

# Analysis of Interactions and Effectiveness in Managing ESI Projects in Croatian Higher Education: Insights from Empirical Research

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**Abstract** — This paper explores the management and implementation of higher education infrastructure projects funded by European Structural and Investment (ESI) Funds in Croatia for the period between 2014 and 2020. Focusing on projects under the Operational Programme Competitiveness and Cohesion, particularly those enhancing student accommodation, it analyzes the allocation of 10.731 billion EUR from various ESI funds, including the European Regional Development Fund (ERDF). The study describes the institutional framework involving the Managing Authority (MA) and the Central Finance and Contracting Agency (CFCA) as the Implementation Authority (IA). It examines their roles in ensuring transparent, efficient, and adaptable project management. Feedback from project users, mainly universities and polytechnics, was gathered through a structured questionnaire. The survey assessed their perceptions of CFCA's effectiveness in communication, support, and response to project changes. Obtained results suggest a generally positive view of CFCA's role, especially in providing support and impacting project quality. However, the need to improve response timeliness and project adaptability was also highlighted.

**Keywords** – *project, ESI, CFCA, ERDF, OP Competitiveness and Cohesion*

## I. INTRODUCTION

Higher education in Croatia is going through significant changes and challenges as an integral part of the European educational space. At the same time, the sector is particularly facing challenges such as financing, the quality of education, and internationalization. In this context, the European Union (EU) funding plays a key role. Since joining the EU in 2013, Croatia has had access to significant EU funds intended for higher education and scientific research [1]. As part of such financing, various projects have contributed to infrastructure development, improved teaching quality, stimulated research and innovation, and strengthened international cooperation. Multiple challenges were observed, such as complex bureaucratic procedures, supporting project management and implementation capacities, and ensuring project sustainability after financing.

During the previous financial period (2014-2020), the European Structural and Investment (ESI) Funds played a pivotal role as a key funding source for the higher education sector in Europe, including Croatia. In doing so, it is possible to single out infrastructure projects

implemented at the local and regional levels and co-financed from the Operational Program Competitiveness and Cohesion 2014-2020 from the European Regional Development (ERDF) Fund. The program above was aimed to stimulate economic development and reduce regional disparities. In the context of higher education, these funds were allocated to the following priority axes: Strengthening the economy through the application of research and innovation and Education, skills, and lifelong learning.

In this paper, issues of interaction and efficiency in the management of ESI-funded projects were specifically analyzed. These issues were associated with the priority areas of education, skills, and lifelong learning, primarily focusing on the construction of infrastructure to meet the accommodation needs in student dormitories. The research examined the project users' views of the mentioned projects to gain a deeper insight into their perception of the effectiveness of project management, identifying key success factors, possible areas of improvement, and challenges they encountered. In doing so, the impact of cooperation with implementing bodies on the quality and sustainability of project results was explicitly examined.

## II. ESI PROJECTS FUNDING

During the financial period 2014-2020, Croatia had access to 10.731 billion EUR from the following ESI funds: ERDF, Cohesion Fund (CF), European Social Fund (ESF), European Agricultural Fund for Rural Development (EAFRD) and European Maritime and Fisheries Fund (EMFF) [2]. Special Operational Programmes (OP) were created as detailed plans that determined the use of these funds and were aimed at specific goals and measures within certain national and EU policies and priorities. For the financial period 2014-2020, Croatia adopted four OPs: Efficient Human Resources, Maritime Affairs and Fisheries, Competitiveness and Cohesion, and Rural Development Programme [2]. Each OP defined several priority areas in which ESI funds would be invested, making it possible to use one or more funds for individual OPs. For example, funds from the ERDF and the CF could be used locally for OP Competitiveness and Cohesion. Each priority area had multiple objectives with indicators that a project must meet to secure funding. Table 1 AND Figure 1 show the allocation of these funds for the mentioned period while Figure 2 shows a diagram of project funding from ESI funds.

TABLE I. DISTRIBUTION OF ALLOCATION FROM ESI FUNDS FOR CROATIA 2014-2020.

ESI fund	Operational Programme	Allocation (EUR)
European Regional Development Fund (ERDF)	OP Competitiveness and cohesion	4.700.499.588
Cohesion Fund	OP Competitiveness and cohesion	2.130.755.644
European Social Fund (ESF)	OP Efficient Human Resources	1.621.046.414
European Agricultural Fund for Rural Development (EAFRD)	Rural development programme	2.026.222.500
European Maritime and Fisheries Fund (EMFF)	OP for Maritime Affairs and Fisheries	252.643.138
<b>Total</b>		<b>10.731.167.284</b>

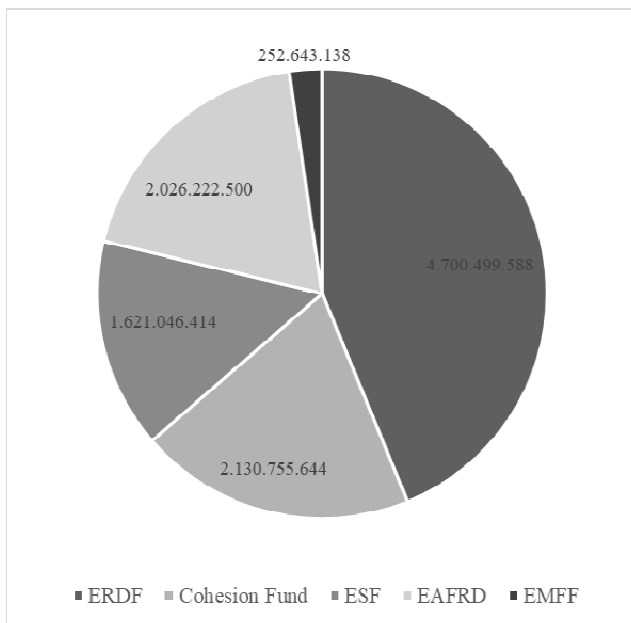


Figure 1. Distribution of Allocations from ESI Funds in Croatia

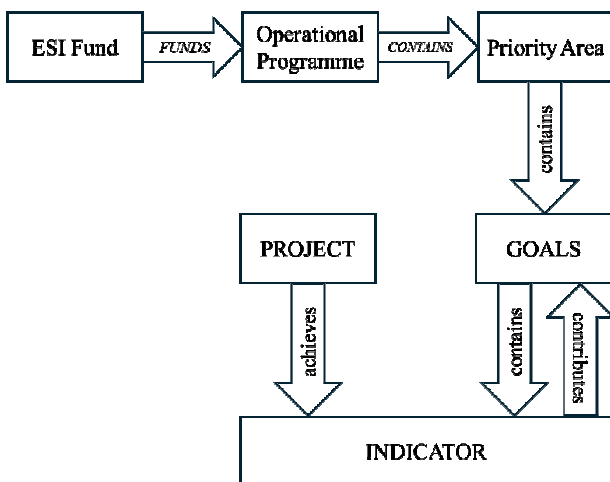


Figure 2. ESI project funding diagram

Specifically, for the need for investment in infrastructure projects in the field of education within OP

Competitiveness and cohesion, the priority areas of Education, skills and lifelong learning were defined, which included financing from the ERDF in the total amount of 304.914.791 EUR [2]. Among these, in the area of infrastructure projects in higher education, which were the subject of research in this paper, 15 projects were contracted with a total value of 197.582.463,36 EUR, of which funds from ESI funds amounted to 189.506,990,35 EUR [2]. The majority (14 out of 15) of the mentioned projects were related to the construction and expansion of accommodation facilities in student dormitories, with a total value of 167.339,037,19 EUR, of which ESI funds amounted to 167.339.037,19 EUR [2].

### III. INSTITUTIONAL FRAMEWORK FOR ESI FUNDING

The institutional framework represents the basic structure for managing and implementing all projects, especially those financed from EU funds. By defining clear roles, responsibilities and hierarchy, this framework should enable all project stakeholders to act transparently and efficiently, ensuring that all processes occur by the regulations and objectives of the operational programme. A simplified view of the institutional framework for ESI funding under OP Competitiveness and cohesion for the financial period 2014-2020 (that is described in detail at [2] and at [6]) covering all 5 levels of management is shown in Figure 3.

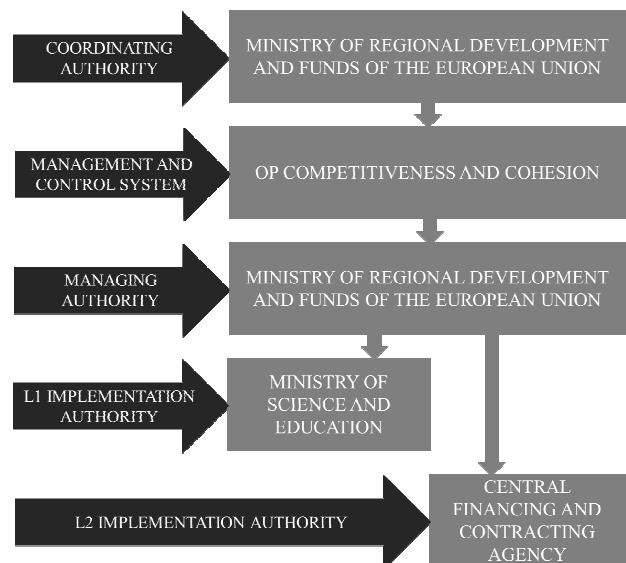


Figure 3. Simplified institutional framework for OP Competitiveness and cohesion funding (2014-2020)

The Coordinating Authority (CA) and Management and Control System (MCS) are vital parts of the institutional framework. The CA is the Ministry of Regional Development and Funds of the European Union (MRRFEU), which is also responsible for harmonizing and supervising Croatia's entire fund management system.

The MCS includes different levels of management, such as the Managing Authority (MA) and Implementation Authorities (IAs). The Ministry of Regional Development and European Union Funds also serves as the Managing Authority (MA) and is therefore responsible for managing OPs and implementing projects. IAs work at different

levels (Level 1 and Level 2) to ensure the implementation of projects and programs. Level 1 IAs are focused on broader risk management and planning at the level of priority axes, while Level 2 IAs have a more focused approach, concentrating on individual operations and projects. In addition, Level 2 IAs have a specific role in confirming project requirements and conducting due diligence. In contrast, Level 1 IAs are involved in a broader range of activities, including project financing and drafting guidelines.

Based on the above, it can be determined that project users usually communicate with Level 1 IA in the earlier stages of the project, especially during project planning, programming, and approval. On the other hand, Level 2 IA becomes a key communication partner during the project implementation phase, monitoring progress and submitting requests for reimbursement.

The Certifying Authority (CA) is the Ministry of Finance, which is responsible for confirming the correctness and acceptability of the costs of projects financed from EU funds and submitting requests for payment to the European Commission. In addition, it manages the financial aspects of projects and ensures transparency in using EU funds.

Agency for Audit of European Union Programs Implementation System (ARPA) is an Auditing Authority (AA) responsible for conducting independent audits and ensuring compliance with EU rules and regulations.

#### IV. INTERACTION OF PROJECT USERS WITH LEVEL 2 IAS

The project user's interaction with the Level 2 IAs during the implementation of the project is defined in the general and special conditions of the contract for the allocation of ESI funds, signed by the project user, MA and Level 2 IAs of the project [3]. For the higher education infrastructure projects analyzed in this paper, the MA was the MRRFEU, the Level 1 IA was the Ministry of Science and Education (MZO), and the Level 2 IA was the Central Finance and Contracting Agency (CFCA). The following key documents are used for monitoring project implementation: Project description and budget, Procurement plan, Request for reimbursement of funds, Advance payment request, Final implementation report and Report after project implementation.

The project description and budget include a detailed description of the activities and budget, including planned costs and funding sources. The procurement plan lists the scheduled procurement of goods, services, or works necessary for the implementation of the project, including estimated values and deadlines. The request for reimbursement of funds is used to recover funds for costs incurred in the project implementation framework. The user can submit an advance request to pre-finance part of the project before the costs occur. The final implementation report is submitted by the user after the end of the project, reporting in detail on the achievements and comparison with the planned results. A post-project report is submitted after the end of the project and a certain period to evaluate the achievements and effects of the project.

When there is a suspicion of irregularities in the procurement of a project, CFCA initiates the procedure to determine the existence of irregularities. If an irregularity is determined, CFCA determines financial corrections based on the methodology prescribed by the EU Guidelines [4]. Financial corrections may include a reduction in the amount of grants or a request to return unduly paid funds and serve as a mechanism to ensure transparency and proper use of ESI funds.

#### V. RESEARCH METHODOLOGY

The research used a structured questionnaire to analyze interactions and efficiency in managing infrastructural ESI-funded projects in Croatian higher education for the period 2014-2020 within OP Competitiveness and cohesion.

Due to the limited number (15) of financed projects, the research was not focused on analyzing cause-and-effect relationships between project interactions and project outcomes, which can be the subject of future research. Instead, the focus was on descriptive statistical analysis that aimed to provide insight into users' general perceptions and attitudes on aspects such as transparency of procedures, availability of support and effectiveness of communication and speed of reaction of CFCA.

This is in line with research of the factors of success of projects funded by an international organization dedicated to providing financing, advice, and research to developing nations to aid economic advancement. The factors have been identified in project design, monitoring, training, project coordination, institutional environment, local environment, and clear policies [5].

The questionnaire of this study was divided into three key sections, in which project users expressed their opinions for specific evaluation criteria on a scale from 1 (do not agree at all) to 5 (completely agree).

The first section was focused on the interaction with the CFCA, asking respondents to rate the transparency of procedures, the availability and usefulness of support, the efficiency and speed of communication, and the timeliness of the CFCA's reactions to their inquiries and requests.

The second section dealt with project management and control processes, where respondents evaluated their satisfaction with project monitoring and control processes, the adaptability of CFCA to changes in the project, and the influence of CFCA on the course and success of the project.

The third section focused on the project's results and impact, including assessments of the achievement of project goals, the effect of cooperation with CFCA on the quality and sustainability of project results, and the project's overall success in the context of expected results.

#### VI. RESEARCH RESULTS

User responses were successfully collected for 13 out of 15 implemented infrastructure projects for higher education users financed from the ERDF fund within the OP Competitiveness and Cohesion. Eight (8) universities and five (5) polytechnics participated in the analyzed sample, and their responses are shown in Figure 4 and Table 2.

Respondents express strong satisfaction regarding the availability and usefulness of CFCA support. The consistency in positive experiences is notable, with a high percentage of respondents rating this aspect favorably. As for the efficiency and speed of communication with CFCA, the results show good ratings overall. However, the range in responses and satisfaction percentage point to some variability in experiences among respondents. Regarding the timeliness of CFCA responses to inquiries and requests, the lower end of the grading spectrum suggests a need for improvement in response timeliness, as indicated by the satisfaction percentage. When it comes to satisfaction with project monitoring and control processes, there is a moderate level of satisfaction among respondents. The diversity in experiences is evident, suggesting varied perceptions of these processes.

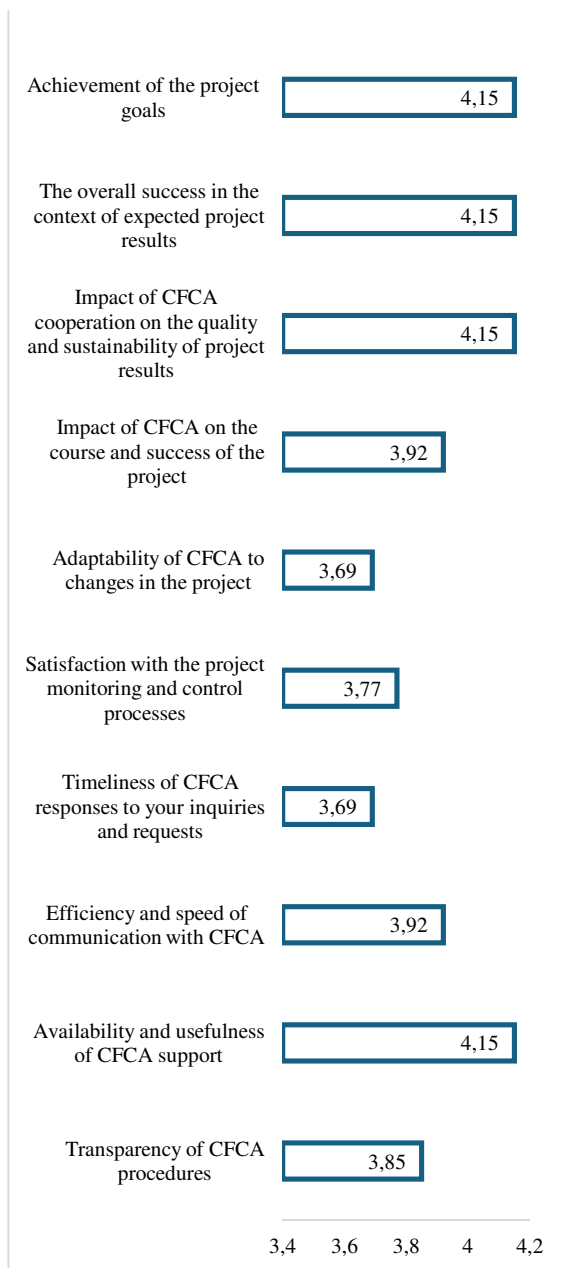


Figure 4. User responses – average grade

TABLE II. SUMMARY OF USER RATINGS ON CFCA PROJECT MANAGEMENT ASPECTS

Evaluation criteria	Median grade	Standard deviation	Mode (most frequent grade)	User satisfaction (grades 4,5)
Transparency of CFCA procedures	4	0,8	4	70,00%
Availability and usefulness of CFCA support	4	0,69	4	88,89%
Efficiency and speed of communication with CFCA	4	1,04	5	72,55%
Timeliness of CFCA responses to your inquiries and requests	4	0,95	3	64,58%
Satisfaction with the project monitoring and control processes	4	1,17	5	67,35%
Adaptability of CFCA to changes in the project	4	0,95	3	64,58%
Impact of CFCA on the course and success of the project	4	0,86	3	70,59%
Impact of CFCA cooperation on the quality and sustainability of project results	4	0,8	4	88,89%
The overall success in the context of expected project results	4	0,69	5	83,33%
Achievement of the project goals	4	0,8	5	83,33%

On the adaptability of CFCA to changes in the project, responses indicate a need for improvement in adaptability and flexibility. This is an area where respondent experiences vary, as seen in the satisfaction percentage and the range of responses. Evaluating the impact of CFCA on the course and success of the project, the general sentiment is positive. Still, the range of responses and the most common grade received suggest some differing perceptions among the respondents.

There is a positive perception of the impact of CFCA cooperation on project quality and sustainability, with a significant portion of respondents indicating high satisfaction in this area. The responses on the project's overall success in the context of expected results are highly favorable, meaning that many respondents view their projects as successful in achieving their desired outcomes.

In summary, while there is a generally positive perception of CFCA's role across various aspects of project management, particularly in support and impact on project quality, there are areas like response timeliness and adaptability where improvements could be made.

## VII. CONCLUSION

This research offers fundamental insights into the administration and efficacy of infrastructure initiatives in Croatian universities financed by ESI Funds within the 2014-2020 timeframe. The analysis emphasizes the significant function of the CFCA in aiding and influencing project outcomes. In general, views regarding the CFCA's engagement are favorable, particularly in the aspects of assistance and its impact on project quality. However, the study identifies specific areas that require improvement, such as the time taken to respond and the adaptability of projects. Future research should delve deeper into these

findings, mainly focusing on projects currently being implemented in the 2021-2027 financial period. Such research should include a more extensive and more diverse sample covering different operational programs. This approach would enable a comprehensive regression analysis to identify causal relationships between various project implementation factors and the ultimate outcomes of the projects.

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