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COOPERATION OF AGRI-FOOD CLUSTERS WITH UNIVERSITIES: THE CASE STUDY FOR POLAND

Joanna WIŚNIEWSKA-PALUSZAK[1]*, Krzysztof KOSZELA[2], Izabela LIPIŃSKA[3], Lucyna PRZEZBÓRSKA-SKOBIEJ[4], Anna WIELICKA-REGULSKA[4], Arkadiusz SADOWSKI[4], Olga GRABOWSKA-CHENCZKE[5]

[1]Department of Economics, Poznan University of Life Sciences, Poland
[2]Institute of Biosystems Engineering, Poznan University of Life Sciences, Poland
[3]Department of Law and Organization of Agribusiness Enterprises, Poznan University of Life Sciences, Poland
[4]Department of Economics and Economic Policy in Agribusiness, Poznan University of Life Sciences, Poland
[5]Department of Social Sciences and Pedagogy, Poznan University of Life Sciences, Poland
* Corresponding author: joanna.wisniewska-paluszak@up.poznan.pl

ABSTRACT

Poland is a major supplier of food for Western Europe. It ranks 4th in the EU in arable land. Agri-food industry clusters are developing dynamically in Poland, which is mainly related to the agri-food specialisation of most regions of the country. Clusters play a significant role in creating supply chains, joint investments, and developing innovative solutions; for these reasons, their development depends on cooperative relations with scientific institutions, which become initiators of joint activities. This paper aims to investigate collaborative relationships that arise between agri-food clusters and universities. The article analyses an example of an agri-food cluster from the Greater Poland region, which mainly develops modern distribution channels of food products produced by its participants. To obtain data, we interviewed cluster management. We elaborate on the concept of university-cluster collaboration (UCC) which identifies that the cooperation between cluster participants and the universities bases on creating interpersonal relations by direct and personal interactions between cluster entrepreneurs and university research staff.

Keywords: *University-Cluster Collaboration (UCC), Cluster Initiative Centre, Agri-food Industry Cluster.*

INTRODUCTION

The competitiveness of the Polish agri-food sector may result from different factors, including the support for the development of clusters which play an increasingly significant role in creating supply and value chains, R&D, relational investments and open innovations (Wiśniewska-Paluszak, 2018). One of the most

critical factors of their development is the creation of knowledge and new technological and organisational solutions for industry. Therefore, universities are required leaders of cluster initiatives bringing together knowledge of different disciplines with the practice (Claver-Cortés et al., 2020; Kolomytseva and Pavlovska, 2020; Reichert, 2019; Wyrzykowska, 2015). For these reasons, the development of clusters depends on collaboration with universities and other research institutions, which become initiators of joint research (Reichert, 2019). According to M.E. Porter (1998), clusters are the prevalent future of the globalised economy, because they create regional competitive advantage by enhancing productivity, innovation, and new business formation. Therefore, the concept of university-cluster collaboration (UCC) is economically and socially vital. This paper aims to investigate collaborative relationships that arise between agri-food clusters and universities. The article analyses an example of the Southern Wielkopolska Food Cluster (pl. Klaster Spożywczy Południowej Wielkopolski), which mainly develops modern distribution channels of food products produced by its participants (www.klaster.kalisz.pl).

MATERIALS AND METHODS

This research is a case study of a qualitative approach and descriptive. It develops and explores an analytical concept of university-cluster collaboration (UCC). The case investigated is a cluster cooperating with universities located in the region. The data come from a review of the literature, including theoretical and empirical studies, documentary and textual analysis of publications, reports and documents of the studied cluster, and semi-structured interview with the President and university representative in person as well as direct observation.

RESULTS AND DISCUSSION

The analytical concept of University-Cluster Collaborations (UCC)

Universities create values and impact society in several ways. Traditionally they carry out scientific research and education (Dobrowolski, 2016). Nowadays, in knowledge-driven economies, the third mission of universities is connected with the practice of innovation and entrepreneurship. Both of them are more dependent on interdisciplinary networks, clusters and ecosystems spanning across many organisational, institutional and cultural boundaries, and facilitate by geographical and social proximity. The practical involvement of universities includes research partnerships, collaborations as well as services for industry partners located in the vicinity of industrial areas (Claver-Cortés et al, 2020; Kaloudis et al., 2019; Ankrah, and AL-Tabbaa, 2015). Commonly found tensions between universities and industry come mainly from diverse organisational perspectives, interests and objectives (Kaloudis et al., 2019; Ankrah, AL-Tabbaa, 2015). They may especially cause difficulties in triple helix clustering.

Table 4 Essential tensions between university and business and expected outcomes of UCC

Area	Tensions		Outcomes
	University	Business	
Knowledge	Creation, education, theorisation, cognition	Innovation, implementation, commercialisation	Sharing and co-creation of knowledge
Method	Systemic, interdisciplinary	Technological specialisation	Addressing social and ecological challenges
Financing	Public or private funding	Self-financing	Fundraising, profiting
Time horizon	Long-term, solutions to scientific problems	Short-term, solutions to current, operational problems	Contract research and consulting for specific solutions
Tangible Resources	Research infrastructure	Technical facilities and equipment	Access to research and technological facilities
Intangible Resources	Reputation, prestige, legitimacy	Private and undisclosed modes of operation	Spin-offs, complementary expertise
Management	Bureaucratisation, formalisation	Flexible, unformal, project-and profit-oriented	Managerial and networking skills
Research	Basic, public dissemination of research outcomes, citations	Applied, professional and technological confidentiality, patents	Collaborative or sponsored research, research partnerships and publications

Source: own elaboration based on: Jami, Gökdeniz 2020; Alrajhi and Aydin 2019; Kaloudis et al., 2019, Signorini, 2019; Rybnicek and Königsgruber, 2018; Zhou, 2017; Ankrah and AL-Tabbaa, 2015.

However, there are also drivers of social capital resources, such as commitment, trust and ongoing long-term relations between partners, especially for reducing commonly found tensions (Kaloudis et al., 2019). The successful academic leadership focuses on long-term strategic partnerships with a shared vision and strategy to achieve goals. The key individuals with an understanding of both academic and business worlds are the driving force behind successful partnerships (Awasthy et al., 2020; Kaloudis et al., 2019). When mutual understanding and ability to overcome the barriers are more potent than cultural and organisational differences, tensions, and conflicts, then expected outcomes are possible including mainly obtaining necessary resources and generating synergies of UCC (Table 1).
The importance of the UCC differs across scientific fields and industry sectors. Some studies indicate that specific industry sectors and scientific fields have significant potential for cooperation (Kotiranta et al., 2020; Kaloudis et al., 2019; Bekkers and Freitas, 2008). Science-intensive sectors such as biotechnology,

pharmaceuticals and chemicals have strong complementarities with basic academic research and tend to rely on research partnerships and to some degree on research services (Kaloudis et al., 2019). Also, agricultural and economic sciences show significantly higher propensities to interact with industry and have higher intensities of interaction. Increased powers of exchange are in more resource-oriented sectors like agriculture. In particular, in agri-food industries, cross-science and cross-sectoral knowledge sharing are essential for sustainable development (González-Morenoa et al. 2019; McKelvey, Ljungberg 2017). Knowledge interactions of agri-food sectors are on a few fields of science, like agricultural engineering, biology, chemistry or economics (Schartinger et al., 2002). Such sectors as food production rely more heavily on university research than others.

State of agri-food clusters in Poland

Poland's agri-food sector produces a variety of agricultural, horticultural and animal origin products. It is one of the most important and influential areas of the Polish economy (Kiełbasa, 2015). However, over the last 30 years, the Polish economy has experienced many changes and transformations, and the Polish agri-food sector has undergone a significant shift. It evolved from a relatively backward sector, using outdated technologies and production methods, has grown into a modern and dynamic business (Igras, 2014; Kiełbasa, 2015; Szczepaniak and Wigier, 2020, Wigier, 2014, Figiel 2014). Agri-food sector is currently the fourth largest sector of the economy in Poland, and its contribution to the country's GDP is much higher than the EU average (Igras, 2014). In 2019, the agri-food sector accounted for 2.5% of the total value-added, and it employed nearly 9.0% of the economically active population (EC, 2020). In the last 30 years, the competitiveness of the Polish agri-food sector has significantly increased in the European and global markets (Kowalski and Wigier, 2014).

Investigation of clusters in the agri-food sector began in the first decade of the 20th century (Stryjakiewicz and Dyba, 2014). In Poland, the early research on clusters dates back to 1989. In 2002, an analysis showed 18 sets located in 8 voivodeships (Szultka and Brodzicki, 2004). At the end of 2007, there were 33 clusters in Poland, including only one agri-food cluster, namely Ecological Food Valley Cluster of University of Entrepreneurship and Administration in Lublin (PARP, 2012; Kacprzak, 2014; Słoniec et al., 2016). Until 2012, there was a total of 212 cluster initiatives, including 20 in the agri-food sector (PARP, 2012). In 2015 cluster map included 134 clustering groups operating in Poland, including 5 clusters in the food industry (Buczyńska et al., 2016).

Although there are about 20 initiatives in the food industry clusters, they are significantly fragmented. There are three initiatives in each Lublin, Łódź, Podlaskie and Warmińsko-Mazurskie voivodship, and the other cluster initiatives scatter across the other twelve voivodships. Clusters in Poland are both strictly sectoral and regional (Wierzejski and Nasalski, 2014). Several Polish regions distinguish for clustering (www.clusterobservatory.edu/data). The potential of

these regions is very favourable in the context of the possibility of creating new cluster structures (Wierzejski and Nasalski, 2014).

The activity of the Southern Wielkopolska Food Cluster

The Southern Wielkopolska Food Cluster (pl. Klaster Spożywczy Południowej Wielkopolski) was established in the form of an association on the initiative of three regional chambers on the 16th of September in 2009 (Spychalski, 2014). It currently has 37 regular members, including numerous R&D institutions. The mission of the Association is to create in the southern Wielkopolska a stable and robust organisation able to meet the continually changing needs of the agri-food sector (Spychalski, 2014).

Various factors determine the cluster's efficient operation. The internal one comes from clustering companies and in particular from the relations between them. Other factors are external related to the area, mezzo and macro environment. The critical success factors of cluster organisations are: advantageous location to sources of supply and proximity to partners (Hinzmann et al., 2019), production and service traditions and work culture and level of knowledge in the field (Isaksen, 2016), experience in developing new technologies (Ibragimova and Golovkin, 2019), experience and skills of management staff (Kamath et al., 2012), the ability to monitor the environment, forecast changes and plan strategically (Klofsten et al., 2015), a high level of automation in production processes (Götz, Jankowska, 2017) and mutual trust in relations between cluster participants (Mueller and Jungwirth, 2016). These factors are discussed below in the context of the South Wielkopolska Food Cluster.

The critical condition for the excellent functioning of the industrial cluster is its convenient location to crucial resources. The studied cluster has located in the area of intensive cultivation of vegetables and fruits since the inter-war period thanks to the agricultural and food processing plants created in this region in Pudliszki and then in Kotlin. Large processing factories caused agricultural and fruit production to flourish in this region. Along with agri-food processing, machine manufacturers for the agri-food industry develops. In this way, it creates a group of companies living in symbiosis. The industrialisation of the local agri-food sector allowed to increase the productivity of production factors and, consequently, created a regional competitive advantage. The long-term specialisation of companies has allowed to gather knowledge and create a unique working culture supported by the experience of employees.

Geographical proximity, although it significantly facilitates companies to establish useful contacts and a better understanding of the needs of business partners is not always a guarantee of mutual trust among cluster participants. In turn, mutual trust is necessary to take advantage of the specialisation and to take joint but usually burdened with risk and uncertainty, initiatives often with effects visible in the distant future. Therefore, the priority objective in the initial stage of cluster development is to get to know each other's members and build mutual trust against grounded competitive behaviour. It is worth noting that the companies participating in the cluster mostly belong to small and medium-sized enterprises, and

fragmentation (and low economic power) is one of the essential prerequisites for cooperation to achieve common goals such as assortment promotion or the search for business partners and also joint research and development projects. Showing the benefits of collaboration for companies operating on similar markets and in the same areas of production or services is the primary task of the cluster authorities. Often the role of an impartial but also objective entity bringing together competitors is taken over by independent organisations such as scientific institutions or local authorities. In the case of the studied cluster, this role is played by the local government, whose representative coordinates the work of the cluster.

Engaging in joint activities aimed at increasing the competitiveness of the group and the region requires a full understanding of the top management in individual companies. Therefore one of the objectives of the cluster should be to invest in the development of knowledge and management skills of the associated companies. That is why the steering committee of the group informs its members about the possibilities of training. It also organises and finances workshops and networking events. The members also participate in knowledge transfer by organising internships and classes for students of profiled schools, thus influencing the quality of available human and social capital.

One of the most valuable competencies of each cluster and at the same time strongly linked to other key performance factors is the creation of new technologies that have the potential to improve the competitive position of individual companies significantly and ultimately the whole cluster. This area requires close cooperation of different types of entities - manufacturing or service companies, scientific institutions, often also financial entities. Due to the involvement of significant resources and stretching over time of research, the R&D projects require coordination. They usually burden with high risk, so it is crucial to initially support joint initiatives by local authorities as well as by low-interest or non-refundable external funding reducing the perceived costs of cooperation and risk in development projects. Several times the cluster has obtained non-refundable grants from the EU and national and local sources, for investments. In particular, the cluster was the beneficiary of a large EU grant, which financed the modern ICT equipment. It launches its server, Internet portal and Virtual Commodity Exchange connected to the IT systems of clustering companies (Spychalski, 2014).

The cluster's activity in recent years has decreased, which can be associated with a lack of continuity of financial support. Undoubtedly, cluster initiatives in many cases require a long incubation period and the coexistence of many success factors to maintain their sustainability after the end of external financial support.

In the studied cluster, two barriers of collaboration are key ones - lack of well-educated and trained staff in companies and lack of funds, and on the second stage difficulties in communication and lack of information about the activities of the other party. And last but not least the cluster can boast of many initiatives that rely on the scientific and research training of its particular members; however, cases of spontaneous cooperation of cluster members in research and development projects are rare.

The collaboration of Southern Wielkopolska Food Cluster with universities

The studied cluster collaborates with four research institutions and three universities located in the region. The location of cooperating universities and research centres is in the vicinity of the cluster industrial area of activity. The cluster seems as being facilitated by geographical, cognitive, and social proximity to the universities mostly located in Poznan city - the capital of the region. Clusters often collaborate with several universities to meet their objectives. In this context, the concept of collaborative advantage is gaining momentum within academia, where universities and research institutions operating in different spheres had begun to collaborate to provide support for a particular industry (Alrajhi, Aydin 2019, p 171-172). This momentum could be possible within the setup of the strategic university-cluster research centre.

The President of the cluster represents the university. He was the initiator of the entry of his alma mater into the group. He is currently the cluster academic representative and a signatory of the letter of intent between the cluster and the faculty dean. The university participation does not connect with the need to pay any financial contributions, but it also does not involve any costs on the part of the cluster. The President indicated that the cluster development depends primarily on the EU funds and projects.

The President of the cluster seems to be the key individual in the industry-university collaboration process. He claims the desire to combine the worlds of business and science, as well as an attempt to commercialise scientific ideas by the company and vice versa. This example confirms the results of other studies which indicate, that the variety and frequency of interactions with cluster, is not explained by the rankings of the university departments, but rather by the researchers' characteristics and motivations (Kaloudis et al., 2019, p.49-51). On the one hand, the President of the cluster has a high degree of cognitive proximity and mutual understanding regarding university and cluster interaction, within both academic and agri-food sectors.

The collaboration of the studied cluster with universities consists mainly of taking the initiatives toward research services targeted for problem-solving activities, in which they obtain assistance from university researchers. Universities, on the other hand, are slow to take the initiative of a university-cluster research centre. The President of the cluster claims that '*the role of the university is rather the role of individual colleagues from universities, who represent universities in the cluster. Without my initiative, the university does not show such activity'*. So far, the most active in cooperation with the cluster has been the department represented by the cluster president. He underlines, that the most benefits from collaboration result from the commercialisation of research, exchange or transfer of knowledge, and research contracted by companies and to a lesser extent from training. It confirms the results of research carried out in other countries indicating that industry mainly initiates universities initiate research services and research partnerships. Business

generally desires more applied research, while universities generally strive for basic research (Kaloudis et al., 2019, p.46-47).

The cluster has positive experiences from projects in collaboration with universities. Its partners claim that lack of broader interest in cooperation, extensive formalisation and bureaucratisation of universities hinders collaboration. Likewise, the literature, indicates that slow academic bureaucracies may stifle technology commercialisation, depress the firm's performance and delay the fulfilment of the firm's objectives (Ankrah, AL-Tabbaa 2015, p.399). In the studied cluster President opinion, quite often initiatives are taken to invite researchers to present the university offer to business. Business is quite sceptical about such actions, due to the lack of a specialised intermediary unit and initiative on the part of the university. Individual members of the cluster also cooperate independently with colleagues, in no small extent, it bases on good mutual relations and exchange of experience and knowledge. The example confirms research carried out in other countries, which shows that intermediary collaboration centres set up at universities significantly increase the level and effectiveness of university-business cooperation. The role of university research centres is essential, as it is mandatory that in the management of it universities participate in all critical decision-making processes (Kolomytseva, Pavlovska, 2020, p.55-56; Kaloudis et al., 2019, p.45; Awasthy et al. 2020, p.51-53; Ankrah, AL-Tabbaa 2015, p.396). On the other hand, it requires skills and activities performed by business/cluster representatives to manage the knowledge stemming from universities successfully.

The President declared that the relationships with local and regional governments are excellent and they significantly influence the cluster activity, despite the lack of funding from the authorities. '*In my opinion, the cluster very often participates in many regional initiatives and more. We are active based on even international and national initiatives. We often prepare reports, recommendations etc. Local government units notice us*'. The universities are seen by business and local authorities as a link to the dots of local networks. For compelling connect the dots, the university has to be highly responsive, adaptable, strategically directed, autonomously governed, and densely interlinked with its regional partners as well as an international network (Reichert 2019, p.7). These new roles of orchestrating multi-actor knowledge creation require profound, systematic institutional transformations of universities and financial participation of all actors, in particular local and regional governments.

CONCLUSIONS

The UCC should be incorporated into agri-food policies and regulations to stimulate green innovations and new instruments for food quality and safety. The governments should intensify the adoption of measures to encourage and improve collaboration between agricultural universities and the agri-food industry. It tailors policies and responsive to the specific needs of industry and university actors.

Universities need to redefine their mission, and collaboration with industry clusters needs to be in include as an essential part of the role of research universities.

Universities must involve people with networking and managerial skills to attract industry partners. At the same time, academics with industry background are an added value as they are expanding more willing to cross boundaries and network with people beyond their area of expertise. Intermediary organisations in the form of research centres, in particular, cluster initiative centres, may play a crucial role in a vital economy and society. The main objective would be to promote and establish personal contacts between scientists and entrepreneurs. They should be set up at universities, including life sciences and management, to facilitate interdisciplinary and inter-sectoral collaboration in the agri-food industry.

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