FUNCTIONING OF THE LOCAL PRODUCTION SYSTEMS IN BULGARIA, POLAND AND RUSSIA

THEORETICAL AND ECONOMIC POLICY ISSUES

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Edited by
Aleksandra Nowakowska

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Aleksandra Nowakowska – University of Łódź, Faculty of Economics and Sociology
Institute of Spatial Economics, Department of Regional Economy and Environment
90-214 Łódź, 36 Rewolucji 1905 St.

REVIEWER
Artur Ochojski

PUBLISHING EDITOR
Danuta Bąk

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Georgi Shinkov Zabunov[*], **Nadya Viktororva Gilina**[**]

INSTITUTIONAL CONDITIONS FOR THE FUNCTIONING OF CLUSTERS IN BULGARIA[1]

1. Institutions and economics – introduction

According to the Global Competitiveness Report of the World Economic Forum for 2012–2013, Bulgaria is ranked 62nd in the level competitiveness out of 144 countries. At the same time, in terms of the evaluation of the state of institutions it is ranked 108th, and in terms of the extent to which clusters are developed – 87th.[2] These numbers are an indicator of the importance of the state of institutions and clusters in the overall level of competitiveness of the economy.

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[*] Associate Professor, PhD, Business Faculty, Real Estate Department, University of National and World Economy, Sofia, Bulgaria; e-mail: georgi_zabunov@unwe.bg

[**] Assistant Professor, PhD, Business Faculty, Real Estate Department, University of National and World Economy, Sofia, Bulgaria; e-mail: ngilina@yahoo.com

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[2] Global Competitiveness Report for 2012–2013, p. 14–17, http://www.weforum.org/reports/global-competitiveness-report-2012-2013 (accessed November 2013).

The aim of the present paper is to propose an approach for analyzing the institutional conditions for the functioning of clusters in Bulgaria, from the viewpoint of institutional theory. It strives to find a methodology, which can determine the key factors in cluster development within a certain local production system. We consider clusters as highly organized structures that generally arise from local production systems under certain conditions. Local production systems are traditionally regarded as evolving structures, which react to changes in the environment, but the mechanisms of their reactions are determined by processes internal for the systems. Delineating the environment of the local production systems, of their components, elements and structure is done from the perspective of modern institutional theory.

In that context, the concept "institution" has been adopted by economists from the social sciences, in particular from sociology, political philosophy and social psychology. In economic theory, the concept "institution" was included for the first time in the analysis of Thorsten Veblen. He defined it as a general, common way of thinking (stereotype of thinking) about the relationships between society and the individual and the performance of their functions. It builds up a system of social life comprised of a set of activities – at a certain time or at any moment in the development of every society. From a psychological perspective, institution can be described as the prevalent spiritual attitude (mindset), or as a general understanding of the way of life in the community.[3]

Also by an institution Veblen understands:

– common ways of reacting to stimuli,
– the structure of the production and economic mechanisms,
– the accepted acting system of social life.

Another of the founders of institutionalism, John Commons,[4] defines the institution as a collective action in restraint, liberation, and expansion of individual action. According to Wesley Mitchell,[5] an institution stands for the prevalent and, to a great extent, standardized, social habits.

[3] Т. Веблен, *Теория праздного класса*, Москва 1984, p. 201–202.

[4] B. E. Kaufman, *The organization of economic activity: insights from the institutional theory of John R*., *Commons*, "Journal of Economic Behavior & Organization" 2003, Vol. 52, p. 87.

[5] http://5ka.ru/101/849/1.html (accessed August 2013).

Within the framework of contemporary institutionalism, the interpretation of an institution by Douglas North is the most widely spread. According to this interpretation, institutions are the rules, and mechanisms, which ensure their application and the norms of behavior, which structure the repeated interactions between the individuals.[6]

The business actions of the individuals do not take place in isolated space but in a particular society. For that reason, it is of great importance how the society will react to them. In that way, deals, which are acceptable and profitable in one place, can turn out to be inappropriate in another even under similar conditions. Examples of this can be the limitations imposed on the economic behavior of individuals in different religious cultures.

The variety of internal factors influencing success and the very possibility to take a decision of some sort, in the framework of the economic and social habits, impose schemes and algorithms of behaviour, which under the specific conditions will be the most effective ones. This set of rules, mechanisms for their enforcement and control over their observance builds up schemes and matrices of behavior of the individuals and forms the institution.

The concept of "institution" and "organization" are interrelated. According to Douglas North, institutions are the rules of the game, and organizations are the players. In their activities, organizations follow the rules of the game, but cannot, whatsoever, to influence them. In spite of that, their aim is to win the game, and not to regulate it.[7]

In accordance with the institutional theory, the rules (formal and informal) are some kind of norms, deliberately introduced restrictions, which are observed, can be observed or followed by large groups of people or as T. Veblen calls them "habits of thought".[8] These are widely accepted and protected guidelines, which forbid or permit a certain type of activity of an individual (or group of individuals) in their interaction with other

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[6] Д. Норт, *Институты и эконоический рост: историческое введение*. *Тезис*, Т. 1, Вып. 2, Москва 1993, p. 73.

[7] Д. Норт, *Институты, идеология и эффективность экономики*. *От плана к рынку: будущее посткоммунистических республик*, Москва 1993, p. 307.

[8] T. Veblen, *The Preconception of Economic Science*, [in:] T. Veblen, *The Place of Science in Modern Civilization and Other Essays*, Russel and Russel, New York 1961, p. 143–-157.

individuals or groups. The rules, making up the institutions, have sense only when they are accepted by more than one individual. From that perspective, each institution is a set of certain rules, but not every rule is an institution.

According to Elinor Ostrom,[9] the rules determine what actions or situations are necessary, forbidden or permitted for the participants (organizations or individuals).

The rules include:

– possible roles of the participants

– the position the participants and the order in which it changes,

– actions, for which participants are obliged or are not obliged to undertake,

– results, for which they are obliged or are not obliged to achieve.

The rules set the framework within which the participants make a choice, and do not prescribe or impose the choice. The rules stipulate:

– set of roles and the number of the agents, which can perform a certain role,

– technology of the choice, among the participants who are candidates for one or another role and the change of the positions,

– results and costs of the alternatives,

– set of strategies accessible for the participants in a certain role in the interaction with the other participants,

– function of taking a decision for each situation,

– permitted channels and forms of communication among the participants, which perform one or another role.

By means of the set of rules, a classification of institutions in terms of: the obligation to observe the rules – formal (official) and informal (unofficial); the hierarchy and the various aspects of social development – economic, political, legal and social, can be made.

The informal (unofficial) institutions are the unrecorded habits, traditions and stereotypes of behavior. Such are, for example, the principles of business and professional ethics, religious precept and customs or ideological formulations. The preservation of the informal institutions is related

[9] Э. Остром, *Управляя общим. Эволюция институтов коллективной деятельности*, Мысль, ИРИСЭН, Москва 2011 (orig. *Governing the Commons: The Evolution of Institutions for Collective Action*, 1990), p. 86–89.

to the culture, which, in terms of our analysis, can be seen as a set of values and norms, which determine the behavior of the individual. As advantages of the informal institutions we can consider:[10]

1. Possibility of adaptation to the changing conditions preferred inside the community and other exogenous and endogenous changes;
2. Possibility of imposing various sanctions in each particular case.

The shortcomings of the informal institutions lie in the fact that they are often characterized by varying interpretation of the rules, by impairing the effectiveness of the sanctions, and the emergence of discriminating rules.

Formal institutions are the written laws. The main difference between the formal and the informal institutions lies in the extent of their manifestation. The extent of manifestation of the formal rules is related to their written character and the presence of experts engaged in controlling their application. The significance of the formal institutions increases with the more sophisticated division of labor, and respectively, with the more complicated nature of social structure. Their importance is strengthened by the fact that they are a means of generalization and fixation of the great variety of specific rules. It is common to classify formal rules in a hierarchical order, where the rules of a higher order determine the content of the rules of lower order. The advantages of formal rules are:[11]

1. Formalization of the rules makes it possible to broaden their normative function. That allows individuals to reduce costs for information, makes the sanctions for breaking these rules understandable, and eliminates the controversies they contain;
2. Formal rules can counteract discrimination;
3. Formal rules provide a mechanism for dealing with those individuals, who as members of the society gain certain benefits, but refuse to bear the costs related to them.

The classification in terms of hierarchy, or the interaction between individual – institution can be built on the basis of the three level scheme of analysis proposed by Oliver Williamson. At the first level there

[10] Ц. Колев, *Основи на общата теория за стопанството*, ЕКИУ, Пловдив 2011, p. 45–47.

[11] O. E. Williamson, *Hierarchies, Markets and Power in the Economy: An Economic Perspective*, "Industrial and Corporate Change" 1995, 4(1), p. 21–49.

is the interaction of the individuals. At the second – interactions of the institutions of various types, which are institutional arrangements. At the first level are those, that form the institutional environment.[12]

According to the terminology proposed by D. North, an institutional alliance is an agreement between an individual and/or a group of individuals, or business entities. That agreement determines the ways of cooperation and competition. An example of an institutional alliance is most of all the contract – voluntarily established by the economic agents rules of exchange, rules of functioning of the markets, rules of interaction of the internally hierarchical structures (organisations). There are hybrid forms of institutional alliance combining features of both market and hierarchical interaction. The institutional environment is a combination of underlying social, political, judicial and economic rules, defining the frame of human behavior and institutional arrangements. Components of the institutional environment are the rules of social life, the functioning of the political sphere, fundamental legal norms such the Constitution, codes, laws, etc.

The main links between the different levels show:[13]

1. The effect of the individual on institutional arrangements. As far as institutional arrangements by definition are voluntary agreements, preferences and interests of the individuals, the latter play a decisive role in the establishment of institutional arrangements. That process, of course, takes place within the framework of a particular institutional environment. Depending on what behavioral prerequisites the business agent adopts, the observed institutional arrangements will differ;

2. The influence institutional arrangements have on one another. The nature of such interaction is quite varied: the behaviour of the different organisations affects the character and type of market – market structure;

3. The effect of institutional arrangements on the institutional environment. A typical example of such interaction are the distributing effects of the institutions. For example, an institutional alliance, which ensures that there is a benefit for its participants can lead to the formation of the so

[12] http://portal.agun.kz/e-books/content/lN8GxS9yXZch6dxMUbPm/pages/Tema 2.6.htm/ (accessed June 2013).

[13] М. Марков, *Учебен речник по институционална икономика*, Издателски комплекс УНСС, 2012, p. 29–30.

called groups of special interests. It is a number of individuals, interested in the preservation and the increase of the benefits gained. In some circumstances such a group is capable of influencing the legislative process in order to pass a law, formalizing the gain of benefits resulting from the aforementioned private agreement;

4. The effect of the institutional environment on institutional arrangements. The nature of that connection results directly from the definitions of institutional environment and institutional alliance: the rules, comprised in the institutional environment, determine an unequal amount of costs for forming various institutional arrangements. If with a certain type of alliance there is a ban in the general rules, then the costs for the individual, who decides despite the ban to enter such an alliance, increase. Respectively, the expected benefits decrease;

5. The effect of institutional arrangements on individual behaviour. Although institutional arrangements are formed by business agents on a voluntary basis, unforeseen circumstances can change the situation and a decision, which has already been taken, can be unprofitable for the individual. That can lead to losses for the other party, which exceed the benefits from the initial agreement. In such cases there is a mechanism for enforcing the enactment of the alliance and preventing the incurrence of unjustified social losses;

6. The effect of the individual on the institutional environment. Individuals influence the institutional environment in two basic ways: first, through participation in the election of governing state bodies, second, through forming institutional arrangements, which affect the institutional environment;

7. The effect of the institutional environment on the individual behaviour. That effect is felt through the underlying rules both directly, for example through the laws, and through the formation institutional arrangements.

Within the institutional environment there can be supraconstitutional, constitutional and business rules, as suggested by Douglas North.[14]

[14] D. North, *Five Propositions about Institutional Change*, [in:] *Explaining Social Institutions*, eds. J. Knight, I. Sened, The University of Michigan Press, Michigan 1998, p. 15–27; Д. Норт, *Институты, институциональные изменения и функционирование экономики*, Начала, Москва 1997, p. 17–28.

Subordination to the rules is expressed through the hierarchy of the normative acts, passed by the bodies of the executive power. On that basis the law determines the principles and strategies of behavior, and by-laws specify these principles as a mechanism of action. The general rule is that norms of lower order specify and reveal the content of the norms of higher order.

All components of the institutional environment are rules, determining the order and comprise "subordinate" rules. Similar "metarules" can have both formal and informal character. The general and difficult to change informal rules, which are rooted deep in the history and life of the different peoples, the prevalent stereotypes of behaviour, religious beliefs and cultural specifics, which often are not even realized by the individuals, are called supraconstitutional. They determine the hierarchy of values, shared by the society as a whole, the attitude of the political power, the psychological mindset of cooperation or confrontation, of social status, etc.

Constitutional rules perform two important functions. At the first place, they set the hierarchical structure of the state and, secondly, set the rules for decision making about the formation of the organs of state power. Constitutional rules can have both formal and informal character. For example, the rules about the succession of power in monarchy can have the form of unwritten custom or tradition, and the rules for voting in the election of a legislative organ can described in detail in a law or a code.

The rules, which directly determine the forms of organisation of business activities, are called business rules. These are the general framework, within which business agents form institutional arrangements and take decisions about the use of resources i.e., cooperate or enter into competitive relations. At the basis of the business rules there are the rights of property and responsibility.

2. Research context and method

Despite the great importance of the issue, at the moment in Bulgaria there is no comprehensive systematic study of the institutional environment, in which Bulgarian clusters function. The European Cluster Laboratory set

up in 2007 follows their development and functioning and that of the other European clusters, but the problems of the institutional environment have not been studied yet. The reasons for that situation are of complex nature. Firstly, a leading factor for the normal functioning of the institutional environment is the legal system, which is a very complex subject of analysis. Although the government deliberately influences the work of the clusters, that by rule happens within the framework of the normal legal regulation of business activities. In Bulgaria clusters are not the object of special legal regulation and they are formed and function in compliance with the general requirements of civil law. That matter is subject only to qualitative analysis and that makes research difficult. For that reason, we suggest the use of fuzzy logic systems for the study of these problems, which provide good tools for quantifying quality information.

Fuzzy logic systems are defined as intelligent systems for decision making, which are capable of dealing with uncertainty, inaccuracy and partial authenticity of the quantity and quality information available. Fuzzy logic systems ensure higher effectiveness and robustness of the managerial decisions that have been made. The effect of the fuzzy logic systems is analogous to the behaviour of a group of highly qualified experts with experience in the area of research, which make informed decisions in conditions of uncertainty.[15]

Determining the potential for a viable cluster to emerge from a particular production system is based on the subjective knowledge of experts about the institutional characteristics of the system and the available statistical information about the business entities that make it up. Expert assessments are represented through linguistic variables (with values of little, average and big respectively), which by nature are quality not quantity variables. That naturally leads to the idea of assessing the prospects for a particular production system using fuzzy logic.

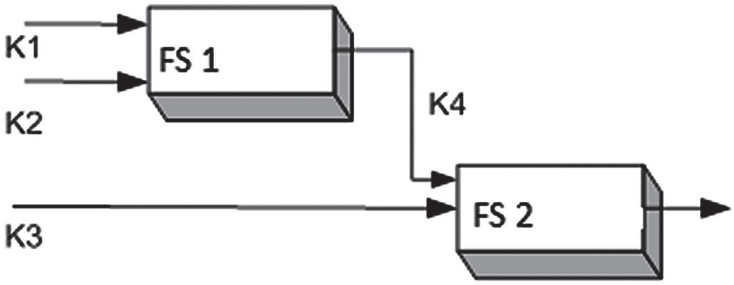
Different approaches are possible. One of them is to develop a hierarchically fuzzy expert system, within which, for example, three quality criteria of analyzing the prospects of a local production system have been defined:

[15] П. Златева, *Комплексен финансов анализ на фирмата чрез размита експертна система*, сп. Финанси, 2006, III, No. 1, Прил. към бр.1, p. 239–251.

1. Market prospects of the system – K1;
2. Effectiveness of the legal framework in the sector of industry – K2;
3. Economic efficiency of the business entities – K3.

The above criteria are interpreted as linguistic variables, which are input for the fuzzy expert system.

In this case, a hierarchical expert system is used and it includes two levels and two fuzzy subsystems. Thus, the logical rules, which arise from the relationship of the three input variables, are distributed in two knowledge data bases. That structure of the fuzzy system allows a more accurate representation and coding of expert knowledge, as well as an easier clarification of the rules. A generalized image of the two-level hierarchical system is shown in Figure 1.



FS 1 – fuzzy system 1
FS 2 – fuzzy system 2

Figure 1. Two-level hierarchical fuzzy system of assessing the prospects of the client

Source: П. Златева, *Комплексен финансов анализ на фирмата чрез размита експертна система*, Финанси, 2006, III, No. 1, Прил. към бр.1, p. 240

The first and second level of the hierarchical system under consideration includes one fuzzy subsystem. Each subsystem has two inputs and one output.

For the first subsystem the input are the two linguistic variables (basic criteria):

1. "Market prospects of the system" – K1;

2. "Efficiency of the legal framework in that sector of industry" – K2, and as output there is the linguistic variable "Prospects for the external institutional environment of the system" – K4 (intermediate complex criterion).

The subsystem at the second hierarchical level has the following input variables (one intermediary complex criterion and one basic), as follows:

1. "Prospects for the external institutional environment of the system" – K4;

2. "Economic efficiency of the business entities" – K3.

As the output of the fuzzy subsystem, the variable "Estimation" is introduced. The latter is the output for the whole fuzzy expert system. It is the final complex assessment of the prospects for the local production system.

As it is known from the theory of the fuzzy sets, linguistic variables can take different quantity or quality connotation (little-big; low--middle-high, etc.). In fuzzy systems these variables are considered to be sets (therms) with a certain degree of appurtenance to the specific value. Functions of appurtenance different in form are defined (triangular, trapezoidal, etc.).

In this case the input variables (the three basic criteria) are represented by means of three fuzzy sets for the two subsystems: "Little" ("Little" – L), "Middle" ("Middle" – M), "Big" ("Big" – B) level.

The input variables (the intermediate complex criterion and the final complex assessment) of the subsystems from the first and second level of the hierarchical fuzzy system are defined with five sets: "Very Little" ("Very Little" – VL), "Little" ("Little" – L), "Middle" ("Middle" – M), "Big" ("Big" – B) and "Very Big" ("Very Big" – VB).

In this paper, all linguistic variables are assigned with normal triangular functions of appurtenance. All input variables (K1, K2, K3, K4) change within the interval [0, 10], and the final complex estimate ("Estimation") – in the interval [0, 100]. The form of the linguistic variables is shown in Figures 2 and 3.

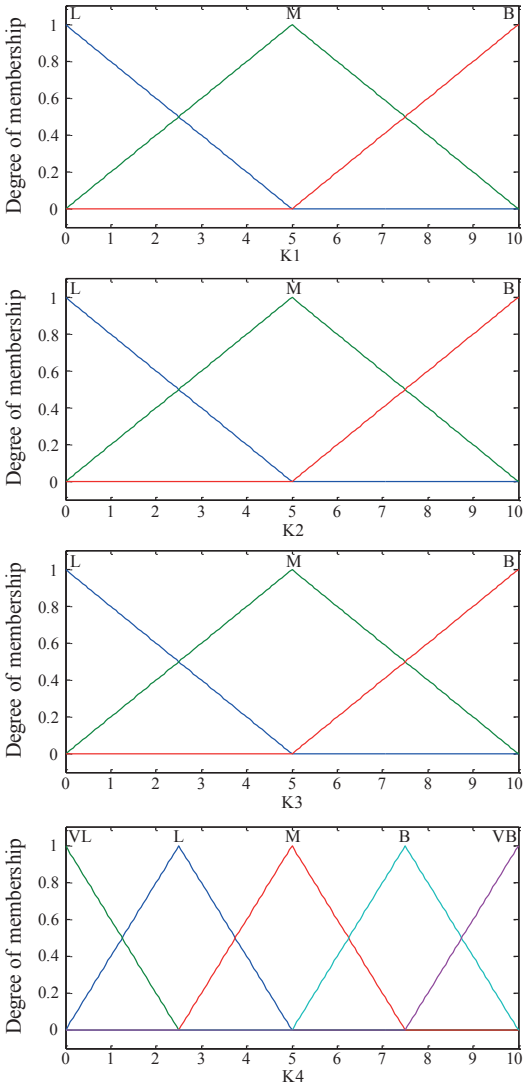


Figure 2. Form of the input linguistic variables (K1, K2, K3, K4)

Source: П. Златева, *Комплексен финансов анализ на фирмата чрез размита експертна система*, Финанси, 2006, III, No. 1, Прил. към бр.1, p. 248

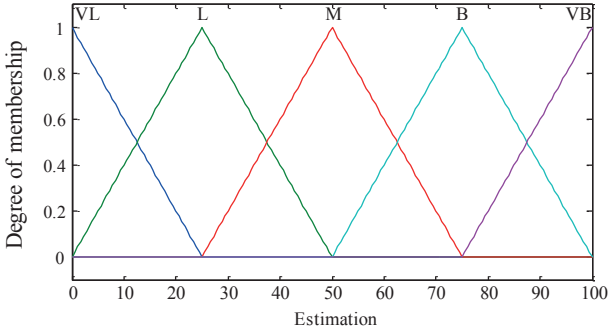


Figure 3. Form of the output linguistic variable "Estimation"

Source: П. Златева, *Комплексен финансов анализ на фирмата чрез размита експертна система*, Финанси, 2006, III, No. 1, Прил. към бр.1, p. 248

The rules for making a conclusion in knowledge data bases are defined by means of "If – Then" logical forms. Nine rules are included in the first fuzzy subsystem, and 15 in the second. Some of these rules are as follows:

IF [K1 is Little] and [K2 is Little] THEN [K4 is Very Little]
IF [K1 is Little] and [K2 is Big] THEN [K4 is Middle]
IF [K1 is Middle] and [K2 is Little] THEN [K4 is Little]

IF [K4 is Very Little] and [K3 is Big] THEN [Estimation is Middle]
IF [K4 is Little] and [K3 is Middle] THEN [Estimation is Little]
IF [K4 is Middle] and [K3 is Big] THEN [Estimation is Big]
IF [K4 is Very Big] and [K2 is Little] THEN [K4 is Middle]

The hierarchical fuzzy expert system for complex assessment of the opportunities a client presents to the firm is projected in Matlab environment, using Simulink and Fuzzy Logic Toolbox. The two subsystems are built up in the "Mamdani" variant of fuzzy systems. Classical max/ /min procedures of processing the rules and method of defuzzying – center of gravity have been used.

The output surfaces for the first and the second fuzzy subsystems in three dimensional space, with coordinates (K1, K2, K4) and (K4, K3, Estimation) respectively, are shown in Figure 4.

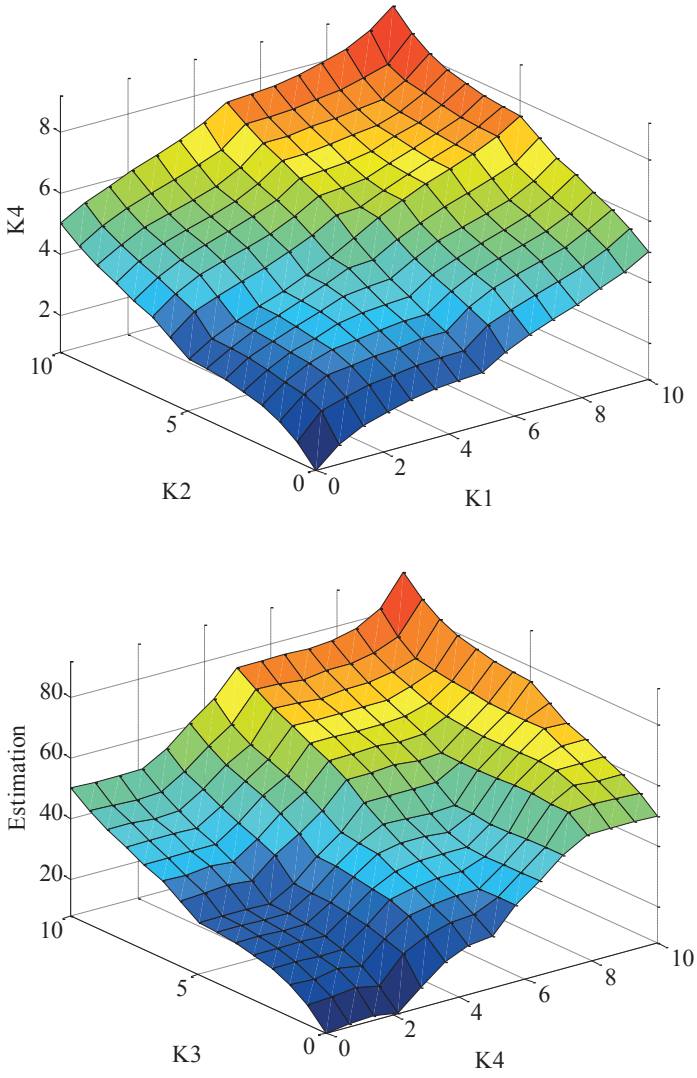


Figure 4. The output surfaces for the first and the second fuzzy subsystems

Source: П. Златева, *Комплексен финансов анализ на фирмата чрез размита експертна система*, Финанси 2006, III, No. 1, Прил. към бр.1, p. 250

The initial fixed values of the input variables, which are subject to fuzziness, can be obtained on the basis of an analysis and appropriate statistical processing of data collected through questionnaires completed by experts.

The particular value at the output of the hierarchical fuzzy system is the final complex estimate of the potential of the local production system to give rise to a viable cluster. Therefore, the output value of the fuzzy system can play the role of an indicator and to facilitate the making of more informed managerial decisions.

There are other variants of hierarchical expert systems with fuzzy logic, which are able to process more input variables, transforming them to the higher hierarchical levels. In these cases, output results can also be represented by means of three dimensional planes, similar to the ones that have been shown above. Data of this type is appropriate for further processing in various types of information systems.

In some cases it is better for the final result to be a quantity estimated set in a preset interval. The value of the estimate is interpreted as a characteristic of the assessed institutional environment.

For the purposes of the present study, such a model can be represented in the following way:

$$I = w_1.FI + w_2.InI$$

where:

I – is a general characteristic of the institutional environment

FI – evaluation of the state of formal institutions

InI – evaluation of the state of informal institutions

w_1, w_2 – are weights.

The idea is to apply a model with fuzzy logic, which allows using the knowledge and experience of experts. The parameters of the model – the input values for assessing the state of institutions (formal and informal), as well as their weights are determined by experts. The same is valid for w_1 and w_2.

In the model under consideration, a general characteristic of the institutional environment (I) is measured as the weighted sum of two integral factors: an estimate of the state of formal institutions (FI) and an estimate

of the state of informal institutions (*InI*). We suggest that the state of formal institutions (*FI*) is assessed on the basis of three basic factors, for example: viability of the legal forms of cooperation in the cluster – X_1; efficiency of the system of solving disputes – X_2; efficiency of the tax authorities – X_3. The second integral value – the estimate of the state of informal institutions (*InI*) can be obtained by taking into account the following main factors: ethicality of the firms in this sector of industry – Y_1, the competence of management – Y_2, qualification of staff – Y_3.

The linguistic variable "Factor level" is introduced in five fuzzy subsets: "Very Little", "Little", "Middle", "Big" and "Very Big". All variables vary in the interval [0, 10] and are defined with trapezoidal functions of appurtenance. Each linguistic variable F_i (X_i or Y_i), $i = 1, 2, 3$, has the respective function of appurtenance m_{ij}, $j = 1,\ldots5$, to the five fuzzy subsets, as follows:

$$\mu_{i1} = \begin{cases} 1, & 0 < F_i < 1.5 \\ 2.5 - F_i, & 1.5 \le F_i < 2.5 \\ 0, & 2.5 \le F_i \le 10 \end{cases} \qquad \mu_{i2} = \begin{cases} 0, & 0 < F_i < 1.5 \\ F_i - 1.5, & 1.5 \le F_i < 2.5 \\ 1, & 2.5 \le F_i < 3.5 \\ 4.5 - F_i, & 3.5 \le F_i < 4.5 \\ 0, & 4.5 \le F_i \le 10 \end{cases}$$

$$\mu_{i3} = \begin{cases} 0, & 0 < F_i < 3.5 \\ F_i - 3.5, & 3.5 \le F_i < 4.5 \\ 1, & 4.5 \le F_i < 5.5 \\ 6.5 - F_i, & 5.5 \le F_i < 6.5 \\ 0, & 6.5 \le F_i \le 1 \end{cases}$$

$$\mu_{i4} = \begin{cases} 0, & 0 < F_i < 5.5 \\ F_i - 5.5, & 5.5 \le F_i < 6.5 \\ 1, & 6.5 \le F_i < 7.5 \\ 8.5 - F_i, & 7.5 \le F_i < 8.5 \\ 0, & 8.5 \le F_{ki} \le 1 \end{cases} \qquad \mu_{i5} = \begin{cases} 0, & 0 < F_i < 7.5 \\ F_i - 7.5, & 7.5 \le F_i < 8.5 \\ 1, & 8.5 \le F_i \le 1 \end{cases}$$

The complex estimation of the general characteristic of the institutional environment (*I*), based on the proposed fuzzy logic model, is done as follows:

$$I = w_1.FI + w_2.InI = w_1 \sum_{j=1}^{5} r_j \sum_{i=1}^{3} w_i^x \mu_{ij}(X_i) + w_2 . \sum_{j=1}^{5} r_j . \sum_{i=1}^{3} w_i^Y \mu_{ij}(Y_i)$$

Weights from the basic factors (w_i^X and w_i^Y) in the complex estimate are chosen on the basis of expert knowledge and empirical observations. Vector $r = (r1, r2, r3, r4, r5)$ with five coordinates, is introduced in the formula for estimating I, and has the form: $r = (1, 3, 5, 7, 9)$. For the linguistic variable – general characteristic of the institutional environment (*I*) there are also five levels as shown in Table 1.

The value we obtain for I shows the characteristics of the institutional environment in the studied options. The higher value of variable I is related to a more favorable state of the environment.

Table 1. Characteristics of the institutional environment

I intervals	Values of the characterization of the environment
$8 < I \leq 10$	Extremely favourable
$6 < I \leq 8$	Highly favourable
$4 < I \leq 6$	Middle favourable
$2 < I \leq 4$	Highly unfavourable
$0 < I \leq 2$	Extremely unfavourable

Source: Г. Забунов, Д. Велев, П. Златева, *Компютърно базирана система за управление на отношенията с клиенти, Строително предприемачество и недвижима собственост*, Сборник доклади от 26-та научна конференция с международно участие, Изд. "Наука и икономика", Варна 2011, p. 117–125.

The value obtained for I shows the degree of attractiveness of the institutional environment in a particular production system. A higher value of variable I shows higher attractiveness of the environment.

3. Expected results

Until now, studies of Bulgarian clusters and local production systems in line with the institutional theory have not been made. The proposed method has not yet been tested in a field study. In relation to a forthcoming study of the possibilities of forming a cluster in the sphere of facility management, a survey was conducted with experts in the field. One of the aims is to approbate the model of general characterization of the institutional environment proposed in the paper. Facility management is a relatively new business in Bulgaria and there are no pronounced regularities in its spatial location – there is no reason to consider it as a local production system. Concentration of firms in the sector is observed in the big cities of the country and in some special production areas (energy sector, copper extraction, etc.). Interviews were held with members of the Bulgarian Facility Management Association, which is the only professional organization in the sector. Even at this very early stage it was noted that, according to the respondents the lowest value among the input variables has the X_i factor. This means that the main problem for forming a cluster in the sector, according to them, would be a not good enough legal regulation of the forms of interaction in the cluster. On that basis we can formulate the hypothesis that in Bulgaria the laws regulating the activities of the objects of social economy are not sophisticated enough. That, in turn, leads to the insufficiency of social capital in the interaction of the business organizations in their attempts to form structures of the network type.

4. Conclusion

An attempt has been made to find a quantitative approach in processing quality information with the aim to analyse the institutional environment of the functioning of the clusters from the perspective of the modern institutional theory. Models with fuzzy logic, which are applicable in that specific area, have been proposed. Institutional theory applies analysis with quantity methods in institutions, but most often at the level of business rules. The present paper can be viewed as the first step in the development of a whole approach, in which the supraconstitu-

tional and constitutional rules are modelled and studied through systems with fuzzy logic, and the business rules – through quantity models, which have been established in the theory and practice.

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Abstract

Local production systems are traditionally regarded as evolving structures, which react to changes in the environment, but the mechanisms of their reactions are determined by processes which are internal for them. Delineating the environment of the local production systems, their components, elements and structure – is done from the perspective of modern institutional theory. That matter is subject only to qualitative analysis which makes research difficult. For that reason, we suggest using fuzzy logic systems for the study of these problems, which provide good tools for quantifying quality information.

Key words: local production systems, institutions, fuzzy systems.