Research Article

Open Access

Jolanta Harasymiuk*, Elżbieta Hanna Szafranko, and Jan Tyburski

Methods of habitat reports' evaluation

<https://doi.org/10.1515/eng-2019-0001>

Received September 2, 2018; accepted October 21, 2018

Abstract: A building investment, especially in nature valuable areas, is almost always inseparable with a bigger or smaller environmental interference. For a few years there are legal regulations created to protect these areas. One of them is the requirement to conduct a habitat evaluation and to prepare a habitat report if there is a indication of significant impact on the Natura 200 site. The quality of such a report is crucial for completion an investment in a chosen localisation as well as for shortening a preparation stage with respect to environmental requirements. A defective report can result in a agreement refusal of investment completion conditions of an investment by an authorised body, and can be a reason for protests of a community which is affected by the planned investment. A well-made report, on the other hand, results in a smooth acceptance of the project without the need for consultation of the investor with the proceeding body and saving the cost of correction of a defective documentation. An review of the literature done by the authors and the talks carried out with the staff making an assessment of reports of an impact on Natura 2000 sites showed the lack of common use in practise of a formalised set of criteria of evaluation of such documents. The aim of the study was to prepare a set of evaluation criteria for reports on environmental impact on Natura 2000 sites. The set was tested on already made reports and it showed their basic omissions and disparities. The set prepared can be used by an investor in the course of making a report. It can be also a useful tool for a verifying clerk while evaluating a report for its completeness and adequacy. On the basis of the prepared set of evaluation criteria, a procedure was proposed allowing an impartial verification of reports. As a result of analyses made, a procedure was worked out which is presented in the diagram concluding this paper.

Keywords: habitat evaluation, habitat report, Natura 2000 sites in Poland, building investment, investment process

1 Introduction

Reports of an impact on Natura 2000 sites¹ have existed in the Polish legal system since 2005, when amendments of the Parliamentary Act of May 18 – Law of nature protection came into force (This Act introduced a new category of undertakings which require conducting an assessment of an impact on environment – the undertakings which can considerably affect Natura 2000 sites). These are documents required while assessing an impact on Natura 2000 sites of all new building investments which may affect considerably the species of flora or fauna under protection. The impact of a proposed project on a Natura 2000 site should be considered in the case when:

- an investment was classified to the undertakings which can considerably affect natural environment² (which completion requires a prior decision for an investor on environmentally-related condition³);
- an investment of lower technical parameters legally excluded from the undertakings which may considerably affect the environment and which must be preceded with an analysis of their possible impact on

Elżbieta Hanna Szafranko: Faculty of Geodesy, Geospatial and Civil Engineering, Heweliusza 4 Str., 10 – 724 Olsztyn, Poland; Email: elasz@uwm.edu.pl

Jan Tyburski: Foreign Language Department, University of Warmia and Mazury in Olsztyn, Poland, Obrońców Tobruku 3 Str., 10-718 Olsztyn, Poland

1 In Natura 2000 sites in Poland not the entire area is protected but given habitats and rare species. There is no ban list. But an investor cannot conduct investments which may negatively affect protected plants and animals. When compared to national parks or reservations they have an advantage of the possibility of investment but meeting the requirements of nature protection.

2 The classification of undertakings with respect to their negative impact to the environment was made in the Decree of the Council of Ministers of 9 Nov. 2015. The decree (similarly to the previous ones of 2010 and of 2004) distinguishes two basic categories of undertakings which may considerably affect the environment – the undertakings for which a preparation of report on the impact on the environment is or can be required.

3 In the environmentally-related conditions the requirements of natural protections are determined, among those are these concerning Natura 2000 sites, which must be observed in the course of completion and use of a building investment.

***Corresponding Author: Jolanta Harasymiuk:** Faculty of Geodesy, Geospatial and Civil Engineering, Heweliusza 4 Str., 10 – 724 Olsztyn, Poland; Email: jolanta.harasymiuk@uwm.edu.pl

Natura 2000 sites. The analysis is made on the stage of issuing a decision on the condition of construction and a building permit.

A report of an impact on Natura 2000 sites is a specialist study prepared by experts from different fields, constituting a basis to determine a degree of all impacts, which can result from completion of a construction project on a given Natura 2000 site and its integrity with other sites included in the European ecological network. A report should present all the analyses made on an impact of an object on the environment and their results indicating the possibility of occurring considerable impacts. It fulfils the function of a kind of a summary of all the activities done to determine the probability of occurrence of given impacts. Thus it allows to make an appropriate administrative decision on acceptance or refusal of a planned investment. And the superior goal of an investor is to disclose of all the impacts and to propose methods and technologies which minimise the harmfulness of an investment.

A verification of a report on an impact of a construction project to the environment should be conducted in the most objective way possible and ought to be comparable for different regions of the country. In practise of assessing an impact on Natura 2000 sites though, there is a lack of a coherent set of criteria for an assessment of documentation being a basis for evaluation. Presently an individual assessment and the competence of administrative staff is the basis of an evaluation.

The aim of the research was to work out criteria of habitat reports' evaluation in the case of SFRs.

The research done in the field of verification of environmental documentation prepared for the needs of the assessment of an impact on the environment is limited. In references (Engel, 2009, Assessment of plans and projects ...), main stages of the assessment of an impact on Natura 2000 sites were analysed as well as the main documents accompanying these stages were indicated, and among these a report of an impact on Natura 2000 site. In reference (Lai, Zoppi, 2017), an identification of valuable nature habitats in Sardinia was done and in reference (Haest et al., 2017), the potential of image spectroscopy was shown in the identification of habitants included in the European ecological of Natura 2000. In reference (Rak, 2014), the methods of the predicting the likely impacts of projects used in Poland were presented, whereas in reference (Mora-Barrantes et al., 2016), the possibility of using a method for the assessment of an impact on the environment of university building projects in Costa Rica was analysed. In references (Wärnbäck, Hilding-Rydevik, 2009; Gerlée, Kaim, 2011) the most popular methods of cu-

mulative effects were discussed, as a compulsory part of the assessment of an impact on Natura 2000 sites inflicted by single building investments. In references (Kowacki, Czopek, 2014; Harasymiuk, 2018) the question of the most common shortcomings in habitat reports was addressed, but the research concerned different kind of construction projects (roads, SFRs).

The problem of quality of reports of an impact of construction projects on Natura 2000 sites is crucial from the viewpoint of a possibility of shortening the stage of investment preparation with respect to environmental requirements. A defective report can be a reason for refusal of the completion condition of an investment by an authorised body or be a reason for protests of a community, which can be affected by the results of an investment completion. A well-made report, on the other hand, results in a smooth acceptance of the project without the need for consultation of the investor with the proceeding body and saving the cost of correction of a defective documentation. In this paper an analysis of such reports was made with respect to their content as required by the Parliamentary Act of November 8, 2008, its amendment and the practise of their preparation. Later, these reports were evaluated with appropriate methods, after reviewing the methods used to support the decision-making processes (Gentile et al., 2017; Guo et al., 2014; Hao et al., 2015; Kar et al., 2016; Korda et al., 2016; Li, 2016; Li et al., 2013; Li et al., 2016).

2 Materials and methods

The study was initiated with a review of the literature, among these of the legal regulations pertaining to an assessment of an impact on Natura 2000 sites, as well as eight reports prepared by investors and handed in the years of 2014 - 2017 in one of Regional Headquarters of Environment Protection. The study was enhanced with interviews with three fully qualified experts who deal practically with conducting assessments of an impact of Natura 2000 sites. This survey helped to identify the key elements of habitat reports and their importance. To the evaluation of analysed reports on an impact on Natura 2000 sites, the criteria were worked out by the authors. Then, the reports were assessed using the method of point scalarisation and the weight-point evaluation.

3 Results and discussion

In the world there were or are the following ways of verification of the documentation prepared for the assessment of an impact on the environment:

1. Indication of a report maker (the method was used in Poland in the early stage of the procedure of assessing an impact on the environment – the body indicated to the mover who in a given case was to make a report);
2. Obligation of applying to an accredited executor of an environmental documentation (the method used in the developing and post-communist countries – up to 2005 also in Poland, where there was a list of experts solely authorised to prepare such documentation);
3. Asking for assistance by the body which makes a decision on the correctness of the documentation to an independent consulting body (e.g.. to the Committee for Assessment of Impacts on the Environment in Poland and the Netherlands).

In evaluation of reports on the impact of construction projects on Natura 2000 sites in Poland a method of individual assessment is used. Such reports are subject to verification by Regional Headquarters of Environment Protection⁴ - the bodies specialised in controlling of investment-building processes with regard to environment protection. The verification of reports is done with the aim to determine if the information presented in them are:

- according to the decision of the scope of the report issued by the proper administratively Regional Director of Environment Protection,
- according to the Parliamentary Act of November 8, 2008 on providing information about the environment and its protection, public participation in environmental protection and environmental impact assessments,
- sufficient to make a decision of acceptance of fulfilling a building investment.

This situation calls for preparing criteria of reports' evaluation ensuring the possibility of foreseeing and of compatibility of the verification process. In the proposed set of criteria, prepared by the authors, there are these formal and the substantial ones.

3.1 Defying the criteria of evaluation

The formal criteria concern two groups of issues: completeness and professionalism of execution.

Criterion A.1. "Completeness of the report" is to determine whether a report contains the required number of copies (both in electronic and printed versions).

Criterion A.2. "Professionalism of the report" is to determine whether the authors of a report are authorised for making it. Since 2005 to December 30, 2016 (when the amendments to the Parliamentary Act of November 8, 2008 came into force), there were no formal requirements concerning authors of environmental reports. The only requirement on the part of an author was to provide their name. Thus an author did not have to meet the requirement on professionalism or that of being not related to the mover. Since January 1, 2017 the requirements concerning authors of reports on an impact on Natura 2000 sites were enhanced. Their authors should be adequately educated and experienced. In the case, when a report is prepared by a team, the qualification determined in the amended version of the Parliamentary Act of November (2008) should be possessed at least by the boss of the team. The required element of a report is a certification of the author (or the boss of a team when it is collective work), that they meet the Parliamentary Act standards on qualifications.

Defective reports on the stage of a formal evaluation should be directed to correction.

Substantial criteria (B.1 - B.VII) refer to the following groups of issues:

1. Characteristics of a proposed project;
2. Characteristics of natural elements of the environment in the range of the foreseen impact of a proposed project, among these the subjects of protection, for which a given Natura 2000 site was established;
3. Description of variants of a building completion;
4. Assessment of an impact of a project on the condition, the protected subject and the integrity of a Natura 2000 site;
5. Characteristics of activities protecting or limiting the negative impact on the aims and subject of protection in a Natura 2000 site;
6. Characteristics of the methods of predicting impacts of project and the methods of conducting field studies;
7. Presentation of information.

Criterion B.1. "Description of a proposed project" should help to determine whether the report contains the entire description of the project. This description should determine:

⁴ In Poland presently there are 16 Regional Headquarters of Environment Protection – one in each province.

- aim, purpose, and localisation of the project (by determining the localisation of the building(s) on a Natura 2000 site or by indicating the distance of the outer limits of the building(s) to the border of a Natura 2000 site lying within the range of the impact of the building(s)),
- the nearest neighbourhood with characteristic points (the distance between the building and the forest border, to the lakeshore, the nearest residential house or farmyard etc.),
- scale of the undertaking (a single building or complex of buildings);
- basic technical parameters of the building(s) (the built-up surface, usable surface, the surface of roofs, the surface of paved area), description of water, heat and current supply,
- foreseen amount of emission to the environment on the stage of construction (noise on the building site and of the transport means, dustiness, building waste, combustion gases originating from building equipment and means of transport) and of building exploitation (noise from the traffic and garden equipment, sewage waste, combustion gases and dust from the heating system).

Criterion B.2. "Description of natural elements within the range of predicted impact" should show the completeness of the description (or its lack) of the species and habitats under protection of the assessed Natura 2000 site.

Criterion B.3. "Description of variants of a building completion" relates to the duty introduced in the Parliamentary Act of 8 November 2008 on providing information about the environment and its protection, public participation in environmental protection and environmental impact assessment to provide the report not only with the variant of refusing completion of an investment but also the variant which is the most advantageous for the environment. In the case of a report on an impact on Natura 2000 site, an alternative variant of the undertaking is of a great significance, because only in the case of the lack of alternative versions the undertaking with a considerable impact Natura 2000 sites can be completed.

On the basis of the description of the project and the natural elements on which the building can have an impact, through criterion B.4. "Assessment of an impact of a project on the condition, protected subjects and the integrity of a Natura 2000 site" it should be evaluated whether:

- were identified with regard to the character and estimated with respect to the scale all the significant impacts during construction work, exploitation and demolition of a building (not only direct, indirect and ac-

cumulated, but also secondary, short-, medium-, and long-term ones, permanent and temporary ones),

- information was included emphasising the fact which of the impacts will not be a problem while completion of the project, and which can have an influence on the integrity and coherence of a Natura 2000 site,
- to the estimation of the scale of the main impact sufficient data was used and whether its source was clearly determined.

Criterion B.5. "Characteristics of activities curbing the identified impacts on the goals and subjects of protection of a Natura 2000 site" should indicate whether the proposed restricting measures are appropriate for the identified impacts.

Criterion B.6. "Characteristics of the prognosis methods of the impact of a project and the methods of conducting field studies" should allow to determine whether in the report:

- the methods applied for forecast of the character and scale of the impact of an object were identified and described,
- the methods applied in field studies were identified and described.

Criterion B.7. "Presentation of information" is aimed to determine whether the report:

- has a clear structure and a logical order,
- is concise, comprehensive and objective,
- has a table of content at the beginning of the document,
- avoids presenting useless information (not needed for taking a decision on the matter of the procedure),
- effectively uses diagrams, pictures and photographs to support the information presented in the text,
- deals with each subject using reliable sources of information,
- contains a clear explanation of complex issues,
- contain a non-technical summary devoid of a technical jargon.

Each habitat report should be assessed individually and independently by two experts. In the case of clear differences in scoring, the report should be analysed during a panel meeting of appropriate experts with participation of the proper department director for assessment of an impact on the environment. The experts should present their evaluation in writing and based it on the scoring system giving points for fulfilment of each criterion together with a justification of their verdict.

3.2 Evaluation of chosen reports with the point scalarisation method

For the need of making an exemplary analysis eight habitat reports were chosen. Criteria of the group A (formal requirements) and of the group B (substantial evaluation) were applied. The criteria A1 and A2, according to the proceeding description, have the characteristics of a barrier which means that defective reports must be directed to correction before they will undergo a substantial evaluation. Accordingly the zero - one method of evaluation was applied, in which 1 means acceptance and 0 – failure in meeting formal requirements. Because of their specific character, reports should be analysed individually in the first stage of evaluation. The evaluation of meeting these criteria is conducted according to the formula (Szafranko, 2017) (1):

$$O_n = O_{A1} \cdot O_{A2} \quad (1)$$

Where:

O_n – the final evaluation of meeting formal requirements, refers to a n - report, the maximal value is 1,

O_{A1} – the evaluation of meeting A1 criteria, (equals 1 or 0),

O_{A2} – the evaluation of meeting A2 criteria, (equals 1 or 0).

It means that only when both A1 and A2 criteria are met, a report can be forwarded for further analysis.

The criteria of the B group have the characteristics of factors, which means that the level of their fulfilment can be graded. The scale of the evaluation of criteria fulfilment is presented in Table 1.

As the first one an evaluation applying the scalarisation method was conducted. The formula of the evaluation of a report is as follows (2):

$$F_i = \sum_{j=1}^n c_{ij} \quad (2)$$

Where: c_{ij} – the value of C_j criterion expressed in points for the V_i variant; F_i – global evaluation of the W_i variant. The data presented in Table 2 shows that one of the evaluated reports did not meet formal requirements (a statement on the author's qualification was missing). Also partial evaluations in the substantial part showed a lack of the required elements (first of all variant options and the information of the used methods). Another defect of the reports was inadequate information, they referred to the data which is irrelevant for an assessment of an impact of SFRs (but they contain references to the main characteristic features of production processes). They also showed an inner incoherence and contradictions, undermining reliability of their ascertainment. As a result of the formal

evaluation, one report had to be directed to correction while the other ones were subject to further evaluation. In the second stage of the evaluation points were given for meeting defined partial criteria. The results of the analysis showed that the best prepared was report number 8. Its high score was due to the greater number of maximal points gained in partial evaluations. The lowest score got report number 3 as it was given the lowest values (Table 3).

3.3 Evaluation of chosen reports with the weight-point method

The results of the scores are subject to changes when weight will be ascribed emphasising importance of individual criteria (Szafranko, 2017). In the next analysis the weight-point method was used. The formula of the calculation of this method is as follows (3):

$$F_i = \sum_{j=1}^n w_j c_{ij} \quad (3)$$

Notation: c_{ij} – the value of C_j criterion expressed in points for the V_i variant; w_j – weights

The weights were determined according to a three-degree scale in which 1 stands for the lowest value, 2 the average one and 3 the highest. The estimation of the significance of the criteria was made on the basis of the experts' opinion and then a normalisation of the weights was carried out in such a way so that to make their total value equal to 1. Table 4 shows the procedure of determining the value of a priority vector and Table 5 the evaluation procedure of the reviewed reports.

The analysis of the reports conducted with the point scalarisation method and the weight-point method shows the way of verification for the best- and the worst-prepared reports. Taking into account the experts' viewpoint allowed to determine fundamental factors for the quality of the prepared documentation. These factors used as criteria in calculations give the opportunity for a reliable assessment. The result obtained both with the point method (Table 2) and the weight-point method (Table 5) confirms that report number 8 was best-prepared. It was also indicated by the statistics of the scores (Table 3). On the basis of the scores the minimal threshold values for reports' evaluation can be determined.

Table 1: Scoring system used in the evaluation of meeting partial criteria.

Points	Criteria
5	Complete characteristics
4	Partial characteristics, but allowing a further decision procedure
3	Partial characteristics, but allowing a further decision procedure after making small complements
2	Partial characteristics, allowing a further decision procedure after making significant complements
1	Partial characteristics, not allowing a further decision procedure
0	Lack of characteristics

Table 2: Evaluation of the chosen reports with the point scalarisation method.

Partial criteria, kind of evaluation and number of report		Number of report of an impact on Natura 2000 site							
		1	2	3	4	5	6	7	8
A.0.	Formal evaluation	0	1	1	1	1	1	1	1
A.1.	Completeness of documentation	0	1	1	1	1	1	1	1
A.2.	Professionalism of documentation	1	1	1	1	1	1	1	1
B.0.	Substantial evaluation	X	23	20	25	25	25	25	28
B.1.	Description of the proposed project	X	3	2	4	4	4	4	3
B.2.	Description of natural elements in the scope of the predicted impact	X	3	2	3	3	3	3	5
B.3.	Description of investment variants	X	3	3	4	4	4	4	3
B.4.	Assessment of the impact of the project on the condition, protected subject and the integrity of the Natura 2000 site	X	4	3	4	4	4	4	4
B.5.	Description of the prognosis method of the impact of the project and of the conducted field studies	X	3	3	3	3	3	3	5
B.6.	Appropriateness of the curbing activities of the identified impacts	X	4	4	3	3	3	3	4
B.7.	Presentation of information	X	3	3	4	4	4	4	4
C.0.	Total score	X	23	20	25	25	25	25	28

Table 3: The number of the scores in the scale adopted at the beginning of the study.

No of scores	Scores got for meeting a definite criteria	Number of a report of an impact on Natura 2000 site							
		1	2	3	4	5	6	7	8
1	Scores 0	-	-	-	-	-	-	-	-
2	Scores 1	-	-	-	-	-	-	-	-
3	Scores 2	-	-	2	-	-	-	-	-
4	Scores 3	-	5	4	3	3	3	3	2
5	Scores 4	-	2	1	4	4	4	4	3
6	Scores 5	-	-	-	-	-	-	-	2
The final score of the evaluated reports		X	23	20	25	25	25	25	28

Table 4: Weights of evaluation criteria.

No of criterion	Partial criterion, a kind of conducted evaluation and the number of assessed report	Weights	Normalised vector of preference
B.1.	Description of a proposed project	2	0.133
B.2.	Description of natural elements in the scope of the predicted impact of the project	3	0.200
B.3.	Description of investment variants	1	0.067
B.4.	Assessment of the impact of the project on the condition, protected subject and the integrity of the Natura 2000 site	3	0.200
B.5.	Description of the prognosis method of the impact of the project and of the conducted field studies	3	0.200
B.6.	Appropriateness of the curbing activities of the identified impacts	2	0.133
B.7.	Presentation of information	1	0.067
Total of the weights and the value of preference vector		15	1

Table 5: The evaluation of reports with the weight-point method.

No of criterion	Preference vector	Weight-point evaluation of reports							
		1	2	3	4	5	6	7	8
B.1.	0.133	X	0.400	0.267	0.533	0.533	0.533	0.533	0.400
B.2.	0.200	X	0.600	0.400	0.600	0.600	0.600	0.600	1.000
B.3.	0.067	X	0.200	0.200	0.267	0.267	0.267	0.267	0.200
B.4.	0.200	X	0.800	0.600	0.800	0.800	0.800	0.800	0.800
B.5.	0.200	X	0.600	0.600	0.600	0.600	0.600	0.600	1.000
B.6.	0.133	X	0.533	0.533	0.400	0.400	0.400	0.400	0.533
B.7.	0.067	X	0.200	0.200	0.267	0.267	0.267	0.267	0.267
Total	1.000	X	3.333	2.800	3.467	3.467	3.467	3.467	4.200

4 Conclusion

Considering the fact that a habitat report is the basis for issuing a accepting decision of completion of a proposed project in the area or close to the area of the most precious natural values, it should be reliable and professional. The individual method used commonly in verification of such reports does not ensure the comparability and recurrence of the evaluation process. The conducted evaluation of habitat reports confirmed the need for formalisation of the evaluation criteria of such a reports. The criteria proposed by the authors may constitute an auxiliary tool in the riddance process of defective environmental documentation, both by officials and investors.

The presented method enables to make a diagram showing the procedure proposed by the authors which can be useful in reviewing environmental documentation, especially in Natura 2000 sites. The diagram is presented in Figure 1.

Figure 1: Diagram of activities using the defined criteria and the proposed methods.

References

- [1] Parliamentary Act of May 18, 2005 on the change of the Parliamentary Act - environmental protection law and some other Par-

- liamentary Acts, Journal o Law 2005, No 113, item 954.
- [2] Decree of the Council of Ministers of Nov. 9, 2010 on undertakings which may have a significant impact on the environment (Law Journal from 2010., No 213, item. 1397 with amendments).
- [3] Engel, J. (2009). Natura 2000 in assessments of an impact of undertakings on the environment (in Polish). Warsaw: Ministry of Environment.
- [4] Assessment of plans and project significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats. http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf [Access:15.06.2018].
- [5] Lai, S., Zoppi, C. (2017). The Influence of Natura 2000 Sites on Land-Taking Processes at the Regional Level: An Empirical Analysis Concerning Sardinia (Italy). *Sustainability*, 9(2), 259-285.
- [6] Haest, B., Borre, J. V., Spanhove, T., Thoonen, G., Delalieux, S., Kooistra, L., Mùcher, C. A., Paelinckx, D., Scheunders, P., Kempenaers, P. (2017). Habitat Mapping and Quality Assessment of NATURA 2000 Heathland Using Airborne Imaging Spectroscopy. *Remote Sensing*, 9(3), 266, 1-25.
- [7] Rak, A. (2014). Building investment undertakings. Environmentally-related conditions of preparation and completion. Warsaw: Scientific Publishing House PWN S.A.
- [8] Mora-Barrantes, J. C., Molina-León, O. M., Sibaja-Brenes, J. P. (2016). Application of a method for the environmental impact assessment of university construction projects. *Tecnología en Marcha*. Vol. 29, Nº 3, 132-145.
- [9] Wärnbäck, A., Hilding-Rydevik, T. (2009). Cumulative effects in Swedish EIA practice – difficulties and obstacles. *Environmental Impact Assessment Review*, 29, 107-115.
- [10] Gerlée, A., Kaim, K. (2011). Methods of assessment of cumulative impacts in the procedure of an impact on the environment – chosen aspects (in Polish). Technical Transaction of Cracow University of Technology, 6-A/2011, Issue 17, Year 108, 107-111.
- [11] Kowacki, M., Czopek, G. (2014). Completion of investment on a Natura 2000 site. *Modern Engineering Building Trade*, March – April 2015, 12-14 [in Polish].
- [12] Harasymiuk, J. (2018). Analysis of reports on the impact of building investment on Natura 2000 sites in Poland based on own research. *Scientific Review – Engineering and Environmental Sciences*, 27 (3), 251–259.
- [13] Parliamentary Act of November 8, 2008 on providing information about the environment and its protection, public participation in environmental protection and environmental impact assessments (Journal of Laws 2008, No 199, item 1227).
- [14] Act of 9 February 2016 on the publication of a single text of the Act on providing information about the environment and its protection, public participation in environmental protection and environmental impact assessments (Journal of Laws 2016, item 353, as amended).
- [15] Gentile, C., Li, S., Kar, P., Karatzoglou, A., Zappella, G., Etrue, E. (2017, August 6-11). On Context-Dependent Clustering of Bandits. Proceedings of the 34th International Conference on Machine Learning, Journal of Machine Learning Research. Paper presented at the ICML (2017), (Sydney, Australia), 1253-1262.
- [16] Guo, H., Feng, Y., Hao, F., Zhong, S., Li, S. (2014). Dynamic Fuzzy Logic Control of Genetic Algorithm Probabilities. *Journal of Computers*, Vol. 9, No. 1, 22-27. DOI: 10.4304/jcp. 9.1.22-27.
- [17] Hao, F., Li, S., Min, G., Kim, H. C., Stephen S. Yau, S.S., Yang, L.T. (2015). An Efficient Approach to Generating Location-Sensitive Recommendations in Ad-hoc Social Network Environments, *IEEE Transactions on Services Computing*, 8(3), 520-533, DOI: 10.1109 /TSC.2015.2401833.
- [18] Kar, P., Li, S., Narasimhan, H., Chawla, S., Sebastiani, S. (2016, August 13-17). Online Optimization Methods for the Quantification Problem. Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. Paper presented at the SIGKDD (2016), (San Francisco, California, US), 1625-1634.
- [19] Korda, N., Szorenyi, B., Li, S. (2016, June 19-24). Distributed Clustering of Linear Bandits in Peer to Peer Networks. Proceedings of the 33rd International Conference on Machine Learning, Journal of Machine Learning Research. Paper presented at the ICML (2016), (New York City, US), 1301-1309.
- [20] Li, S. (2016). The Art of Clustering Bandits, Università degli Studi dell'Insubria, PhD Dissertation.
- [21] Li, S., Hao, F., Li, M., Kim, H.Ch. (2013, May 9-11). Medicine Rating Prediction and Recommendation in Mobile Social Networks. Proceedings of the International Conference on Green and Pervasive Computing, Paper presented at the GPC (2013), (Seoul, Korea), Vol. 7861, 216-223.
- [22] Li, S., Karatzoglou, A., Gentile C. (2016, July 17-21). Collaborative Filtering Bandits. Proceedings of the 39th International Conference on Research and Development in Information Retrieval. Paper presented at the SIGIR (2016), (Pisa, Tuscany, Italy).
- [23] Szafranko, E. (2017, 29 June – 5 July). Proposal of multi-criteria evaluation of green technologies in civil engineering. Conference Proceedings, 62 (17). Paper presented at the 17-th International Multidisciplinary Scientific GeoConference in Bulgaria, (Albena, Bulgaria), 375 -382.