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ENHANCING THE INNOVATIVENESS OF LOCAL PRODUCTION SYSTEMS – POLISH EXPERIENCES

Abstract

Interest in territorial forms of organisation of production is currently at its peak, both among researchers striving to describe and explain various phenomena and among practitioners – representatives of authorities, entrepreneurs or experts involved in developing the idea. On this basis, the concept of so called local production systems (LPS) is being more and more popular among regional scientists as well as regional and industrial policy makers. LPS are usually defined as systems of businesses centred in geographical proximity around one core industrial activity, maintaining relations among themselves and with their territorial socio-cultural environment, and are considered as one of the key territorial form of organization of production, which can efficiently contribute to the regional development and regional innovativeness.

Among policy makers of most of the European countries, local production systems are usually considered as conceptual equivalent of the notion of cluster, while the latter, together with cluster supporting policy, is treated as of one the most important forms of enhancing the innovativeness of economies on the local and regional level. Also in the case of Poland, clusters as a form of local production systems, represent a very important part of the economy, triggering endogenous development potential. However, the level of innovativeness of Polish clusters is a difficult subject to clear assessment. Innovation commitment of clusters in Poland largely varies and depends mainly on the structure of their membership, development stage, industry and regions of activity. However, for the last 5 years Polish cluster supporting policy has developed a valuable tool for monitoring the situation in this area, which is benchmarking of clusters. The aim of the paper is to present the level of innovativeness of Polish local production systems, based on the benchmarking results', with the emphasis of the dynamic aspect of this phenomena. Together with the review of the instruments of supporting innovativeness of LPS in Poland, these results gives an answer about both positive trends concerning the innovativeness of Polish economy and negative aspects, listed as main challenges and dilemmas of Polish regional policy for the next years.

Key words: local production systems, regional innovativeness, regional innovation policy, benchmarking
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1. Local production systems as a networked form of territorial organization of production

Interest in territorial forms of production organisation is currently at its peak, both among researchers striving to describe and explain various phenomena and among practitioners, representatives of authorities, entrepreneurs or experts involved in developing the idea. Many studies, which consider these factors, conducted by different research teams and covering various, often economically and culturally distant areas, resulted in a variety of ideas and notions, often alternative, competitive or complementary. Thus, it is difficult to find one, universally accepted and binding definition of a local production system. Neither is there one, complete typology including all possible forms of their establishing and development

The concept of the development of and their various forms emerged in the 19th century. It was interpreted in various local production systems (LPS) countries and by different research groups both theoretically and practically and was subject to re-interpretations. The idea of industrial districts provided the basis for works on many other forms of production organisation in space. Among them we can mention the concepts of neo-Marshall industrial districts (known also as Italian industrial districts)[1], new industrial spaces[2] or the concepts of local production systems.[3] Other derivative concepts include: innovative milieus (Fr. *milieux innovateurs*[4]), regional systems of innovation[5], the concept of a learning region[6], or the concept of clusters disseminated by M. Porter[7], often criticised by many authors.[8]

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[1] Becattini, G. *The Marshallian Industrial District as a Socio-Economic Notion*, [in:] F. Pyke, G. Becattini, W. Sengenberger (eds.), *Industrial Districts and Inter-firm Cooperation in Italy*, International Institute of Labor Studies, Geneva 1990, pp. 37-51.

[2] Scott, A. *New Industrial Spaces: Flexible Production Organization and Regional Development in North America and Western Europe*, Pion, London 1998.

[3] Courlet, C., *Les systemes productifs locaux:de la definition au modele*, [in:] *Reseaux d'entreprises et territories. Regards sur les systemes productifs locaux*, DATAR. La documentation Francaise, Paris 2001.

[4] Aydalot, Ph., *Trajectoires technologiques et milieux l'innovation*, [in:] Ph. Aydalot (ed.), *Milieux innovateurs en Europe*, GREMI Paris 1986; Camagni, R., Maillat, D., *Milieux innovateurs. Theorie et politiques*, Oconomica Anthropos, Paris 2006.

[5] Braczyk, H-J., Cooke, Ph., Heidenreich, M., *Regional Innovation Systems. The Role of Governance in a Globalized World*, UCL Press London 1998.

[6] Asheim, B., *Industrial Districts as Learning Regions. A Condition for Prosperity?*, "Studies in Technology, Innovation and Economic Policy", University of Oslo, Oslo, 1995; Florida, R., *Toward the Learning Region*, "Futures", vol. 27 no. 5, 1995, pp. 527-536.

[7] Porter, M. E., *Clusters and the New Economic Competition*, Harvard Business Review, November-December 1998, p. 78; Porter, M. E., *The Competitive Advantage of Nations*, The Free Press, New York 1990.

[8] Feser E. J., *Old and New Theories of Industry Clusters*,; [in:] M. Steiner (ed.), *Clusters and Regional Specialisation*, Pion Ltd, London 1998; Hamdouch, A., *Innovation Networks and Clusters: A Critical Review of the Recent Literature*, Proceedings of the 19th EAEPE Conference: Economic Growth, Development and Institutions, Porto 2007. Available at:

Development of the above thoughts was initiated by A. Marshall who used the notion of an industrial district to explain growing effectiveness of economy.[9] He promoted the idea according to which growing effectiveness is not only the result of economies of scale achieved by large enterprises, but it is also obtained by means of economies of agglomeration[10] and organization generated by the industrial district.

Further, Italian researchers (among others A. Bagnasco, S. Brusco, G. Garofoli, G. Fua, C. Zacchia, C. Trigilia, G. Becattini) enlivened the idea of industrial district in the 1970s and 1980s of the 20th century. In particular, the concept was developed by G. Becattini who made a research on the regions of „Third Italy". The success of Italian industrial districts, which emerged spontaneously during the years of a big economic crisis, brought attention to essential changes that took place in a spatial dynamics of development. The emergence of new production areas, whose success could not be explained on the grounds of the classical theories of regional development, encouraged to search for a new approach to development. G. Becattini described a district as a „spatial concentration of small and medium-sized enterprises concentrated in industrial sectors and specialised in different phases of the production process, which contribute jointly to specific production identified as the district's industrial product."[11]

French researchers (representing the so called Grenoble School and including among others C. Courlet and B. Pecqueur) enriched the concept of industrial districts with methods of regulation and introduced the notion of a *system*. When investigating French regions they formulated the concept of *localised production systems.* C. Courlet defined a localised production system as „a system of enterprises grouped in close space around one of many industrial activities. The enterprises maintain the relationships between each other and socio-cultural milieu. These relationships are not only of commercial nature. They also concern an exchange of information and create positive external effects for the group of enterprises." [12]

(www.fep.up.pt/conferencias/eaepe2007/Papers%20and%20abstracts_CD/Hamdouch.pdf. Accessed 20.07.2012; Martin, R., Sunley, P., *Deconstructing Clusters: Chaotic Concept or Political Panacea?*, "Journal of Economic Geography", vol. 3(1), 2003, pp. 5-35.

[9] Jewtuchowicz A., Pietrzyk I. (2003) *Rozwój terytorialny – Teoria a polska rzeczywistość. (Przykład regionu łódzkiego)*, [in:] *Zarządzanie rozwojem lokalnym i regionalnym w kontekście integracji europejskiej*, edited by A. Klasik, KPZK PAN, Warszawa, pp. 12-13

[10] Under the notion of *agglomeration*, one should understand a set or grouping of elements which form entrepreneurial milieux, and it should not be interpreted in a traditional way as the concentration of population and buildings in a small area resulting in its strong urbanisation.

[11] Hsaini, A., *Le depassement des economies d'agglomeration comme seules sources explicatives de l'efficacite des systemes de production territorialises*, « Revue d'Economie Regionale et Urbaine » n° 2, 2000, p. 218

[12] Hsaini, A., *Le depassement...*, op. cit, p. 219.

The American researchers (A. Scott, M. Storper, R. Walker) reinterpret the importance of external effects in their research on the location of enterprises within the space. Their interests focus mainly on large urban agglomerations, therefore in their works they underline the importance of economies of agglomeration, which „are the result of structural factors connected with the organisation of the industrial process inside the selected community. They claim that these benefits determine the choice of location of enterprises."[13] Now, one points to the fact that economies of agglomeration (connected with external economies) give way to network economies in the hierarchy of determinants of the firm's competitiveness.[14] Benefits achieved through networks belong to the category of synergy effects. Also another American researcher M. Porter deals with the problems of competitiveness of enterprises from the perspective of industrial and spatial organisation of location. However, he does not use the notion of a territorial production system, and instead uses the term *clusters.* In the recent years, owing to M. Porter the term won renown. From the viewpoint of works of European and American researchers, the term *clusters* seems to be helpful to identify the differences that result from basically different specificity and conditions of emergence of territorial production systems on both continents. The territorial forms of industrial organisation in the USA (for example, the Sillicon Valley, Pittsburgh, Phoenix) are characterised by a usually lower impact on their appearance from the factors related to history and tradition of place, and a bigger influence of the infrastructure of technology development (universities, innovation creation institutions, etc.). Hence, on the American ground the notions of a *technology district* or *technopolis,* which constitute a specific form of an industrial district, are closer in meaning than a territorial production system.[15] Technopolises arise spontaneously or as a result of specific industrial policy of the government.[16] However, the definition proposed by M. Porter does not bring any new elements, which would differentiate it from the previous ones and it says „this is the system of interlinked firms and institutions, whose value as a whole is bigger

[13] See: Despiney-Żachowska, B.A., *Rozwój i przyszłość regionów przygranicznych – próba interpretacji w ujęciu dystryktu neomarshallowskiego. Przykład Euroregionu „Nysa"*, Prace Naukowe Akademii Ekonomicznej we Wrocławiu, Gospodarka lokalna w teorii i praktyce nr 939, 2000, p. 239; Manuel de Jesus I., *Działalność przedsiębiorstwa w aspekcie przestrzennym*, [in:] *Ekonomiczne aspekty gospodarki przestrzennej*, (ed.) T.M. Łaguna, Uniwersytet Warmiński-Mazurski w Olsztynie, 2003, pp. 87-94.

[14] Gancarczyk J., Gancarczyk M., *Konkurencyjność skupisk przemysłu (clusters) – od korzyści zewnętrznych do korzyści sieci*, „Studia Regionalne i Lokaln"e nr 2-3, 2002, p. 75

[15] *Technopolis* is the centre of technology sales. They constitute a specific form of an industrial district. They emerge as a result of the government's industrial policy, as it is the case in Japan, Germany or France, or their appearance is a more or less spontaneous result of transformations of production systems, as the US-based Sillicon Valley or Orange County. For more information, see Benko 1993.

[16] Jewtuchowicz A., *Terytorium i lokalne systemy produkcyjne a globalizacja gospodarki*, [in:] *Gospodarka i polityka regionalna okresu transformacji*, (ed.) W. Kosiedowski, Toruń, 2001, p. 45.

than the sum of values of its elements".[17] The American research introduced to the analysis of production systems the so called governance methods and highlighted big importance of institutions in their development. It should be emphasized that representatives of the contemporary stream of institutionalism are inclined to consider institutions as the rules or principles of the game, which limit activities of individuals.

The clusters concept is based on the spatial self-organisation theory. N. Grosjean made use of the theories of systems and indicated the characteristic features, which show the autonomy of territorial production systems[18]:

- systems are autonomous if they create organisations that define them as units,
- these organisations are based on the action of dynamic processes, which allow them to maintain their cohesion,
- systems which maintain their own identity are considered as autonomous,
- autonomy makes it possible for the systems to cooperate with their environment without any breach of their own cohesion.

These features enable the systems to work in the longer period through the processes of modernisation (self-organisation). Clusters are oriented towards the competitive economic development of the territory on which they function making use of innovations and taking into consideration the conditions of the external environment.[19]

2. Innovativeness of local production systems in Poland[20]

Innovation commitment of local production systems[21] in Poland largely varies and depends mainly on the structure of their membership, development stage and industry. Pro-innovation activities, in various forms and scope, were declared by ca. 80% of clusters in 2012[22], while in 2010 only 20%. It confirms increasing market maturity of LPS in Poland, and

[17] Porter M., *Porter o konkurencji*, PWE, Warszawa, 2001, p. 266.
[18] Maillat D., Bataini S-H., *Competitivite des systemes territoriaux de production: le role du milieu*, Communication pour le XXXVIIIe Colloque annuel de l'ASRDLF, Trois-Rivières, 2002, p. 8.
[19] Maillat D., Bataini S-H., *Competitivite des systemes...*, op. cit., p. 8.
[20] This part was prepared for the paper: Nowakowska, A., *Innovativeness of Clusters in Poland – State-of-the-Art and Development Problem* to be published in 2014 in the collection of academic papers of the Institute of Economics and Industrial Engineering of the Siberian Branch of Russian Academy of Science, Novosibirsk
[21] Bearing in mind both semantic differences and similarities between various terms referring to the territorial forms of organization in production, we decided to use terms local production systems (more theoretically "strict") and closerss (more popular among policy makers) alternatively.
[22] Hołub-Iwan, J.(ed.), *Cluster Benchmarking in Poland – 2012. General report*, Polish Agency for Enterprise Development, Warsaw 2010, p. 66. Available at: http://www.pi.gov.pl/PARPFiles/file/POLISH_INNOVATION_PORTAL/Clusters/Raport_eng.pdf. Accessed Accessed 04.08.2012

the results are especially favourable for the group of mature clusters, in the growth stage, with stable and sustainable types of cooperation. Small local production systems operating in traditional industries remain indifferent to research and innovation activities.

Almost half of local production systems are active in industries categorised by the OECD as high or medium-innovative.[23] In most cases their core industries include: IT, aviation, telecommunications, environmentally-friendly power generation or medicine. Structure of these entities by industries shows big innovation potential of their members.

Polish clusters focus their activities on two main areas: joint marketing activities (advertising, fairs and exhibitions, trade missions) and joint initiatives in the field of human resource development (training courses, workshops, conferences, knowledge and experience exchange). In this context direct R&D activities, implementation of innovations or technology transfer are important but still remain secondary for clusters.

For LPS we can observe strong involvement in areas that indirectly contribute to innovation and to generating resources of formal and informal knowledge. In 2010, 80% of clusters in Poland declared that for them the key benefit of being in the structure consists in the access to tacit knowledge, which facilitates establishing business relations, gives access to unofficial information, shortens time and reduces cost of executing market transactions.

In 2012 almost 90% of clusters declared they undertake steps in this area.[24] It is a positive sign as such benefits are the essence of LPS arrangements and a classical field where entities operating in clusters may achieve an advantage; these are also grounds for new products, processes and technologies.

In the area of creating knowledge and innovation, joint training courses, workshops, sectoral conferences or study visits remain the leading type of clusters' activity, which is conducive to generating knowledge and information exchange. It is an approved and stable area of cooperation for some years. For less than 75% of LPS, creating cognitive proximity, building common pools of knowledge resources are the major areas of activity.

Although pro-innovation activities of Polish clusters are still little developed, within recent two years we can observe high dynamics of positive changes in this area. For example, in 2010 only 10% of clusters in Poland owned legally protected innovative solutions while in

[23] It is hard, however, to unequivocally conclude about the level of innovation using only industry-specific classification as there are clusters, which conduct research in new technologies, new products while operating in low-innovative industries (e.g., food processing or construction).
[24] Hołub-Iwan, J.(ed.), *Cluster Benchmarking in Poland – 2012….*, op. cit, p. 64.

2012 more than 40% of clusters declared such innovations. In total, LPS in Poland declared 752 innovations protected with IPR in 2012. [25]

Positive changes were also observed with respect to joint R&D projects. In 2010 only 20% of clusters were involved in R&D projects financed from external sources, while in 2012 the activity was declared by almost 70% of clusters. In the dominating group of clusters these are the first (and single) attempts of developing joint innovative solutions. They are carried out mostly in LPS with R&D units in their structures, which received external financial assistance for such undertakings. The activity strongly correlates with the industry of a cluster in question; the highest innovation in the industry of a cluster, the bigger R&D expenditure.

The trend is also confirmed by the share of R&D expenditure in total spendings on innovation in the core of the cluster. In six cases R&D expenditure share exceeded 25% in recent two years.[26] On the other hand, however, almost half of clusters do not allocate their own resources on R&D. In general, the allocations are small and can be traced only in clusters in the growth/maturity stage.

Main areas of direct innovative activities in Polish local production systems are joint development of innovative products and technologies, which for almost 30% of LPS are the primary activities. Compared against the survey of 2010, this activity area improved the most (the highest increased in benchmark value). Interestingly, clusters focus less on marketing and organisational innovations, which, because of the diversity of entities in a cluster are difficult to implement.

Compared to 2010, employment in R&D in the cluster core slightly diminished. The drop is symbolic and connected mostly with the verification of market competences of the research staff. The performance of Polish clusters is little satisfactory when it comes to establishing innovative companies. In 2012 *start-up* and *spin-off* companies operated in only five clusters .[27]

In recent two years, the availability of laboratories for cluster members significantly improved. In 2010 ca.80% of clusters declared poor or zero access to such infrastructure, while in 2012 ca. 40% of clusters assessed their own access as good or very good, while for 35% of clusters the access was moderate but satisfactory.

[25] Hołub-Iwan, J.(ed.), *Cluster Benchmarking in Poland – 2012….*, op. cit, p. 122
[26] Hołub-Iwan, J.(ed.), *Cluster Benchmarking in Poland – 2012….*, op. cit, p. 166
[27] Hołub-Iwan, J.(ed.), *Cluster Benchmarking in Poland – 2012….*, op. cit, p. 167

The structure of clusters is dominated by enterprises and various supporting organisation (Chambers of Commerce and Industry, development agencies, local and regional authorities). R&D units represent ca. 10% of entities – members to clusters and the fraction has not changed recently. Units from the research industry rarely play the leading role in clusters. Only in several cases they are leading partners and animators of cluster's activities. Half of the population of surveyed local production systems were initiated or co-initiated by R&D entity, which may be indicative of innovation-focus of these structures.

Local production systems with R&D units are usually more mature in terms of organisation. R&D specificity forces out professionalism of relationships, competence and forms of communication. Hence clusters with R&D in their structures are more formalised in their operations and organisation (which is reflected, e.g., in bigger number of staff holding administrative positions in cluster: coordinator, office staff).

Innovation in cluster correlates with its size. The bigger a cluster, the bigger the scope of activities connected with launching new products, technologies, and processes. Correlation between types of entities in a cluster and innovation activities is also clear. Naturally, clusters dominated with an R&D unit perform much better when it comes to the creation of knowledge and innovation.

Optimistically, more than half of clusters declare that joint innovation and R&D activities remain one of their priority strategic objectives in a long-term perspective, although at present they are not in the forefront of their activities. Clusters declare the wish to implement joint innovation and investment projects in the future, knowledge and technology transfer, strengthening cooperation relationships, progress in international cooperation and internationalisation of clusters, which will become leading areas of their activities in the future.

3. Institutional environment of Polish SMEs as an instrument of supporting innovativeness of LPS

From the point of view of local production systems' functioning, the analysis of their institutional environment opens a broad field of exploration. In the common sense, this environment is interpreted mainly through the lens of formal (legal) institutions and institutions-organizations operating at the national, regional and local level, supporting directly and indirectly for the functioning of small and medium sized enterprises and their networks. Such an approach to the analysis of the institutional environment can be considered

strongly established in the field of both economic and regional policy, as opposed to the analysis concentrating on informal institutions, based on norms of behavior, trust and networking. The latter approach refers to more general definition of institutions. For example, D. North perceived institutions as every forms of limits invented by humans in order to shape human behavior, having both formal (legal sets of rules, norms, and sanctions) and informal (customary) character[28] and we find no objection for accepting this well grounded proposal.

In Polish conditions, among institutions that affect the functioning of local production systems one can indicate and the legal environment and business-supporting organizations on the other hand, and organization and rule supporting enterprises and their groups indirectly, on the other hand.

In the first group one can mention legal solutions at both national as well as those constituted by local law. Among regulations supporting LPS we identify: antitrust law, legislation conducive to the SMEs, the tax system preferences for small and medium entrepreneurship and finally regulations rewarding innovation.

In Poland, legislation at the national level concerns primarily ensuring the availability of funds in the form of grants, vouchers for innovation, preferential loans for technologies or the possibility of obtaining the status of enterprise R&D center, which is authorized for using more favorable accounting standards in exchange for innovative activities.[29] As far as local and regional legislative solutions are concerned, support for LPS is mainly limited to exemptions in taxes and local charges, including primarily property taxes, applied for the preferred economic activities, as well as financial support on cluster activities, deriving principally form European Union structural funds and being distributed through regional operational programs.

Next to the legal and administrative solutions, the other important components of the formal institutional environment for the functioning of LPS should include various organizations, and among them mainly centers of innovation and entrepreneurship. In a more detailed approach, such centers include: training and consulting centers, technology parks, business incubators, loan and guarantee funds and regional development agencies, business support centers, employers' associations and other associations of SMEs

[28] North, D. C., *The New Institutional Economics*, "Journal of Institutional and Theoretical Economics", No. 142, 1986, p. 234.

[29] See Polish bill form 30th of May 2008 on *o some forms of supporting innovative activities* (Głodek, P., Pietras, P., *Źródła finansowania dla komercjalizacji technologii i wiedzy*, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2011).

Table 1. Classification of Polish innovation and entrepreneurship centers – the basic institutional environment for LPS in Poland

Business supporting organizations	**Financial organizations**	**Innovation supporting organizations**
– training and consulting centers – entrepreneurship centers: o business centers o entrepreneurship clubs o consulting points o consulting and advisory points o business incubators o business pre-incubators	– Regional and local loan funds – Guarantee funds – Seed capital funds – Business angels' networks	– Technology transfer centers – Academic business incubators – Technological incubators – E-incubators – Technology parks: o scientific, o research-based, o industrial o technopoles

Źródło: Bąkowski, A., Mażewska, M. (eds.), *Ośrodki innowacji i przedsiębiorczości w Polsce. Raport 2012*, Polska Agencja Rozwoju Przedsiębiorczości, Warsaw 2012, s. 12.

At present, stronger and stronger emphasis is put on the of informal institutions, especially those including territorial dimension of economic processes. Among them, what emerges on the first plan it is the issue of trust asa stimulant or destimulant of economic processes and entering the SMEs into economic networks. One can refer here both to the confidence to authorities (which may affect the expected level of transaction costs in the operation of the administrative and legal environment) as well as the mutual trust between business partners.

It turns out that if the level of trust in society and economy determines their functioning, it also affects systemic links between entrepreneurs as the most active individuals of the society. In this context, the level of trust in public institutions (parliament, the courts, the central bank and other banks, pension funds, insurance companies, social security, stock exchanges), the tendency to violate the law or the social as the foundation of social capital should be treated as an inevitable success (or defeat) factor.[30]

On the regional and local level, among informal institutions one can mention local and regional traditions, that at the same time build specific conditions for conducting business and differentiating local demand for goods and services, as well as territorially rooted rules, conventions and habits. Locally and regionally diversified may be also the level of trust and willingness to cooperate with other entrepreneurs or local government administration. These factors determine to a large extent the territorial embededdness of Polish local production systems. The latter is linked to the competitive regional advantage which, paradoxically, in the conditions of globalization takes on new meaning as a development factor.

[30] See: Czapiński, J., Panek, T. (eds.), *Diagnoza Społeczna 2013. Warunki i jakość życia Polaków*, "Contemporary Economics", "Quarterly of University of Finance and Management in Warsaw", vol. 7, Special Issue, September 2013, p. 285.

4. Summary

The major challenges to the boost in innovation of local production systems in Poland are:

1. Low propensity of entrepreneurs to cooperate, lack of trust between business partners (low level of social capital),
2. Misunderstanding when it comes to cooperation and strong competitive culture, which prevents from perceiving cooperation as an opportunity for joint development or for improving an individual competitive position,
3. Weak and immature cooperation networks with weak instruments encouraging to intensify individual activities,
4. Lack of experience and cooperation formulas with R&D units, both in organisational terms and in intellectual property rights,
5. Reluctance of R&D units, funded from the central budget, to get involved in market undertakings, which require modifications in operational mechanisms and changes in their organisational culture and routines,
6. Poor availability of financial instruments that could help finance high risk undertakings, such as: venture capital funds, business angels.

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