preliminary exploratory analyses I have conducted a questionnaire survey to examine to what extent the individual examined behavioural characteristics affect one another. Responses were recorded on two samples: with the representatives of the cluster management organisations of the accredited innovation clusters, and in the circle of the member organisations of the accredited innovation clusters.

In the following my scientific results will be described.

*T1: The sectoral effects highly influence innovation clusters, and it can be observed in the members' internal abilities and the internal operation of clusters. As a consequence, the cluster management has to put emphasis on that (both in the area of operation and services) similarly to companies intending to join. Furthermore, in order for innovations to be successfully on the market and the extension of clusters necessary for that, clusters must take into consideration more dimensions of relation proximity – cognitive, organisational-institutional, social, and technological. In the interest of successfully joining members and common work, cluster management has to assess the proximity of candidates in several dimensions and the proximity must also be maintained in order to ensure the market success of innovation (as all these lead to relationship marketing orientation, more powerful buyer orientation and presumably more successful innovation).*

*Own related publications: Kovács, 2019; Kovács & Petruska, 2016; Kovács & Petruska, 2014*

Based on my qualitative results it can be concluded that the *sector characteristics manifest themselves in the strategy and operation of the individual clusters, as well as the criteria of accepting members, and the solutions and forms of cooperation they apply.* Furthermore, the

quantitative analysis confirmed that the *cluster members' innovation characteristics and market endeavours show a correlation with the sector-specific features*, as a relation is apparent between the sectoral effects and the strategic and innovation abilities of member companies. It may also be concluded that the effects of the above competition authority be observed in the case of intra-cluster cooperation activities.

Based on the analyses it may be established that *although the technological pressure proved to be more typical - even because of the composition of the sample analysed - but the results underpin the similar-level strength of the pull orientation, which is also important from the aspect of the analysis of market orientation*. This is true not only for clusters but also for the member organisation, especially *in respect of the product development abilities*, which may be related to market orientation, also from the aspect of satisfying the market needs. Naturally, this is not surprising, as in those sectors (for instance, IT, food and beverages) in which the impacts of the *technological environment* are more apparent, these highly influence the developments to be implemented, and thus the market orientation of innovations as well.

In addition to the above, in the case of the clusters analysed it may be concluded that *the dimensions of the proximity in relations actually affect the members' motivation to join*, which this way also influence the cluster's opportunities to expand, therefore they have an impact on the creation of the communication strategy focusing on the expansion of members, as well as the internal communication strategy. Furthermore, the dimension of the proximity in relations separately and also reinforcing each other's effect may facilitate the *flow of knowledge and cooperation*, as due to the broad network platform the members of the clusters include actors with different knowledge, competencies, technical and market views, and organisational background. Thanks to that, the clusters, building on various knowledge bases, provide a broader view of the complete innovation value chain, and with their help the specialised fields of science, technical development, manufacturing and marketing may be linked.

In respect of my analyses I managed to prove that in the case of the proximity in relations, the geographical factor is only an umpteenth criterion in the case of the joining member organisations and rather its cognitive, organisational-institutional, social and technological dimensions are significant. I also demonstrated that there is a relation between the extent of the relationship marketing orientation and the quality of the proximity in relations, that is, it may be concluded *closer proximity in relations provides a more favourable ground for the assertion of the dimensions of relationship marketing orientation*.

*T2: The clusters' market oriented innovation activities – in addition to their actual innovation abilities – are highly influenced by the extent and quality of the cooperation emerging along other abilities of the members. Therefore, in addition to the strengthening of the innovation activity, the cluster management and the members must lay special emphasis on these factors, that is, the development of information dissemination, reaction, product development, internal innovation, and technological abilities, which is made possible in our country also by the spread of open innovation. (Own related publication: Kovács & Petruska, 2016 Kovács & Petruska, 2012)*

In the qualitative analysis it was revealed that *the market orientation of innovation* requires the participants to have *certain competencies*, as these abilities have an indispensable role in the creation and development of all these. Based on the results of both my qualitative and quantitative analyses it can be concluded that the *information dissemination, reaction, internal and external innovation and technological, and proactivity abilities* also play an important role in the case of the strategic and innovation abilities of the cluster members under review. Results show that these abilities actually influence intra-cluster cooperation and through this influence the market orientation conduct the individual member organisations follow in the case of

cooperation, and the implemented r+d processes. Therefore, for cluster management it is an important task to strengthen these organisational and strategic abilities, with special attention to successful and efficient communication (ability to disseminate information).

The results underpinned that the strategic and innovation abilities affect cooperation, which in turn influence the quality of the innovation projects to be implemented. I have also proven that there is a moderately strong relation apparent between the abilities and the market orientation, i.e. it may be concluded that the existence or lack of these abilities influence also how the member organisations *manage the corporate activities necessary for innovation both within the organisation and the cluster.*

*T3: In the interest of successful cluster activity (and market oriented innovation implemented through that) it is not sufficient for the cluster member companies to concentrate on r+d in respect of their own internal abilities, but they have to develop their relationship orientation as well, focusing on communication. The management of member companies must be aware of the factors of relationship marketing orientation, and the possibilities of its development, and this activity must naturally be supported by the cluster management.*

*Own related publication: Kovács, 2019; Kovács & Petruska, 2014*

Based on theoretical and practical analyses I have proven that *certain factors of relationship marketing orientation help* understand those effects and organisational features that urge or hinder the players to mutually utilize the advantages of relations and at the same time they would also create and offer possibilities for cooperation. It may be concluded that all these influence the level of market orientations of the implemented r+d cooperation.

The results show that *although the relationship marketing orientation scale can be used to explore the relationship orientation*, however, out of the six factors used based on the original scale four factors are necessary to create in the case of cluster members: *empathy and common value; trust and attachment; reciprocity and communication*. I have also proven that *in case of member companies of higher relationship marketing orientation the market orientation is also stronger*, as the strong reciprocal influence (0.672 correlation) of the two factors could be demonstrated.

Based on the results it may be concluded that among the individual relationship marketing orientation dimensions although *communication is one of the most critical success factors*, trust and attachment move on a lower level based on the responses of the member companies included in the sample. The analysis and knowledge of the individual dimensions of the relationship marketing orientation influence the extent of market orientation of the innovations within the clusters. For the cluster management organisation to be able to exploit the potentials it is important for them to know the importance of the individual relationship dimensions in the case of cluster membership.

*T4: In the case of domestic innovation clusters in order to make innovation market oriented, it is not the r+d activities that have to be improved first of all, but the intra-cluster cooperation, especially coordination between the organisation and information flow. Therefore, the services of cluster management are highly emphasised, as these service determine the quality of cooperation within the cluster.*

*Own related publications: Kovács, 2019; Kovács & Petruska, 2012*

Both the research of the literature and my qualitative and quantitative results underpin that *clusters provide favourable organisational conditions for cooperation built on the sharing of knowledge and this is how they increase innovation performance*. It may be concluded that the cooperating partners can integrate their competencies and resources not only on the technical

side, but they may help each other in the successful market utilisation of innovative solutions as well. Indeed, through the cluster relations and the supportive participation of the management organisation it is easier to have access to market information, there is a broader view of the market and the competition is easier to understand.

Furthermore, the results substantiated that the marketing concept is asserted in case of cooperation in place, that is, the operation of organisations may be described in the corresponding way of thinking, behaviour patterns, thus the market orientation of innovation can also be analysed.

It is also to be taken into consideration regarding the results of the analysis that the sample under review deemed *buyer orientation and the inter-organisational dimension* a more important factor in the analysis of the market orientation of intra-cluster cooperation than competitor orientation. In respect of my earlier sub-hypotheses, however, my statements were acceptable as it could be demonstrated that the extent of the intra-cluster cooperation and market orientation affect the market orientation of innovation. I have also concluded that *the more diverse the members are, the bigger the burden on the management is*, as it is not an easy task to harmonise the differing interests of small and large companies taking part in cooperation and of the entire cluster. On top of that, the members in several cases are company groups, which makes the reconciliation of interests related to specific innovation projects even more complex. Therefore, in summary, it may be concluded that *in the case of cluster member companies a connection is apparent between the individual analysed dimension and the factors of market orientation*, and the cluster management services also have an effect on all these.

## 6. SUMMARY

My research is an attempt to contribute to gaining a better knowledge of domestic accredited innovation clusters, and to have a better understanding of the factors influencing intra-cluster cooperation. *The results, this way, expanded the criteria of the analysis of clusters and form a kind of framework for future research.*

I have identified the factors that affect the innovation activities performed within the clusters, then narrowing down, the factors that influence cooperation, and these impact the market orientation of innovation evolving from cooperation, which are important criteria in the analysis. On top of that, in my work I applied accepted and well-known measurement scales and transferred these scale statements in the context of the accredited innovation clusters my examination focussed on, thus the individual factors were given a new interpretation. In relation with that I interpreted the *relationship marketing orientation, proximity in relations, and market orientation scales* used in the measurement *for the entire cluster and analysed in the context of the joint projects, and activities*. Along the analyses those interrelations could be identified through which on sector, corporate and cooperation level the groups of factors under review relate to one another, thus *supporting the interpretation of the implemented market orientation in the context of innovation.*

In addition to the redefinition of the criteria of analysis, my research also has a *methodological* significance, since as a result of applying *the grounded theory as it facilitates a new approach for the exploration and understanding of the factors drawn under review*. Only few scientific research has been made so far among the analyses of clusters that described such a method and data. The main reason for that is that this type of methodological approach requires a longer time frame and more resources than the qualitative, professional interview technique, for which a couple of persons are needed.

Its *comprehensive nature* constitutes the practical significance of the results of the research. The grounded theory applied in research ensured the more in-depth understanding of the motivation, conduct and expectations of cluster management, cluster membership and external

actors through the exploration of qualitative information, thus providing inputs worth considering about the cooperation built. In addition to that, during the quantitative analysis inquiries were conducted both in the cluster management organisations and the cluster members – along the factors identified in the course of qualitative research.

On top of that, my research spans over several sectors, overreaching the research of innovation clusters appearing in individual sectors. In relation with the concerned fields of science it is important to highlight that in addition to the marketing management approach focusing on market orientation, the research also has organisation-centred management results. I have explored *those factors as well that highly contribute to the successful work of cluster management and the member organisations*, thus bringing to surface such viewpoints new for them, through which they can improve their measures aimed at the admission of new members and supporting internal cooperation.

The limitations of my research arise partly from its subject, frames and partly for methodological reasons. One of the limitations of my research is that the target population used in the empirical analysis went through major changes in the last seven years, therefore, despite the relevance of the research questions in all the populations, due to these changes the composition of the target population involved in qualitative and quantitative analyses became different. Regarding the sample analysed it is important to mention that in the sample of the member companies only four industries were represented in a bigger element number. Furthermore, unfortunately due to financial and time limitation the element number of my quantitative research of member companies cannot be considered large, and since I used the snowball method in sampling the representativity of my analysis got also compromised. Due to the variable, and the small sample in the future a larger-scale research should be performed by all means, in which the representatives of more sectors could be contacted. Along such a research, a different type of analysis methodology applicable in case of a bigger sample overreaching the analyses I used in quantitative research may be applied, which may allow to identify additional correlations.

It can also be seen as a methodological limitation that I formulated the scale statements, for instance for the innovation and strategic abilities, based on the results of the qualitative research, thus I did not examine these factors along a generally accepted scale. The further testing and analysis of these abilities should be one of the important elements of future research as well as their integration with abilities already tested in other research.

In addition to the above outlooks, a further possibility of research is conducting an analysis overreaching the dimensions I used or analysing those more in depth, as although my research is broad in terms of the analysis dimensions, it would be important in the future to measure the significance of the individual dimensions in such research that focuses only on the individual partial elements. This way, at the same time, the willingness of completion and responding can also be improved.

However, in addition to the above I have to say that the results of the research described in my dissertation, even considering its limitations, fill a gap as such an extensive analysis has not been made in the past 10 years about innovation clusters, and it also fills a gap in the sense that it may be viewed as a piece of work serving as the basis of future research.

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