
Measuring the Integrated Effectiveness of Regional Development: Directions for Regional Government

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Abstract:

Purpose: The purpose of the study is to identify the proper economic tools to evaluate the effectiveness and efficiency of a regional development policy.

Design/Methodology/Approach: The proposed methodology consists of three stages. At the first stage, the indicators are analyzed, allowing pointing the level of particular development dimensions in the self government strategy. At the second stage, indicators characterizing the efficiency of Opolskie Regional Operating Programme (OROP) and Development Strategy of Opole Voivodeship are examined. The third final stage is the analysis of the integrated effectiveness of regional development policy. The research methodology is based on the use of the following methods: desk research, the method of grouping statistical data, and the method of effectiveness analysis.

Findings: The proposed methodology let us to find the need of redefining the tool enabling the measure of the degree of imbalance as the result of leading the regional development policy, as well as the uneven development potentials.

Practical Implications: The authors purpose a new approach to the regional development policy by defining the complementary tools for regional self government evaluation.

Originality/Value: The authors propose the new approach to the regional development policy programming, especially by redefining regional needs included into regional strategies.

Keywords: Region, integrated effectiveness, economic evaluation, regional development policy, regional operational programme, development strategy.

JEL codes: O38, O47, P48.

Paper type: Research article.

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1. Introduction

Measures of effectiveness (MOEs) are measures designed to correspond to the accomplishment of mission objectives and achievement of desired results. They should be related to performance, simple to state, testable complete state any time dependency and any environmental conditions as well as easy to measure. They also should be measured quantitatively – if required, may be measured statistically or as a probability market (Fathabc *et al.*, 2019). It is then possible to monitor the RDP or some of its mechanisms (Benowitz *et al.*, 1975), and to compress the data stream observed during the test. Given that MOE are taken from early studies of performance evaluation, it is reasonable to point the discussion about this concept starting from Levis at MIT (Levis, 1986) and further such as Waltz and Llinas (Hall, 1992). The term MOE has more recently been used to indicate measures of performance (Green and Johnson, 2002; Badiu *et al.*, 2015) as well as customer satisfaction or compliance (Laere, 2009). It has been also used anywhere in a system and at any level, insofar as a customer has corresponding requirements. It may be based at on a systematic analysis of variables that are considered key target values of the regional development policy (e.g. GDP, employment) (Polverari, 2015; Jasińska-Biliczak and Sitkowska, 2014).

The subject of the study is an analysis of selected integrated efficiency assessment tools in terms of their usefulness for evaluating the regional development policy. The authors focus on the 2007-2013 financial programming period of the European Union. This is the first full financial period since Poland's accession to the European Union and, due to the n+2 rule, some of the projects implemented at that time were completed in 2015. Thus, obtaining data from this period enables a current analysis of the financial effectiveness of the regional development policy during this period.

By presenting selected tools for evaluating the regional development policy (RDP), the authors intend to join the current discussion on whether its effectiveness and efficiency may be improved. This article aims to share experiences from research conducted by assessing the integrated effectiveness of selected elements of the regional development policy in relation to the Opole Voivodeship.

In the research undertaken, the effectiveness of actions undertaken within the scope of the regional development policy will be understood as the degree of consistency between the objectives of the actions implemented in relation to the objectives of the entire program and/or the development strategy of the region under study. In turn, the concept of effectiveness of activities is stipulated as a defined ratio of the achieved goals (or the degree of compliance of the goals achieved to those planned) to the expenditure incurred. Effectiveness implies that a system is capable of producing an effect. Effectiveness issues include efficiency (doing things in the most economical way - good input to output ratio), efficacy (getting things done, i.e. meeting targets) and effectiveness (doing the "right" things, i.e. setting appropriate targets to achieve an overall goal (the effect)) (Anderson and Stejskal 2019).

Adopting the thesis about the need to include both of these categories concurrently in the economic evaluation of RDP, they are defined as integrated efficiency and are both measurable and gradable. A condition for rationalising the RDP funding process is the choice of the most efficient and at the same time effective level of public service provision. This article was confirmed thanks to the economic evaluation regarding the implementation of the development strategy of the region under study and the associated regional operational program by using indicative tools for measuring integrated efficiency.

The purpose of this article was to identify the proper economic tools to evaluate the effectiveness and efficiency of a regional development policy. The research methodology is based on the use of the following methods: desk research, the method of grouping statistical data and the method of effectiveness analysis. The work used statistical data characterizing the regional development policy taken from official information resource – Opolskie Regional Operating Programme (OROP) and Development Strategy of Opole Voivodeship, Poland, until 2020 in the EU financial period of 2007-2013.

2. Data and Methodology

To gain a better insight into the industry and growth relationships in a changing economy, indicators that can account for the potential importance of sectors with strong domestic linkages are needed. The following article was set up in the research hypothesis:

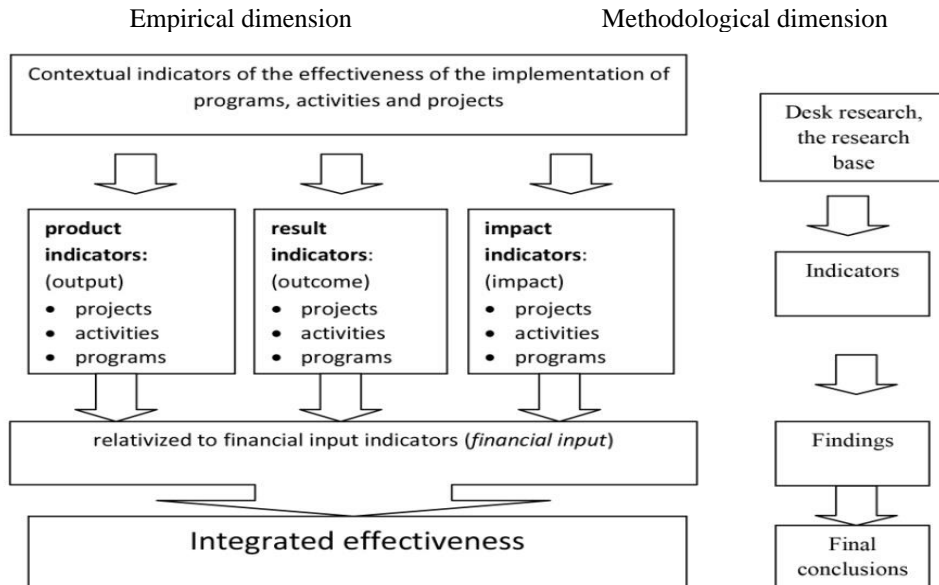
***Hypothesis 1:** The tool for qualifying and quantifying the study of specific contexts of the regional development policy assessment follows the scheme of product – result – impact, supplemented with indicators of public funding contribution.*

At the base of the observed general rise in independent academic interest in the appraisal of policy outcomes and effectiveness, linked to the disappointing socio-economic performance of the European regions despite the considerable resources spent on such a significant investment, lies the question as to why have regional disparities not been re-absorbed. The research design is presented in Figure 1. The presented scheme of performance indicators includes gauges used in the European Union in connection with the implementation of strategies, programs, activities and projects co-financed from European funds:

- output indicators as the measures of the degree to which the operational objectives specified in the program have been implemented, expressed in physical units or in value;
- result indicators, whose outcome measures the effectiveness of achieving the specific objectives of the program, specifying the direct and immediate results of the implementation of the program from the point of view of beneficiaries;

- impact indicators as the measures of the effectiveness of achieving the general objectives of the program (strategic objectives).

Figure 1. Integrated effectiveness (effectiveness and efficiency) of the implementation of the regional development policy

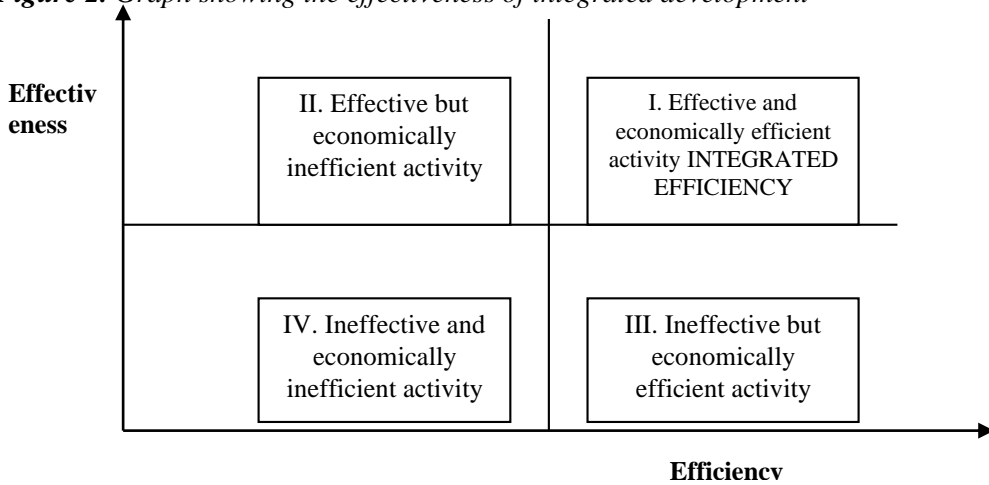


Source: Developed by the authors.

They refer to the results of the program that emerge after a certain period of time after the implementation of the program. Such results are regional in nature – often transcending a specific beneficiary (interest group). Some may refer to regional participation in solving global problems (global impact).

The product, result and impact indicators are in fact measures of the effectiveness of achieving strategic (program) objectives at various levels within the program. Financial contribution indicators refer to the budget allocated at each level of assistance and are used to monitor the progress of the (annual) commitments and disbursements of funds available for a given action or program against its allowable costs. In this sense they also correspond to the literature on the empirics of growth that focuses on the variables which are important determinants of growth in a variety of different models (Blasch et al. 2010). Possible combinations of indicators together with an indication of a desired combination is presented in Figure 2.

Figure 2. Graph showing the effectiveness of integrated development



Source: Developed by the authors.

3. Discussion

3.1 Evaluation as a Tool in Economics

Evaluation is the process of assessing the value of public intervention made by taking into account relevant criteria and standards. The concepts of assessment and evaluation are therefore partly convergent, but not identical. The use of the term 'assessment' focuses attention on only one element, assigning it the characteristics of the whole process, while also excluding a whole range of alternative approaches. On the other hand, evaluation is a multi-criteria and continuous evaluation process and refers to long-term results and is based mainly on the results and impact of program (strategy) implementation (de Michelis 2008). It is used to assess the impact of specific actions on solving strategic problems and to increase the effectiveness and efficiency of public intervention. The evaluators focus on assessing the results and long-term results (impacts) of the program, by primarily focusing on assessing the sustainability and effectiveness and efficiency of the positive changes that arise and by identifying possible side results (Glossary, 2002).

Monitoring and evaluation systems are interdependent in the sense that the information generated by the monitoring system conditions the process of evaluating public intervention as creating knowledge about the development of the region and the impact of a specific policy on its course. In turn, the requirements of evaluation entail, as it were, some modifications to the monitoring system, as shown at following figure.

Figure 3. Links between the monitoring and evaluation systems of the regional development policy and the measurement of integrated efficiency



Source: Developed by the authors.

3.2 An Integrated Indicator System

The indicators of how effectively the program objectives have been implemented (i.e. product, result and impact) by referring to the expenditure, or more precisely the share of EU funds (input indicators) in the expenditure on a specific project (action), enable the evaluation of the effectiveness of the entire program's contribution, specific actions (sub-actions) and projects. The target system of indicators should make it possible to assess the effectiveness and efficiency of achieving the objectives of the regional development policy recorded in strategic and operational documents. The choice of the indicators is crucial to the theoretical development of the efficiency evaluation. Therefore, it may be reasonable to weight specific indicators within a given priority according to the significance of the priority itself in the structure of the development strategy (program).

Therefore, in practical terms a relevant issue is the construction of synthetic indicators of priority implementation that, in addition to strategic (program) analysis, also include specific transformations of diagnostic variables (statistical data) necessary to build the indicator, consisting of unification (for example by transforming destimulants and nominants into stimulants), standardisation (bringing value to comparability by means of standardisation, unitarisation, ranking and other methods), weighing (for example, heuristic methods) and aggregation (additive and multiplicative formulas).

3.3 Evaluating the Integrated Effectiveness of the Regional Development Policy

The regional development policy is an important development factor nowadays and also a source of competitive advantage for the region (Malik and Jasińska-Biliczak 2018). The results of the regional development policy should be analysed and

evaluated comprehensively according to specific criteria designed to assess integrated effectiveness. The use of criteria connected with dimensions of sustainable development (Strahl, 2006) is not without significance. In essence, evaluation of the regional development policy is of a strategic nature; hence, the presented assessment tools can be mainly used as part of strategic evaluation ex post. Table 1 presents selected examples of tools that can be used in the process of assessing specific criteria for economic evaluation of the regional development policy.

Table 1. Criteria, indicator formulas and examples of efficiency evaluation tools integrated in terms of strategy – program – project

L p .	Integrated efficiency evaluation criterion	Conceptual formula of the strategy - program - project indicator	Examples of research tools
1 .	The effectiveness of implementing the adopted concept of sustainable development measured in terms of consistency of the regional policy with the concept of sustainable development	$S/s = \frac{\text{aims of the development strategy}}{\text{aims of the sustainable development}}$ $S/p = \frac{\text{aims of the development programme}}{\text{aims of the sustainable development}}$ $S/pr = \frac{\text{aims of the development project}}{\text{aims of the sustainable development}}$	Examination of the provisions of the Opole Voivodeship Regional Development Program in terms of its consistency with the concept of sustainable development
2 .	The effectiveness of implemented projects, activities and programs measured in terms of the consistency of their results with the objectives of the regional development policy (strategy)	$Se/s = \frac{\text{effects of realized strategy}}{\text{aims of development policy}}$ $Se/p = \frac{\text{effects of realized programme}}{\text{aims of development policy}}$ $Se/pr = \frac{\text{effects of realized project}}{\text{aims of development policy}}$	Assessment of the consistency of the governance structure and development capital. Examination of the effectiveness of projects co-financed in the scope of public aid
3 .	The effectiveness of public co-financing contribution in relation to the project results, activities, programs and development strategies	$Es = \frac{\text{effects of realized strategy}}{\text{public expenditure}}$ $Ep = \frac{\text{effects of realized programme}}{\text{public expenditure}}$ $Epr = \frac{\text{effects of realized project}}{\text{public expenditure}}$	Research on the effectiveness of the contribution to co-financing development projects from the resources of the Opole Voivodeship Regional Development Program

Source: Developed by the authors.

In the following section, selected case studies will be presented performance indicators according to the indicated criteria of effectiveness of the integrated development policy of the Opole Voivodeship.

4. Results

The effectiveness of the implemented policy (strategy) of regional development should be measured in terms of changes in phenomena and processes in the socio-economic system. Examples of regional development policy assessments include analyses conducted with an econometric model (HERMIN, MaMo2), shift-share, and ones based on Yule's co-efficient of association in regional benchmarking. Regardless of those, dedicated to regional policy assessment, analyses in the process of assessing a regional development policy, methods and tools for assessing the development of the regional socio-economic-environmental system may be used as a starting point (Malik, 2009). In this context, specific measures of changes in states and processes in regional development should be compared to strategic goals resulting from the implementation of a specific development policy, each time questioning the convergence or divergence of real development processes with the objectives of the RDP.

4.1 Implementing the Adopted Concept of Sustainable Development Policy

An example of RDP assessment according to the criterion of its consistency with the selected concept of regional development is the examination of the provisions of the Opole Voivodeship Regional Development Program for the years 2007–2013 in terms of its consistency with the concept of sustainable development. In the context of assessing the global contribution of OV RDP 2007–2013 to the implementation of the concept of sustainable development, identification and assessment, inter alia, was conducted to review the consistency of the main objective of the Program with the overall objective of the sustainable development strategy as well as strategic goals and priority axes of the Program with dimensions of sustainable development. Additionally, the scope of integrated dimension was assessed. The dimension of development was treated as a model structure of development objectives with a universal nature, resulting from the analysis of European Union and UN strategic documents (Serrano, 2004; Jasińska-Biliczak, 2012). It is a conceptual model for a specific regional development policy.

The implementation of the sustainable development strategy consists in integrating dimensions, i.e., bringing the objectives of the analysed Program in line with the dimensions of various development dimensions (the so-called integrated dimension).

The examination of the consistency of strategic objectives (and related priority axes) of OV RDP 2007–2013 with specific development dimensions serves to determine the extent to which the concept adopted in the RDP was matched to the sustainable development policy, as illustrated in Table 2.

Table 2. Cohesion of strategic objectives and priority axes of OV RDP 2007–2013 with sustainable development dimensions

Lp	Governances of sustainable and lasting development: bundles of strategic goals	Strategic goals and priority axes of the Program					Scope of integrated dimension	
		C1	C2	C3	C4	C5	C6	
1.	Social dimension <ul style="list-style-type: none"> ▪ social ties (unity and social integration) ▪ balancing the value system and the economic system (reducing cultural lag by boosting the level of education) ▪ social justice (within and between generations) ▪ participation of all social groups ▪ elimination of poverty; living conditions 	2	3	2	2	3	3	83%
2.	Economic dimension <ul style="list-style-type: none"> ▪ maintaining or increasing well-being (consumption) over the long-term ▪ increase in added value 	3	2	3	1	2	2	72%
3.	Ecological dimension <ul style="list-style-type: none"> ▪ not exposing the environment to excessive anthropopressure ▪ preserving the participation of the environment in the economic system and processes of wealth creation ▪ a society that respects its resources ▪ architectural dimension, aesthetically appealing spaces 	2	1	1	3	3	3	72%
4.	Extent to which development dimensions are integrated	78%	67%	67%	67%	89%	89%	76%

Source: developed by the authors

The extent to which development dimension has been achieved, assuming the full implementation of the strategic goal, is expressed on a scale from 1 to 3:

Full integration – 3 points; Partial integration – 2 points, Negligible integration – 1 point.

In general, the structure of strategic goals adopted in the analysed document is sustainable (the degree of integration of development dimensions has been estimated at 76%). The highest – an 89% level of governance integration – is featured by the C5 objectives focused around priority axis 5 (Social infrastructure and higher education) and axis 6 (Activation of urban and degraded areas). The smallest yet significant level of sustainability dimension is related to the achievement of C2, C3 and C4 objectives (priority axes: IT society, Transport, Environmental protection).

4.2 The Effectiveness of Implemented Activities and Programs

The effectiveness of regional operational programs was assessed according to the criterion of achieving the objectives of the regional development policy in terms of the growth in development capital in the years 2007-2013. The following programs were included in the analysis:

- Opole Voivodeship Regional Development Program 2007-2013;
- Rural Development Program 2007-2013;
- Human Capital Operational Program 2007-2013.

The characteristic values for the funding period analysed are presented in the following Table 3.

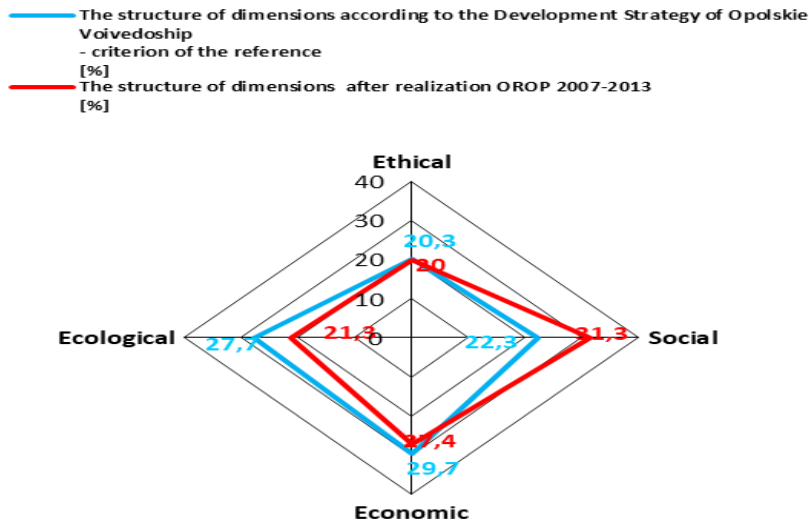
Table 3. *Strategic effectiveness of Opole Voivodeship development programs in relation to the Opole Voivodeship Development Strategy until 2020*

Developmental dimensions	Opole Voivodeship development strategy dimension [%]	Developmental dimension achieved as a result of implementation of:			Developmental dimension achieved thanks to public intervention 2007-2013 [%]	Level of dimension - deviation analysis [%]	Strategic effectiveness of public intervention according to dimensions [%]
		OV RDP 2007 - 2013 [%]	HC OP 2007 - 2013 [%]	OV DP 2007 - 2013 [%]			
Ethical	20,3	17,9	22,6	19,5	20	(+0,5)	101,5
Social	22,3	27,9	36,1	30,1	31,3	(+8,3)	140,8
Economic	29,7	32,8	25,9	23,4	27,4	(-1,6)	108,4
Ecological	27,7	21,4	15,4	27	21,3	(-7,1)	130
	100,0	100	100	100	100,0		

Source: Developed by the authors.

These values are also presented graphically in Figure 4.

Figure 4. Strategic effectiveness of Opole Voivodeship development programs in relation to the Opole Voivodeship Development Strategy until 2020.



Source: Developed by the authors.

The analysis reveals deviations in the effectiveness of the results yielded by the regional development policy from the structure of the development goals and capital declared in the Development Strategy in terms of four development governances: values, social, economic and ecological. Too little was invested in the development of ecological and economic capital in relation to the strategic provisions. On the one hand, this constitutes a premise for correcting the system of selecting projects for public funding within the Program under study, and on the other – the possibility of intervention (Kowal et al. 2017) within other programs available regionally. In turn, social capital indicates excessive investment, which may cause a real outflow of educated staff who may not find employment in the region.

4.3 The Effectiveness of Public Co-Financing Contribution

The impact of co-financing from funds for the implementation of the regional development policy was examined from the example of projects co-financed under the development programs of the analysed region in the 2007-2013 financial perspective and the Opole Voivodeship Development Strategy (Review of the EU Sustainable Development Strategy – Renewed Strategy June 2006).

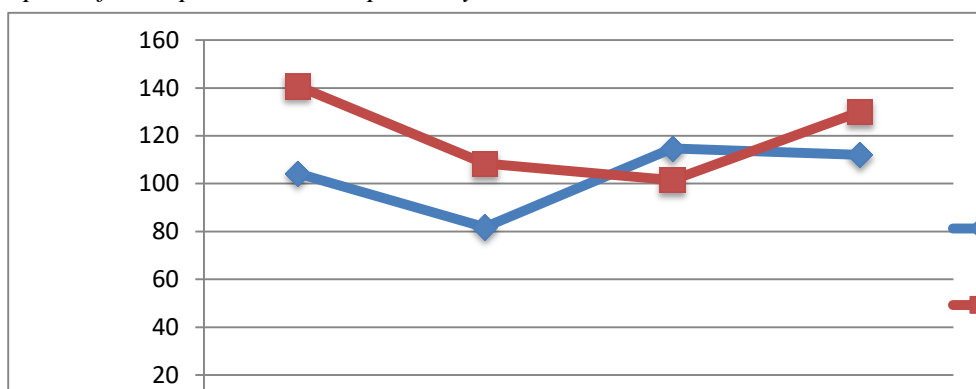
The effectiveness of the fund's contribution to co-finance development projects relative to the structure of project impact was used as a research tool. The level of effectiveness of the contribution of funds was determined, resulting from the

structure of using the funds for co-financing in relation to the structure of development capital of Opole Voivodeship development programs in the 2007-2013 financial perspective and the Opole Voivodeship Development Strategy.

The analysis reveals that the effectiveness of the contribution of development projects is excellent. Regarding the programs, the greatest consistency was achieved in ethical (+ 0, 5) and economic (-1.6) capital. Analysis of the fund's contribution in relation to the capital structure states that deviations occur in pairs: small in ethical and economic capital, greater in social and ecological capital. The selection of projects within the RDP 2007-2013 in this perspective was more correct in relation to capitals with smaller deviations, while capitals with larger deviations tend to indicate that less effective projects were chosen.

The assessment of the effectiveness of the allocation of the project's contribution to the structure of development capital arising from the Opole Voivodeship Development Strategy was different. In terms of human and socio-institutional capital, there were inefficient deviations between the relatively high contribution of funds to co-financing projects on the one hand, and the relatively low assessment of the impact of these projects on the sustainability and development of this capital. In terms of economic and ecological capital, the effectiveness of the contribution to the Opole Voivodeship Development Strategy was assessed as relatively high. Therefore, the funding period, as was 2007-2013, was used correctly – in the context of its efficiency, and constituted a starting point for the full funding period of 2013-2020. The analyzed relation between the allocative efficiency of the public support and the efficiency of particular dimensions, is presented in Figure 5.

Figure 5. Multi-dimensional effectiveness of the investments in the development capital of the Opole Voivodeship in the years 2007-2013.



Source: Developed by the authors.

The assessment of the multi-dimensional effectiveness of implementing projects concerning the development of economic capital in the Opole Voivodeship was unfavourable. The effectiveness of the policy pursued toward the development of

regional economic capital was low both in respect of the strategic efficiency and the allocative efficiency of the support. Within the scope of the development policy pursued over the period under study, there is a visible need for its modification with regard to increase in the quantity and value of the supported projects generating growth in regional economic capital and improvement of the efficiency of co-financing projects within the scope of developing economic and natural capital as well.

5. Conclusions

A condition of the effective and efficient implementation of a new regional development policy is the implementation of an evaluation system for implemented strategies, programs, activities and development projects on a regional basis. Designing strategic evaluation systems appropriate for the indicated proposals requires that many decisions be made regarding the selection of measurement tools in the evaluation process of specific elements of the regional development policy. Evaluation tools for specific criteria of the regional development policy are an important element of strategic and operational evaluation systems.

A relevant issue is the construction of synthetic indicators for the implementation of objectives (priorities), also including, besides the strategic (program) analysis, specific transformations of diagnostic variables (statistical data) necessary to build the indicator. Based on the study, the criteria for economic evaluation of the regional development policy were determined as, firstly, effectiveness of the implemented regional development policy (strategy) measured in terms of changes in phenomena and processes within the socio-economic system and secondly, effectiveness of implementing the adopted concept of sustainable development measured in terms of the consistency of regional policy with the concept of sustainable development. Thirdly as the effectiveness of implemented projects, activities and programs measured in terms of the consistency of their results with the objectives of the regional development policy and, fourthly, as effectiveness of public co-financing contribution regarding the results of the projects, activities, programs and development strategies.

The identified criteria for evaluating the regional development policy have been assigned specific tools (Malik, 2010) which effectiveness has been verified for Opole Voivodeship operational programs and development strategies (Regional Program Operacyjny Opolskie Voivodeship Board, 2007; Bedrunka and Malik, 2008). Merely examining how funds are used in circumstances of competitiveness is an inadequate approach nowadays (Kowal and Jasińska-Biliczak, 2016), and does not cover an assessment of how effectively the objectives were achieved or the effectiveness of the fund's contribution as a result of allocating aid. Existing monitoring and evaluation processes should be developed toward analysing the effectiveness of an integrated use of structural funds in the European Union, as well as in Poland, as a significant recipient of structural assistance.

The research tools discussed make it possible to measure the degree of imbalance in recapitalisation, and therefore the development of individual governances, as a result of the regional development policy. As a result, the analysed region may be perceived as unattractive to live or invest in due to the under-financing of natural (ecological) capital. One component of this which may be perceived as neglected is spatial management, and this could provoke an outflow of human capital from the region. In this context, in the programming of subsequent financial perspectives and strategic planning, corrective actions should be taken on the basis of available data and research aimed at achieving smaller (or preferably elimination of) deviations in terms of the result achieved from the result planned.

References:

- Anderson, H.J., Stejskal, J. 2019. Diffusion Efficiency of Innovation among EU Member States: A Data Envelopment Analysis. *Economies*, 7, 34, <https://doi.org/10.3390/economies7020034>.
- Badiu, D., Arion, F., Muresan, I., Lile, R., Mitre, V. 2015. Evaluation of economic efficiency of apple orchard investments. *Sustainability*, 7(8), 10521-1053, doi:10.3390/su70810521.
- Bedrunka K., Malik, K. 2008. Zintegrowana efektywność strategiczna wykorzystania funduszy pomocowych Unii Europejskiej na poziomie regionu, [in:] *Monitorowanie rozwoju regionu – wymiar społeczny, gospodarczy i środowiskowy*, vol. 1, K. Malik (ed.), Instytut Śląski, Opole, 53-62.
- Benowitz, N. et al. 1975. An advanced fault isolation system for digital logic. *IEEE Trans. Comput.*, vol. C24, 489-497.
- Blasch, E., Valin, P., Bosse, E. 2010. Measures of effectiveness for high-level fusion. In *2010 13th International Conference on Information Fusion*, 1-8, IEEE.
- de Michelis, N. 2008. Regional convergence: a relevant measure of policy success? *CESifo Forum*, No. 1, 10-14.
- Fathabc, B.D., Fiscuscd, D.A., Goernerce, S.J., Bereace, A., Ulanowicz, R.E. 2019. Measuring regenerative economics: 10 principles and measures undergirding systemic economic health. *Global Transitions*, 1, 15-27, <https://doi.org/10.1016/j.glt.2019.02.002>.
- Glossary of Key Terms in Evaluation and Results Based Management, Development Assistance Committee (DAC Working Party on Aid Evaluation), Organization for Economic Cooperation and Development (OECD). 2002. 21.
- Green, J.M., Johnson, B.W. 2002. *Towards a Theory of Measures of Effectiveness*.
- Hall, D.L. 1992. *Mathematical Techniques in Multisensor Data Fusion*. Artech House, London.
- Jasińska-Biliczak, A. 2012. Sektor małych i średnich przedsiębiorstw województwa opolskiego na tle polityki regionalnej Unii Europejskiej. *Nierówności społeczne a wzrost gospodarczy*, 28, 326-336, YADDA: [bwmeta1.element.desklight-e9680884-e7f1-4cd9-9fe1-05e70ebbc77](https://ojs.iam.uz.zgora.pl/handle/doc/10000/10000).
- Jasińska-Biliczak, A., Sitkowska, R. 2014. Influence of small and medium enterprises sector at the change of innovation potential of Polish regions. *Grant Journal*, 3(1), 57-61.
- Kowal, J., Jasińska-Biliczak, A. 2016. Socio-Demographic Factors of Innovative Capacity of IT Professionals in Small Regional Enterprises in Transition Economies.

- European and Mediterranean Conference on Information Systems (EMCIS 2016). <https://ssrn.com/abstract=2898319>.
- Kowal, J., Makio, J., Jasińska-Biliczak, A. 2017. Business competencies and innovation capability in cross-border small regional enterprises. 2017 IEEE 15th International Conference on Industrial Informatics (INDIN). doi:10.1109/indin.2017.8104892.
- Laere, J.V. 2009. Challenges for IF performance evaluation in practice. 12th International Conference on Information Fusion, 866-873.
- Levis A.H. 1986. Modeling and Measuring Effectiveness of C2 Systems. Report LIDS-P-1608, MIT, Cambridge, MA, USA.
- Malik, K. 2009. Foresight rozwoju zrównoważonego jako narzędzie wpływu na politykę regionu, [in:] Wpływ idei zrównoważonego rozwoju na politykę państwa i regionów, vol. 2, Problemy regionalne i lokalne, K. Michałowski (ed.), Wyższa Szkoła Ekonomiczna w Białymstoku, Białystok, 21-30.
- Malik, K. 2010. Monitoring and evaluation of implementation of the Regional Innovation Strategy for Opolskie Voivodship: New concept project analysis, [in:] Evaluation in Regional Development Policy, eds. K. Heffner, K. Malik, "Studia Regionalia", ed. of the series, T. Markowski, vol. 26, Polish Academy of Sciences. Committee for Spatial Economy and Regional Planning, Warsaw, 10-30.
- Malik, K., Jasińska-Biliczak, A. 2018. Innovations and Other Processes as Identifiers of Contemporary Trends in the Sustainable Development of SMEs: the Case of Emerging Regional Economies. *Sustainability*, 10(5), 1361, <https://doi.org/10.3390/su10051361>
- Polverari, L., Bachtler, J., van der Zwet, A. 2015. Evaluating the Effectiveness of Regional Policy. European Policy Research Paper, No. 91, European Polices Research Centre, University of Strathclyde, Glasgow, 22-25.
- Serrano, R. 2004. The theory of implementation of social choice rules. *SIAM review*, 46(3), 377-414, <https://doi.org/10.1137/S0036144503435945>.
- Strahl, D. (ed.) 2006. *Metody oceny rozwoju regionalnego*, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław.
- Regionalny Program Operacyjny Województwa Opolskiego na lata 2007–2013. Narodowe Strategiczne Ramy Odniesienia 2007–2013. Document adopted by the European Commission by Decision CCI 2007 PL 161 PO 012 of 1 October 2007 and Resolution No. 1070/2007 of the Opolskie Voivodeship Board of 29 October 2007, Opole, 2007.
- Review of the EU Sustainable Development Strategy – Renewed Strategy. Council of the European Union. 10117/06, 9 June 2006, Brussels. Millennium Development Goals Report. United Nations, New York 2006.