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# Geographical Bases of Industry Distribution in Vojvodinian Part of Banat

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**Abstract** *Banat is one of the regions in Serbia that has relatively old industry whose location and distribution was influenced by a number of natural conditions and socio-historical factors. Apart from the fact that some widely known types of location and distribution were established in middle Europe, some types of object disposition, that are characteristic for geographical specificities that Banat as a region possesses and which may reflect upon the state of industry, were also established (so-called specific types of industry distribution). Complex types of distribution of industry, that can be classified into several characteristic models, are stipulated by some types of primal relevant locational factors that are characteristics for certain weather periods, changes in a state economic politics, need for interregional spatial coordination, politics of even development of all parts in the region and other factors.*
*On a further flow of industrial development and distribution, orientation of Banat towards the further development of agriculture, chemical industry, industry of building materials as well as certain branches of working intensive industries will play an important role.*

**Key words** *industry distribution, industry location, polycentric distribution, dispersible distribution*

## Specific types of industry distribution

Orientation of one region, like Vojvodinian part of Banat, towards specific conception of spatial distribution of industry in whole or of its certain branches, is of great practical importance. Adequately chosen distribution model gives us a possibility to avoid an emergence of certain factors that may, continually or periodically, impede the process of industrial development. Thus, we can avoid an emergence of doubled capacities, follow the legality of the scope economy, create the possibility of optimal usage of industrial capacities, etc.

Distribution and organization of industry in forms of *polycentric* and *dispersive* models of macro spatial distribution are characteristic for Banat. Orientation towards certain models depends on different branches, groups and subgroups of industry, time of emergence of certain objects etc.

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Complex types of distribution of industry, that can be classified into several characteristic models, are stipulated by some types of primal relevant locational factors that are characteristics for certain weather periods, changes in a state economic politics, need for interregional spatial coordination, politics of even development of all parts in the region and other factors.

## Polycentric industry distribution

Polycentric industrial distribution represents construction of thus spatial solution which allows attainment of maximum effects out of specifically structured relevant spatial elements. When applying this model we usually start from the poles of development, i.e. from the optimal number, distribution and interrelations between large and primal objects-bearers of industrial development. Thus, on the one hand, we avoid excessive dispersion of industry in space, which as a consequence has low productivity, incomplete use of capacities. On the other hand, concentration of industry around several poles of development creates one-sided agglomerating, monocentric form of industrial distribution, which represents the opposite to dispersive distribution, but also has certain shortcomings of its kind.

When Vojvodinian part of Banat is concerned, it is characteristics that the most important part of industry has polycentric spatial distribution. The biggest poles of development, which formed appropriate regions by encouraging influence of their industries, are to be found in the southern, middle and northern part.

The position of bigger towns as poles of development of certain regions is the product of both long economical development and their functioning as administrative centres of different rank and range. This kind of complex of formed advantages inevitably had a positive effect on the strengthening of the role of many-sided development pole. Thus they gained a possibility to, almost continually, assimilate investments that initiated from different levels, to form and expand educational, professional, scientific and other similar institutions that could contribute to the strengthening of external, urban economy. That kind of economy, from its side, stimulates the development of industry, especially of technologically intensive branches, groups and subgroups.

In order to notice certain stimulating factors and characteristics of their activities and possibilities of the emergence of poles of development we will give examples of several biggest towns in Banat - Zrenjanin, Kikinda, Pančevo and Vršac. These towns in certain sense were typical for the economic region in Vojvodina. Their role of poles of development contributed to the fact that since the middle of 1970s they gained the position of centres of newly formed integrative systems (agricultural industrial complexes).

According to total capacity and versatility of industry, Zrenjanin became, during 1970s and 1980s, the most developed agro-industrial center in Banat, but also in Serbia and Yugoslavia. Numerous favourable conditions contributed to the fact: its position at the most important communication line in West Banat; vicinity of the Begej river mouth and alluvial plain of the Tisa river and the border of wattle plateau and the Tisa river valley, which all were considered as the areas of different production predisposition. Of great importance was also its position at the communica-

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tion lines junction which gave the site traffic refractive character. Finally, very important was also the vicinity of the Begej river, which has all the advantages of one watercourse, which provides the locality of the industry for whose functioning necessary are mouth of industrial and tap water, collector of liquid waste and navigable current as a cheaper alternative of transporting raw materials and goods.

Until the end of the World War I Pančevo was positioned on the border with Serbia and because of that it developed in specific conditions that only town with curtailed sphere of gravity can have. However, considering the fact that Pančevo was positioned near Danube and Tamiš and that, during certain period, it gained a function of mediator between Banat on one side and Belgrade and Serbia on the other, it developed into important traffic and trading centre. Today it represents the part of a big city agglomeration with Belgrade as a nucleus and it becomes the center of chemical industry. Petrochemical industry initiated the emergence of an industrial complex connected with certain branches on production-technological base. Apart from that, metalworking and food industry are also important.

Kikinda based its earlier development on good relations with Romanian towns - Jimbolia, Comlosi etc. When the border was drawn, the connection was seized. Borderline position of Kikinda caused its economic stagnation. Industrial objects of strategic economic importance could not be built over a long period of time. The most explicit threshold of development was the period of intensifying relations between Yugoslavia and Eastern European countries. When more open economic a political relations between Yugoslavia and Romania were formed, industry started to develop more intensely. During the 1970s Kikinda became industrial center with most definite rate of growth compared to other towns in Banat. It developed into the centre of industry of building materials (of Yugoslav and European proportions). The second complex emerged in agro industry on the basis of connecting agriculture and metalworking industry of different phases of processing. The metalworking industry is of secondary importance and that kind of industry is very old and according to characteristics of its emergence, development and structure, is very similar to metalworking industry located in other towns in Banat. That means that it has characteristics of working extensive industry organized around smaller objects and is subjected to agricultural needs and it, in a large extent, has characteristics of industry which runs its business from the positions of insufficiently expressed purposefulness and justifiableness of its existence, which means that in its existence there are a lot of expressed signs of local inertness.

Vršac had similar position and development to Kikinda. As a strong wine and vineyard center, it experiences stagnation and regression between the two wars, but also revitalization after the World War II. Apart from wine industry, many small and medium enterprises of metal processing industry, food industry, knitwear and clothing industry, and chemical industry were in business. During the 1980s the investments were strategically directed towards chemical (pharmaceutical) industry, which gains the shape of an industrial complex. Wine industry, as well as confectionery and pharmaceutical industry keep their primary role, whereas other industries, presented in forms of smaller and medium size objects, have secondary role and during the changes of state economic politics came to crisis that created depressive tendencies that still last.

## Forms of dispersive industry distribution and its problems

Forms of dispersive industry distribution developed mainly as a result of locating certain industries in smaller places, especially in smaller towns.

Smaller towns are rather numerous in the urban structure of Vojvodina. Their separate industrial potentials take an insignificant part in the whole industry of this region. However, taking into account the whole industry of smaller towns, their significant participation is noticeable.

For classical industry in market conditions it is characteristic taht it is based on the effects of scope economy. Those effects manifest themselves in the lower production expenses and greater profit. Smaller towns, looking separately, do not allow any possibility of forming and usage of the effects of scope economy. However, if they so cut, concerning the capacity, form one unique regional industrial (economical) system, in those circumstances they make conditions for obtaining favourable economical effects. Realization of the positive effects becomes possible due to the fact that dispersively distributed industrial objects can, rationally and economicallu, use local resources, without much investment and they can, if slightly modified, be fitted in the optimal regional economic structure. In that way, smaller objects create agile and elastic spatial- technological system that contributes to the more expressive dynamic of regional economic.

According to causes, time of emergence and duration, dispersively distributed industry in Vojvodinian part of Banat can be classified into several groups, whose characteristics we will display in the following text.

### Industries that are locationally conditioned by dispersively distributed materials

The first subgroup of spatial models is conditioned by the structure of the production of agricultural materials. If that is the case, than dispersive industry distribution, i.e. its position in smaller towns, is characteristic for food industry and agro industry in general, especially for those groups and subgroups that are primarily dependant on materials; but also for those of higher levels of manufacture, considering the fact that they can be based on the processing of semi products that are provided by basic industry. Accordingly, by using local agricultural materials and by adding complementary industries of higher phases onto the industries of lower phases, possibility of forming regional economic system arises. Apart from industry, agriculture and also other, mainly tertiary enterprises belong to this system.

### Industries that in a limited time period had more specific dispersibility

This kind of dispersible distribution is characteristic for *electric-power industry*, i.e. for thermo-electric power plant businesses, as well as for *textile industry*. Since the first thermo-electric power plant was built in Veliki Bečkerek (Zrenjanin) in 1895, they gradually started emerging on the territory of whole Vojvodina, and thus in 1938, only in Banat, there were 26 thermo-electric power plants that produced electricity for the needs of street lights, households, state economy and especially industry. After the World War II, when big power plants were built outside Vojvodina, especially next to water streams of great electric potential and next to coal mines, power plants in Banat stopped running businesses and almost completely disappeared.

Production of textile fibers and knitwear based its numerosity on hemp and silk-worm industry. This kind of industry in Banat was developed and dispersively distributed. However, after the World War II it disappeared. Production of Textile fibers made of silk developed most intensely in the 19$^{th}$ century when Vojvodina, and Banat especially, become the biggest manufacturers of silk-worm in Austria-Hungary Monarchy. Presence in large number of places (Veliki Bečkerek, Vršac, Pančevo, Nova Kanjiža, Novi Kneževac etc.) was not the only characteristic of this kind of production, but it also had a lot of production units in the limited number of bigger towns with developed manufacture.

There are certain types of industries that developed rather early and that have kept great dispersibility until the World War II. After that, if we examine those kinds of industries, the model of dispersity was kept but in a less specific form. Previous high manifestation of that kind of distribution is mainly the result of the fact that the production was functioning in forms of smaller production units that had craft and manufacturing character. Together with a later transition on an industrial manufacture,

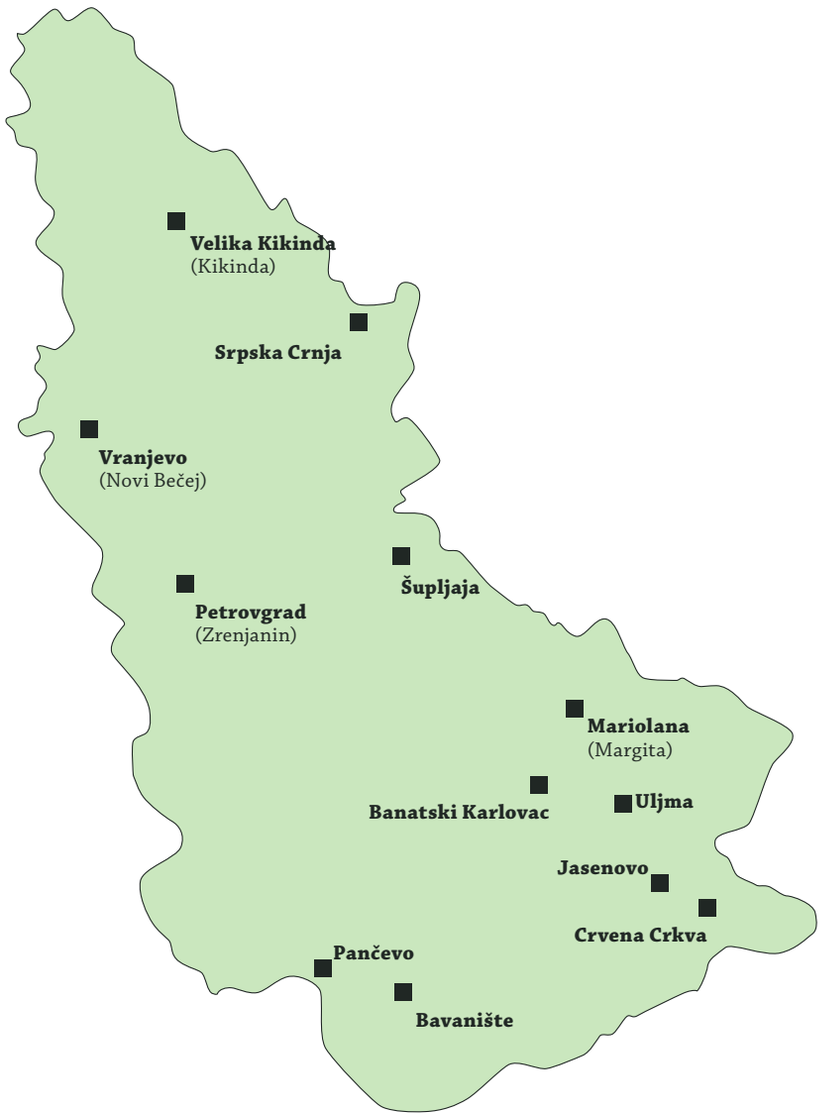


**Figure 1.** *Dispersive distribution of brick and tile production in Banat just after the World War I*

the need for a larger number of objects disappeared. If a massive number of production units was present in one city centre, than their number was lessened by different forms of integration or by gradual reorientation towards the production which fitted into production-technological functionality of one industrial complex

This kind of phenomenon is characteristic for certain groups and subgroups of *metal-working industry*. Here we also have certain groups of *machine-building industry*, such as production of simple agricultural machinery.

That kind of condition in the dynamic of industrial objects' distribution was rather expressed when observing industry of building materials, above all production of bricks and roof tiles. This industry owes that kind of development and distribution to wide spread of quality materials. It is necessary to emphasize that great part of those kinds of objects based their manufactures on the low level of machinery and massive use of labour. Thus, in 1919 there were 67 brick and tile factories only in Banat, and in 1929 there were 80 objects of that kind. (Šijački, 1982) This phenomenon was the result of a sudden process of urbanization. However, it is important to emphasize that although the number of objects would grow relatively quickly, factories were, in certain years, temporary closed because of low needs, and if there was a need they started running businesses again and even new factories were opened. The most important brick and tile manufacturers were located in Srpska Crnja, Šupljaja, Uljma, Velika Kikinda, Vranjevo, Bavanište, Crvena Crkva, Meriolana, Pančevo, Petrovgrad, Banatski Karlovac etc.

In the postwar period factories remained on the same locations, but with technical and technological improvements their productivity was enlarged. Object nets were thinned, but they still kept an intensive dispersity concerningdistribution.

Compared to the industry of textile fibers, *knitwear industry* has characteristics of a fast and economical production and with its tempo of development it exceeds all other branches of industry. Representation of this type of industry in relatively large number of places is possible because production organization can take place in both handicraft shops and big companies. That is working intensive area of business that allows massive employment of unskilled labour force, investments can be easily adjusted to the scope of production and problems of production organization are made relatively simple. These factors conditioned that in the process of industrialization of smaller towns and bigger villages, this type of industry becomes the initiator. Problems of the market distribution are not seldom solved by binding smaller production units, located in places that are economically and especially industrially anonymous, to big companies in city centres. Dispersibility in the distribution of *mill industry* is the result of a large number of production units. Industrial mill would officially be placed in a large town but that also included the existence of one central object in a town and a large number of accompanying smaller mills in the vicinity. The most important centres of mill industry existed in the following places: Zrenjanin, Pančevo, Kikinda, Vršac, Uljma, Straža, Novi Knežavac, Plandište, Velika Greda, Opovo, Bela Crkva, Srpska Crnja, Srpski Itebej etc.

Existence of a large number of mill production units was conditioned by dispersive distribution of raw basis. Apart from that, wheat purchasing is so expressive that in certain parts of Banat it corresponded to the level of quantity of production.

Existence of mills on river streams where pollution made water accumulations contributed to the numerocity of production units. Moreover, in past, those kinds of mills performed the role of mini power plants and were supplying one or two villages with electricity. Nowadays they do not use water as energy, but are still placed at the same locations and the reason for that is the existence of equipment as well as because of the law of local inertness. They are to be found on Tamiš, Karaš, Nera and other rivers.

**Part of industry that kept its dispersibility on the account of the number of production units.**

Part of industry that had dispersive distribution in the past kept that characteristic still today, mainly because of the large number of production units that belonged to a smaller number of central objects. That phenomenon can be seen at *meat industry* (butchering, canning...)

Between two world wars there were slaughterhouses in Banatski Karlovac, Čoka, Veliki Bečkerek, Pančevo, Kovin, Vršac, Debeljača etc. It was characteristic that in bigger city centres apart from slaughterhouses of large capacities there was a certain number of smaller objects. Big packing plants were to be found in Čoka, Kikinda, Zrenjanin and Banatski Karlovac. On the other hand, there is a large number

of so-called "communal" plants that are to be found in small and medial towns, and even in villages but there they were kept in less extent compared to the period just after the World War II. "Communal" plants have a local character, which means that they are intended for supplying narrow market that is reduced to municipal borders or onto several places, which have their own retail network. Besides that, these kinds of objects do business of so-called service butchering. Their existence in a relatively large number on a small area is enabled by the following factors:

- Numerous plants of small capacities were in a possibility to relatively successfully supply themselves with necessary materials from local individual manufacturers.
- Simple structure of production of smaller objects enables simple technical and technological equipment, which requires very little investment.

**Industries that are of relatively newer beginnings**

*Cattle food industry* can be labeled as a very young industry that shows characteristics of fast and spatially expressed expansion. The first object started manufacturing in 1969.In the short period of time, when market was expanded, their number i.e. their dispersity started to show signs of expressiveness (Zrenjanin, Uljma, Pančevo, Deliblato, Kovin, Debeljača, Mali Iđoš, Žitište, Jabuka, Jasenovo etc.). Their numerocity became prominent with forming of agricultural complexes. Formation of very spread network of cattle food manufacturers was influenced by, apart from other things, the following favourable things:

- A great selection of agricultural products that are mass use din the cattle food production (and that are widely spread in Banat (corn, barley, oats, wheat, cattle forage crops etc.)
- Part of cattle food industry represented operations of certain food industries (oil refineries, sugar refineries, mills, etc.) These kinds of factory plants had a function of using by-products and thus they enabled the closing of a manufacture cycle.
- Objects used for cattle food production are part of cattle farms and are exclusively subordinate to their needs. During time, because of the need for stabilization of manufacturing, they deliver products to individual agriculturists that are in a cooperative relation with cattle farms.
- These kinds of dispersity in spatial distribution led to the creation of a very contradictory situation. Thus, actually, some specialized production objects became over capacitated; and on the other hand, some types of cattle food had to be imported because of the monotony in production orientation of this industry.

**Dispersive industry distribution on the territories of bigger towns**

The characteristic of towns like Zrenjanin and Pančevo is the emergence of industries that are technologically "cut into smaller pieces" and dispersively distributed in the very town centre because thus they are in an immediate contact with concentrated market, i.e. shops that daily deliver goods. It is necessary for these types of industries that goods are delivered to consumers as soon as possible, and that can be achieved if it is spatially closely placed near consumers, i.e. all ordering parties (bakeries, soft drink industries, printing-offices etc.). Those can also be old industrial objects that did not have a need for building new plants and reconstruction o building objects or working equipment. If kept in a residential area, the possibility of their more expressed expanding is reduced, but the damage, made due to that, is, as a rule, negligible when the advantages of market closeness are taken into account.

## Some specificities of spatial and macrospatial models of industry distribution

### Poles of development as bearers of economic and spatial expansion

When analyzing what type of economic structure choice will prevail we put industry on the first place because not only that it does show the most noticeable effects of development, but it also affects, directly or indirectly, that scopes of other activities become specific poles of development. The process usually flows in a way that strong industrial cooperations become poles of *growth*, and later part of them develop into specific poles of development. (Krešić, 1981)

Several poles of development can be developed in certain production integrities. During economic expansion that is also characteristic for Banat. The result of the emergence of such extended spatial structure was the loss of crucial role that certain poles of development had and the emergence of polycentric system concerning industry distribution.

It is characteristic for Banat that the role of the pole of development belonged mainly to towns, where hard industry started to develop first, so that it became the originator of other economic activities. Small processing industry could not have that kind of role. It usually had a complementary position, which helped it become continuator of developed nucleus, thus contributing to the emergence of one gravitating space, usually with the characteristics of a nodal region. If, nevertheless, smaller industries start the emergence of poles of development, then that is of lesser importance and frequency

### Traffic intersections and refractions as centres and movers of industrial development

Important industrial centres also become points in space, i.e. urban settlements that gain the position of traffic refraction points or traffic refractions. Those are places where different types of transportation roads meet, i.e. means of transportation that that have different transportation tolls. That is why it is possible to choose here longer but cheaper transportation direction. Such a position in Banat can be found in Zrenjanin, Pančevo, Novi Bečej where we can see junctions of motorways, railroads and river waterways. Raw materials are transported by cheaper waterways, whereas more expensive land transportation is reduced to short transports to the factory, or even better if the factory's position is on a canal or river, unloading is done directly from the water vessel into the factory

Moreover, as railroad transportation of large quantities of goods is cheaper than motorway transportation, there is a large number of towns in Banat (Vršac, Kikinda, Bela Crkva, etc.) that permanently or continually had the role of such refraction points.

### Development axis as a specific form of spatial idustrial distribution in other complementary activities

One of the preconditions of creation, growth and importance of development axes is infrastructure. Firstly, it is the versatile and quantitative transportation infrastructure; secondly of great importance are waterways (rivers, canals etc.). One such waterway may represent an important infrastructure (transportation) and technological production factor of the whole content of the development axes. Danube, Tisza, Veliki Kanal, as well as certain fragments of water currents, valleys and more important traffic roads, all have the character of more or less constituted development bases. Formation of development axis may have both positive and negative consequences. Negative consequences in Banat are reflected in over pollution of water, destruction of soil either by occupying or polluting feral areas or air pollution. However, the development axis is often also the mover of more intensive economic development in the neighboring area. In fact, agile spatial integrity is a significant initiator of the secondary activities' structuring proc-

ess, i.e. moving of economic resources in the gravitating area.

Development axes may represent union, i.e. system of refraction points, individual activities, and also whole developmental and urban centres or different combinations of these already mentioned.

### Specificities in the development and reorganization in the borderline region

Industrial activities express their spatial scope in a form of a circle. They were thus formed while Banat, until the end of the World War I, was a compact intra-state unity. Formation of political borders interrupted normal spatial industrial development and accompanying activities (mainly Kikinda and Vršac). Conditions for using potential advantages of scope economy and exterior economy were firstly worsened. Border regional models, especially in conditions that our country had, are usually of non -typical shape and structure. Thus, in borderline regions we have an appearance of specific problems of economic development, and especially of industry, whish means that classical poles of development could not be developed. Their scope was limited or shaped by a border.

That is why, with a good reason, it is emphasized that the greater openness of a border is one of the biggest, most important chances for the development of that region.

## Some characteristic examples of the functioning of spatial and locational inertness in Banat industry

If it comes to the worsening of locational favourable terms of certain industries, such as metal-processing industry, electric industry, leather and shoe industry, than some other industries can be moved into their buildings and other objects.

On the other hand, the objects and equipment of some other industries cannot be used for anything else, and the typical example of that in Banat are foundries. Most of these objects lost the advantages of a good location, but did neither stop running nor change a location. It came over to nullifying new locational disadvantages by using the effects of scope economy, i.e. enlarged productional effects. Moreover, besides the development of new plants, the greater variety of assortment is attained very often. Thus, the new location is even more strengthened. That kind of object resort to the business phase based on the following law - locational constancy (inertness) that puts the development of a corporation into the sphere of more expressive uncertainty.

## Conclusion

During the history of industry business in the Vojvodinian part of Banat, certain common types of global distribution were formed, together with different types of objects' disposition that are characteristic for specificities that Banat as a region has and which can reflect the state of industry. These are so-called specific forms of distribution: emergence and development of poles of development that become bearers of expansion of economic and spatial contents in general; traffic intersections and refraction points that during time become centres and movers of development of certain spatial unities; larger natural-geographic and socio-geographic objects of linear extension direction become development axes; emergence of specificities in the development and organization of economic conditions in the borderline region etc.

According to the reasons, time of emergence and duration, dispersive industry distribution on the territory of Banat and Vojvodina can be classified into several groups: industries that are locationally conditioned by dispersively distributed materials, industries that periodically had very explicit dispersibility, i.e. in a limited time period, industries that emerged rather early and kept great dispersibility until the World War I; part of industry that from the very beginning of the existence has had dispersive distribution; industries that base their production according to the numerous production units; industries that are relatively new; dispersive distribution of industrial objects in central and peripheral parts of bigger towns.

In the whole industrial structure, the most specific share belongs to those industry branches that belong to the system of agroindustry. Their establishment is above all based on good agricultural predispositions. However, exclusively that direction of interdependence does not represent the guaranty of its development because that kind of industry is directed towards lower phases of production, and thus a great mass of unused secondary materials is produced. Thus, if key orientation of Banat is directed towards agroindustry than it should implicitly include the orientation towards the closing of production cycles in all production segments. As a consequence, it would base itself on the principles of sustainable development. It is also necessary to continue with the tendency towards agroindustries that are locationally and distributively directed towards concentrated and dispersive markets; towards exterior economies that are based on good and functional infrastructure, high-quality technological component etc.

Agroindustry, chemical industry and the industry of building materials will certainly best sustain problems and difficulties of the transition process. When observed optimistically, their stable development should contribute to the slow, but certainly continual development of revitalized traditional industries that were firstly in a function of perseverance on the account of the need for massive labour employment as well as industries that would base their safety on the agricultural production.

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