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CONSEQUENCES OF THE TRANSFORMATION OF REGIONAL SPATIAL PLANS IN THE REPUBLIC OF CROATIA ON INVESTMENT IN AGRICULTURE, VIEWED THROUGH THE PRISM OF THE LAW OF THE FIFTH DISCIPLINE

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Abstract: The development of a particular area is conditioned by spatial planning regulations. Spatial planning is based on an integrated assessment of space in order to enable the improvement of technical and social infrastructure through the management of spatial resources. Spatial planning is a visionary task, as it relies on anticipating future development needs. Managing space according to the principle of an integrated approach creates conditions for social and economic development, environmental protection, and the rational use of natural and historical assets. On the other hand, investment represents the process of allocating tangible and intangible assets into specific business activities with the aim of creating new value. This process is conditioned not only by market circumstances, but also by legal constraints. For this reason, it is necessary to examine all limitations that impose a burden on potential investors intending to invest their resources in the construction of agricultural-purpose buildings. Using a methodological approach based on comparative analysis, spatial-planning indicators will be examined, while methods of multi-criteria decision-making, correlation, and regression will be used to relate variables such as the volume of investment, the number of building permits for agricultural buildings and facilities, and the number of business zones, in order to determine the significance of their interrelationships. Through inductive analysis, general conclusions will be drawn regarding the effects of investments on the social community, and the importance of applying systems thinking in spatial planning decision-making processes will be highlighted. The aim of this paper is to demonstrate the economic significance of transformations in spatial planning at the regional level, viewed through the laws of the Fifth Discipline, and to analyze the long-term consequences of specific decisions on investments in agricultural buildings and facilities.

Keywords: Spatial plans, Laws of the fifth discipline, Investments, Agriculture

INTRODUCTION

Spatial planning is based on a comprehensive assessment of space and the environment to create a foundation for the most favorable management of natural and anthropogenic areas and to identify solutions that enable improvements in technical and social infrastructure under given natural, social, and economic conditions (Healey, 2006). Particular emphasis

is placed on anticipating future development needs while giving due consideration to the specific characteristics of space and the results of research on demographic trends (Hostovsky, 2000). Spatial planning is a multidisciplinary and continuous process, the outcome of which consists of spatial plans as the most effective regulatory instruments for environmental protection (Alexander et al., 2007). The transformation of spatial planning in Croatia is rooted in the Physical Planning Act (Official Gazette Nos. 153/2013, 65/2017, 114/2018, 39/2019, 98/2019, 67/2023). This transformation aims to modernize the system, increase efficiency and transparency, and align with European standards. It enables faster adoption, implementation, and monitoring of plans, improving spatial management. Key reasons include digitalization, informatization, alignment with the new Act, better efficiency, plan coordination, transparency, and monitoring. Essentially, the transformation seeks to create a digital framework for better management and spatial development. According to the Act, the fundamental objectives of spatial planning can be summarized as follows:

- balanced spatial development aligned with economic, social, and environmental foundations, respecting spatial sustainability and the rational use of space,
- integration of the national territory into European spatial planning systems,
- coordinated and complementary distribution of various human activities in space to ensure functional and harmonious community development while protecting the integral values of space,
- well-organized allocation and development of construction land through high-quality and humane development of urban and rural settlements, the development of green infrastructure, and the provision of a safe, healthy, and socially functional living and working environment,
- provision, functional accessibility, and use of services and facilities for the needs of different population groups, especially children, the elderly, and people with reduced abilities and mobility.

Local self-government units adopt spatial plans within their territorial jurisdiction. This enables more efficient use of space. Because resources are scarce, spatial planning should guide natural resource use toward activities that create new value (Ehler et al., 2009). Spatial plans should serve as a basis for creating a vision of the future. At the same time, they must not rigidly delimit the current material and institutional structure (Portman, 2011). For these reasons, the spatial planning process tries to consider socio-economic, natural, cultural-historical, and landscape values (Healey, 2006). Spatial development, as a set of activities, ensures the management of space as a particularly valuable and limited good of an organized community (Alexander et al., 2007). Through spatial management, conditions are created for social and economic development, environmental protection, and the rational use of natural and historical assets, based on the principle of an integrated planning approach (Allmendinger et al., 2009). This process includes the analysis and determination of general development goals, the introduction of organizational and legal measures, control of construction implementation, and monitoring of the functioning of built structures (Haughton et al., 2004). High-quality sustainable development is based on the synergy of two opposing concepts of spatial management (Nadin, 2007):

- a static concept (land registry and cadaster), which must guarantee stability, immutability of geometry, and ownership rights,

- a dynamic concept (spatial planning), conditioned by economic development programs and urbanistic or agrarian design projects for the area of the local self-government unit. Through the dynamic concept and high-quality spatial planning documents, the value of all included real estate can be significantly increased.

A vision of spatial development without systems thinking will have no functional meaning, as the assessment of current reality would be conducted without an analytical approach. Systems thinking requires the disciplines of building a shared vision, team learning, and personal mastery in order to understand potential (Checkland, 1991). Building a shared vision creates advantages over a longer time horizon. Mental models focus on the openness needed to uncover deficiencies in our current understanding of the world (Flood et al., 1996). Team learning develops the ability of groups to observe and understand the broader picture that transcends individual perspectives. Personal mastery creates individual motivation for continuous learning about how our actions affect the world (Senge, 1990). The laws of the Fifth Discipline help approach problems in a thorough and analytical manner. Through his research, Peter Senge defined ten laws of the Fifth Discipline:

- Today's problems come from yesterday's solutions,
- The harder you push, the harder the system pushes back,
- Behavior grows better before it grows worse,
- The easy way out usually leads back in,
- The cure can be worse than the disease,
- Shifting the burden to the intervener,
- You can have your cake and eat it too but not at once,
- Faster is slower,
- Cause and effect are not closely related in time and space,
- Dividing an elephant in half does not create two small elephants.

Due to its complexity, investment represents a process that can generate negative effects as a result of incorrect decisions (Holland et al., 2010). Therefore, investment cannot and must not be a spontaneous process, as this leads to poorly considered decisions (Hirt et al., 2005). An increase in capital investments in buildings, equipment, infrastructure, and similar assets raises business potential (Dunning, 1972). The causes of current problems are often confusing; therefore, it is necessary to examine present solutions rooted in the past in order to understand why problems have emerged. Compensating feedback that arises from intensified intervention in a problem is reflected through even stronger resistance of the system itself (Litterman, 2003). Compensating feedback often includes delays the time between short-term benefits and long-term damage which results in temporary, symptomatic solutions. Several years may pass before the problem reappears or a new, even more severe one emerges (Senge, 1990). Symptomatic solutions are temporary and short-lived, unlike fundamental solutions, which are lasting and final. For this reason, the aim of this paper is to demonstrate the economic significance of transformations in spatial planning at the regional level, viewed through the laws of the Fifth Discipline, and to examine the long-term consequences of specific decisions on investments in agricultural production.

MATERIAL AND METHODS

The research on the implementation of the transformation of spatial plans at the regional level was conducted with the aim of analyzing the scope and dynamics of investments in agricultural facilities during 2023 and 2024. Since investment represents a process of allocating tangible and intangible assets and is conditioned by the legal framework regulating land use, this topic requires a thorough and systematic approach. The study employed a quantitative approach based on secondary analysis of official data, combined with inductive reasoning and a descriptive-analytical method. Data were collected through a survey questionnaire addressed to counties, as well as through a review of the websites of the Ministry of Physical Planning, Construction and State Assets, the State Geodetic Administration, and the Croatian Bureau of Statistics. These sources were selected due to their methodological reliability and public availability. The data includes general economic indicators, information on land use, and data on the volume of investments. Quantitative indicators are presented in tables and charts. For comparison purposes, the data were normalized according to cost structures and their values.

The analysis included:

1. Comparative analysis - comparison of data according to economic indicators and the intensity of land use,
2. Statistical correlation test of two variables for hypothesis testing:
 - that there is no significant correlation between land-use efficiency and investments, i.e., $H_0: p = 0$,
 - that there is a relationship between land-use efficiency and investments, i.e., $H_1: p \neq 0$,
3. Statistical spatial regression analysis, describing the relationship between the independent variable (x) and the dependent variable (y) using the linear equation $y = ax + b$,
4. Multi-criteria decision-making, used to rank investments in space and compare data on land-use purpose and the volume of investments,
5. Inductive analysis - deriving general conclusions on the effects of investments on local development and the local community.

The analytical framework is based on the assumption that spatial plans are a fundamental prerequisite for attracting investments and that they should positively influence:

- operational efficiency,
- financial rationality,
- transparency of governance.

Through a conceptual model, three dimensions are linked: the degree of digital transformation of spatial plans, the intensity of investment attraction, and the achieved financial and social benefits, which were compared with the laws of the Fifth Discipline using the methods described above.

Table 1. Spatial planning indicators influencing investment attraction

Indicator	Country ranking /141 (2023)	
	2023.	2024.
Efficiency of the legal framework in challenging regulations	11	10
Burden of government regulation	38	32
Efficiency of the legal framework in dispute resolution	15	17
E-participation	94	97
Property right	80	85
Land administration quality	119	121
Adaptability of the legal framework to digital business models	31	28
Road connectivity	98	92
Road infrastructure quality	121	130
Access to electricity	136	139
Quality of electricity supply	97	96
Water supply reliability	101	116
Cost of starting a business	77	73
Average	78	80

Source: Prepared by the author based on data from the OECD and The Global competitiveness Report 2023-2024 years

The analyzed indicators present values that influence the implementation of spatial planning provisions for the years 2023 and 2024. Out of a maximum possible ranking value of 141 (representing the total number of countries included in the analysis), the Republic of Croatia is positioned between ranks 78 and 80, placing it in the middle of the scale. The data indicate that the Republic of Croatia achieves its weakest results in the areas of legal regulation, the efficiency of the legal system, and the burden of government regulation while, on the other hand, its strongest position is observed in the quality of infrastructure conditions. The analyzed indicators have a direct impact on the attraction of investments. Data on the volume of attracted investments in cities are presented in the following table.

Table 2. Overview of the total volume of investments and investments in municipal infrastructure, and a comparative overview of the number of building permits and the number of business zones during 2023 and 2024 years

County	Investments in agricu. facilities (EUR)	Investments in municipal infrastructure (EUR)	Number of building permits for agricultural facilities	Numb. of business zones	Investments in agricultural facilities (EUR)	Investments in municipal infrastructure (EUR)	Number of building permits for agric. facilities	Number of business zones
2023.					2024.			
Zagreb County	65.505,45	3.853,26	8.057	126	68.125,67	3.736,19	8.106	120
Krapina Zagorje	1.618,40	95,20	1.244	51	1.683,14	92,31	1.268	51
Sisak Moslavina	279,45	16,44	1.725	53	2.766,93	151,75	1.731	53
Karlovac	1.460,75	85,93	1.114	44	1.446,29	79,32	1.121	45
Varaždin	1.827,04	107,47	1.259	45	1.900,12	104,21	1.262	45
Koprivnica Križevci	1.473,14	86,66	1.364	60	1.532,06	84,02	1.358	60

Bjelovar Bilogora	1.150,18	67,66	1.027	55	1.196,18	65,60	1.037	55
Primorje G. Kotar	5.734,21	337,31	1.979	40	5.963,58	327,06	1.996	40
Lika-Senj	406,29	23,90	983	40	403,87	22,15	969	40
Virovitica Podravina	600,85	35,34	1.106	45	624,88	34,27	1.125	45
Požega Slavonia	474,37	27,90	1.387	44	493,35	27,06	1.374	45
Brod Posavina	925,96	54,47	1.801	49	963,00	52,81	1.819	52
Zadar	2.145,77	126,22	1.225	35	2.231,60	122,39	1.241	38
Osijek Baranja	2.509,94	147,64	1.769	60	2.610,34	143,16	1.806	62
Šibenik Knin	1.350,07	79,42	1.497	45	1.404,07	77,00	1.494	45
Vukovar Srijem	1.432,70	84,28	1.235	57	1.421,33	77,95	1.252	60
Split Dalmatia	7.839,76	461,16	1.339	45	8.153,35	447,15	1.363	50
Istria	6.102,57	358,97	1.067	37	6.346,67	348,07	1.048	37
Dubrovnik Neretva	1.663,88	97,88	933	32	1.730,44	94,90	969	35
Medimurje	1.560,50	91,79	1.132	45	1.622,92	89,01	1.166	48

Source: Prepared by the author based on data from the Croatian Bureau of Statistics, the Ministry of Physical Planning and Construction, and the State Geodetic Administration for the period 2023-2024. years

The values presented in the table indicate that the volume of investment increased by an average of 4% during the period analyzed. The highest volume of investments was recorded in the City of Zagreb, while the lowest was observed in Gospić. Cities in coastal Croatia Split, Rijeka, and Pazin lead in terms of investment volume, whereas the lowest levels of investment were recorded in mountainous regions of Croatia. A similar pattern is observed with regard to investments in municipal infrastructure.

The data further show that the largest number of building permits was issued in the City of Zagreb, which also has the highest number of business zones. Dubrovnik and Gospić recorded the lowest number of issued building permits and have the fewest business zones, which can be attributed to the fact that these counties are not predominantly oriented toward agricultural activities.

The values from Tables 1 and 2 will be used as input material for further analysis in this paper. The results section will present spatial planning indicators that influence the attraction of investments and will examine the relationship between the volume of investments, the number of building permits, and the number of business zones.

RESULTS AND DISCUSSION

The following chart presents, using a multi-criteria decision-making approach, the indicators that influence the attraction of investments in the agricultural sector.

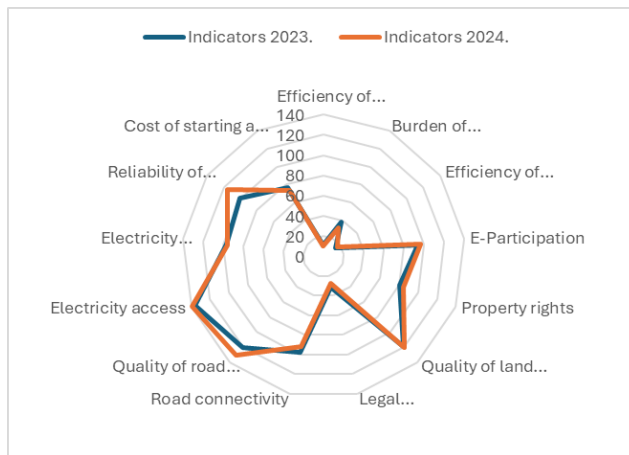


Figure 1. Spatial planning indicators influencing the attraction of investments in agricultural production development a comparative overview for the period 2021-2024 years

Source: Prepared by the author based on data from Table 1.

The data from the chart indicate that the factors most slowing the construction of agricultural capacities are the efficiency of the legal framework in challenging regulations and the efficiency of the legal framework in dispute resolution. This suggests that the legal system is slow, inefficient, and risky for investors. Economic policy measures should be directed toward more efficient business operations, increasing economic efficiency, improving the competitiveness of agricultural and food production and processing, and promoting environmentally sustainable and energy-efficient agricultural activities.

To investigate the relationship between total investments and investments in municipal infrastructure, a correlation test between the two variables was conducted. The correlation coefficient is 0.88, indicating a strong positive relationship. At a significant level of 0.05, there is a statistically significant positive correlation between total investments and investments in municipal infrastructure. The test statistic value is 2.7764; since this value is greater than zero, the null hypothesis (H0: no significant correlation between land-use efficiency and investments) is rejected, and the alternative hypothesis (H1) is accepted.

The following chart presents a regression model illustrating the relationship between the number of issued building permits and the volume of investments in agricultural facilities.

The regression model indicates that if the number of building permits issued (variable x) were 0, the expected volume of investments would be €2,777.4 thousand. If the volume of investments increases by €1,000, the expected number of building permits issued for the construction of agricultural capacities would be 1.7497. Using the global Moran's I index as a spatial statistics tool, the spatial relationship can be measured specifically, how similar or different the values of total investment volume, the number of building permits, and business zones are relative to neighboring counties. The results are presented in the following chart.

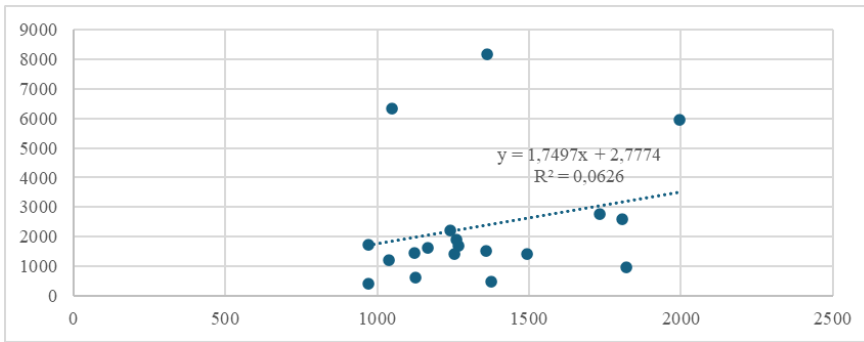


Figure 2. Regression analysis of the relationship between the number of issued building permits and the volume of investments. Source: Prepared by the author based on data from Table 2.

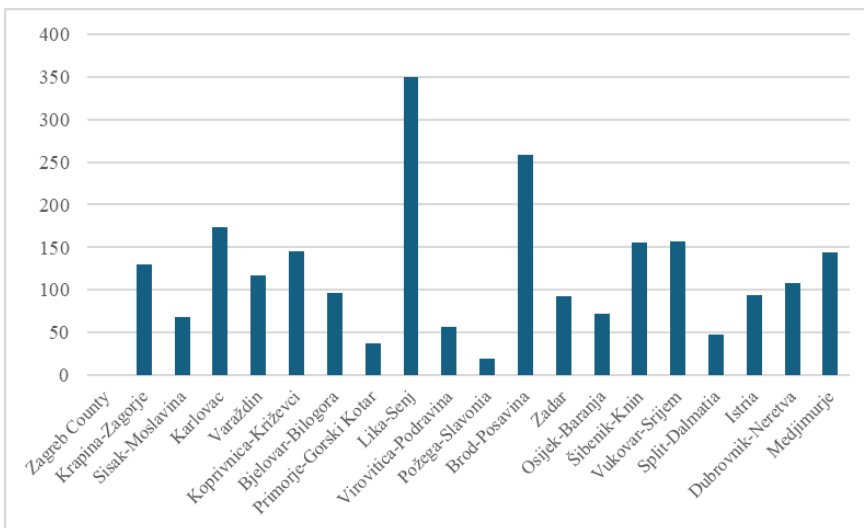


Figure 3. Global Moran's I index from multi-criteria decision-making for selecting the most attractive locations for investment. Source: Prepared by the author based on data from Table 2.

In the conducted analysis, using matrix summation, the value data indicate the presence of spatial auto-correlation; the values are distributed so that central values show connections between low and high values. This means there is a clear spatial relationship, suggesting that the data are clustered. The value in one area reflects the value in neighboring areas. Specifically, the City of Zagreb and counties in the Pannonian and continental regions of Croatia have lower values compared to the mountainous and coastal counties, where agriculture is a strategic sector with a significant number of capacities for cultivation, storage, and processing of agricultural products.

Through the analyzed data and considering the laws of the Fifth Discipline, it can be concluded that current solutions are often ineffective and the result of non-systemic approaches. Initially, it is important to note that the analysis of spatial indicators presented in Table 1 shows that problems originate at the state level, primarily due to an inefficient legal system, inadequate legal protection, and the burden of government regulation, which poses significant risks for investors. Furthermore, some counties replicated models from more developed regions without carefully evaluating their spatial capacities and resources,

either due to the engagement of unqualified personnel or “ad hoc” solutions. This resulted in a weaker inflow of investments. Such problems are fundamentally linked to human behavior; due to incompetence, the approach to problem-solving often relied on “copy–paste” methods. Limited knowledge leads to serious consequences. Systemic thinking is highly challenging and requires visionary problem-solving to eliminate all negative implications and potential future problems at their root.

CONCLUSION

Agricultural production is a significant economic sector in the Republic of Croatia. This study presents the state of investments in agricultural facilities using an analysis of spatial planning indicators. At the national level, the results show that the weakest outcomes are in the areas of legal regulation, legal system efficiency, and the burden of government regulation, representing significant risks for investors. Conversely, the best position is observed in infrastructure quality, which provides a competitive advantage compared to other countries.

The correlation coefficient between total investments and investments in municipal infrastructure is 0.88, indicating a statistically significant positive correlation at the 0.05 significance level. With a test statistic value of 2.7764 (greater than zero), the null hypothesis (no significant correlation between land-use efficiency and investments) is rejected, and the alternative hypothesis (H1) is accepted.

The regression model shows that with 0 issued building permits, the expected investment volume is €2,777.4 thousand. An increase of €1,000 in volume of investment corresponds to an expected 1.7497 issued building permits for agricultural capacities. Multi-criteria decision-making for ranking investments spatially revealed the presence of spatial autocorrelation. Specifically, the City of Zagreb and counties in the Pannonian and continental regions have lower values compared to mountainous and coastal counties, where agriculture is a strategic sector with a high concentration of capacities for cultivation, storage, and processing of agricultural products.

Considering the Fifth Discipline laws, current solutions are often ineffective, a consequence of non-systemic decision-making, which aligns with the law that “today’s problems come from yesterday’s solutions.” Some counties copied models from more developed regions without carefully analyzing their spatial capacities, relying on unqualified staff and “copy-paste” solutions, which resulted in lower investment volumes, illustrating the law “faster is slower.”

Investing time and money in transforming spatial plans should include new methods for more efficient land use. While higher-quality planning increases immediate costs, the long-term benefits are significantly greater, as evidenced by the number of constructed facilities and increased business activity, aligning with the law “you can have your cake and eat it too, but not all at once.” A more careful approach to spatial planning ensures more functional use of land and its potential, reducing the likelihood that peripheral areas often owned by counties and municipalities become overgrown and abandoned. These areas can instead be transformed into business zones that generate financial revenue from rent and

business activity taxes, illustrating the law “dividing the elephant in half does not create two small elephants.”

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