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Institutional Capacity of Local Governments to Implement Circular Economy Clauses in Public Procurement: Evidence from South-East Poland

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Abstract

The transition toward a circular economy requires not only regulatory frameworks but also sufficient institutional capacity within public administration. Despite the growing importance of circular public procurement, limited research has examined local governments' capacity to implement circular economy (CE) clauses, particularly in Central and Eastern Europe. This study addresses this gap by analysing 144 local government units in South-East Poland. Using a logistic regression model, the research examines how institutional, organizational, and knowledge-based factors influence the implementation of CE clauses in public procurement related to construction and infrastructure projects. The findings highlight the importance of staff competencies, training participation, internal procedures, and institutional learning in advancing sustainable procurement practices. The regional focus enables an in-depth analysis of organizational and procedural barriers affecting CE implementation at the local level. The study suggests that strengthening training programs, organizational knowledge frameworks, and administrative support mechanisms is essential for improving circular public procurement practices.

Keywords: *circular economy, public procurement, institutional capacity*

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1. Introduction

The transition toward a circular economy (CE) has become one of the central pillars of contemporary European sustainability policy, reflecting a growing recognition that linear patterns of production and consumption are incompatible with long-term environmental and economic resilience (Migała-Warchoł et al., 2023). Within this transformation, public administration, and particularly local government, plays a crucial operational role.

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Municipalities are not only regulators and planners, but also major market participants whose purchasing decisions shape demand structures, influence innovation, and signal policy priorities to private actors. Public procurement, therefore, has emerged as a strategic instrument through which the principles of circular economy can be translated from abstract policy objectives into concrete economic practices.

In recent years, European Union directives and national legal frameworks have increasingly encouraged the integration of environmental and circular criteria into procurement procedures. However, the existence of formal regulations does not automatically guarantee their effective implementation. The practical application of circular economy clauses is highly dependent on the institutional capacity of contracting authorities, including their organizational structures, staff competencies, access to knowledge resources, and internal governance mechanisms. While the policy narrative tends to focus on legislative harmonization and financial incentives, it has been the case that the administrative and human-capital aspects which determine whether local governments can practically implement sustainability goals in their procurement decisions have been given less attention.

This gap becomes even more evident at the local level, where municipalities must deal with various constraints like staffing, lack of expertise, procedural complexity, and perceived legal risks. Smaller local government units usually have very limited administrative resources and may not have any specialized knowledge of environmental standards or life-cycle costing methodologies. Besides, even if environmental awareness exists, factors such as institutional inertia, fragmented responsibilities, or uncertainty about compliance requirements can be major obstacles to the adoption of innovative procurement practices. Thus, putting CE clauses into practice is not only a technical and legal matter but also the issue of organizational learning, institutional trust, and public institutions' capacity to change in line with new governance paradigms.

The literature on sustainable public procurement has increasingly recognized the importance of institutional and behavioral factors, yet empirical evidence remains uneven across regions and administrative levels. Much of the existing research focuses on national policies or large metropolitan administrations, leaving smaller municipalities under-examined despite their cumulative significance in public spending and infrastructure development. Moreover, studies frequently emphasis environmental results without sufficiently analyzing the administrative preconditions that enable or obstruct these results. Understanding these institutional determinants is essential to design effective policy interventions that move beyond normative recommendations to actionable governance strategies.

Despite the growing importance of circular public procurement, limited research has examined local governments' institutional capacity to implement CE clauses, particularly in Central and Eastern Europe. This study addresses this gap using evidence from 144 local government units

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in South-East Poland, providing a regional, context-sensitive analysis of organizational and knowledge-related barriers.

2. Review of literature

In the Treaty on the Functioning of the European Union (TFEU 2016) it was already established that EU Member State shall work for the sustainable development of Europe based on balanced economic growth and a high level of protection and improvement of the quality of the environment. These objectives are being pursued, currently through the European Green Deal (European Commission 2019) and *Transforming our world: the 2030 Agenda for Sustainable Development* (United Nations 2015), particularly through Goal 12: Ensure sustainable consumption and production patterns, and Goal 13: Take urgent action to combat climate change and its impacts. Their primary aim is to reduce the amount of waste, increase recycling rates, use resources more efficiently, and lessen the pressure on the environment and climate. (Alizadeh et al., 2023). These regulations have been effectively implemented at the national level in the Member States (Ćwiklicki et al., 2024), including in Poland, through amendments to laws on waste, packaging, and public procurement. As a result, nearly all EU Member States (24 out of 27) have adopted national circular economy strategies, roadmaps, or action plans (OECD, 2025).

However, the achievement of circular economy objectives ultimately depends on the policies implemented by local authorities, given that municipal procurement represents a significant share of the market (Godlewska and Godlewski, 2024). City governments play a pivotal role in the transition to a circular economy, both as contracting authorities and as organizers of waste management systems. They are central to driving this change by developing policies for circular practices in areas such as waste, construction and energy (Munonye and Ajonye, 2024).

Nevertheless, outcomes also depend on the broader institutional and administrative framework within which these policies operate (Trigkas et al.,2020). Measures promoting circularity must be harmonized across sectors and governance levels to prevent policy incoherence, which constitutes a significant barrier to circular economy adoption (OECD, 2016; European Commission, 2019).

Despite the existence of legal and financial instruments, the results of their implementation remain insufficient (OECD, 2025). This raises the question of whether the problem lies in a lack of policy coherence and normative alignment between the EU, national, and local levels, or whether other factors may also be responsible (De Pascale et al., 2023). Barriers are typically identified in the political, economic, or cultural spheres (Bourdin and Jacquet, 2025). This problem is also considered to result from a range of non-legal factors that affect the level of implementation of sustainability-oriented provisions (Faracik, 2018). Authors attribute the failures in implementing the circular economy to technical and financial factors. (Naveed W. et

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al., 2022). Nevertheless, the key factor appears to be organizational aspects, among which the main tools include the existence of standards and the ability to apply them effectively, for example through life cycle assessments and cost analyses (Sönnichsen and Clement, 2020).

The issue does not stem from the administrative capacity gap per se, understood as a mere lack of personnel with the required competencies across different levels and dimensions of governance (Freitas De Lima and Giglio, 2025). Rather, it reflects a form of institutional misalignment, manifested as a discrepancy between expectations and the resources allocated to meet them. When the state imposes implementation obligations without providing adequate training, guidance, model clauses, or an effective monitoring and control system (Grafström et al., 2021), a systemic mismatch emerges between strategic objectives and the administrative capacities of the responsible entities. According to studies, this is reflected in limited support at various management levels, low awareness of available opportunities and their practical application, and insufficient tools or knowledge of existing tools (Rizos and Bryhn, 2022). The human and socio-organizational dimension—which has previously been rarely emphasized—proves to be crucial, whereas the debate has predominantly focused, as presented, on financial and managerial aspects.

3. Methodology

The research was based on a quantitative design with a structured survey of local government units (LGUs) in South-East Poland. Data were collected through an online questionnaire directed at representatives responsible for public procurement and administrative decision-making. In total, 144 responses were received, and after data cleaning and removal of missing values, 134 complete observations were included in the final analysis. To identify the factors that influence the implementation of the circular economy (CE) clause in public procurement, a logistic regression model was used. The dependent variable was binary, indicating whether a local government unit had applied CE clauses in construction and infrastructure procurement procedures (1 = yes, 0 = no or only considered). The independent variables were measures of institutional capacity such as staff competencies, participation in CE-related training, perceived regulatory support, internal procedural arrangements, environmental governance structures, and the perceived level of administrative and legal barriers. The control variables included the type and population size of the local government unit.

Due to the presence of low-frequency categories and potential multicollinearity risks, the model was estimated to use logistic regression with regularization L2 to enhance parameter stability and predictive reliability. Model performance was evaluated using five-fold cross-validation, with Area Under the Curve (AUC) and classification accuracy as validation metrics. Odds ratios were used to interpret the strength and direction of associations between predictors and the probability of adoption of the CE clause.

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4. Results

Table 1 presents the results obtained with the usage of the Statistica 13. The dependent variable was the use of Circular Economy clauses (1 = yes, 0 = no or only considered) based on a sample of N = 144 observations, estimated using logistic regression with regularization of L2, and validated through five times cross-validation.

The results show that the competencies of the employees (OR≈3.5) and participation in the CE training (OR≈2.43) are the strongest predictors of the adoption of the clause. In addition, the probability of successful implementation is significantly higher for medium-sized municipalities and county-level units. On the other hand, a high level of perceived administrative and legal barriers has a negative impact on adoption. The model validation results (AUC≈0.81) confirm good predictive performance. The control variables included the type and size of the local government units. The model had good predictive performance with a cross-validated AUC of approximately 0.81 and an accuracy of approximately 0.80. Odds ratios greater than 1 indicate an increased probability of adoption, and values below 1 indicate a decreased probability.

Table 1. Logistic Regression Results. Source: own calculations.

Variable	Odds Ratio (OR)	Interpretation
Staff competencies in preparing CE clauses	**3.5**	Strong positive effect – municipalities with competent staff are ~3.5 times more likely to apply CE clauses
Participation in CE training	**2.43**	Training increases the probability of clause application by more than twice.
Municipality size: 50–100k inhabitants	**2.25**	Medium-sized municipalities are more active in implementation
Unit of the county-level	**2.01**	Counties show a higher adoption probability
Knowledge level on CE clauses	**1.46**	Higher knowledge moderately increases the probability of adoption
Regulatory support perception	**1.24**	The perceived supportive legal framework encourages adoption
Environmental units/ people designated	**1.17**	Slight positive institutional effect
Perception of the average barrier	**0.65**	Higher perceived barriers reduce adoption probability
Formal procedures	**0.71**	Weak negative/neutral effect (possibly reactive rather than proactive implementation)

The results indicate that staff competencies (OR≈3.5) and participation in CE training (OR≈2.43) are the strongest predictors of CE clause adoption. Medium-sized municipalities and

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county-level units exhibit a higher likelihood of implementation, while perceived administrative and legal barriers significantly reduce adoption probability. The model demonstrates good predictive performance, with cross-validated AUC≈0.81, confirming its robustness and explanatory value.

Overall, the findings underline the dominant role of human capital and knowledge-based resources in shaping the adoption of circular economy clauses in local public procurement. Staff competencies show the strongest positive association, indicating that municipalities with more qualified personnel are substantially more likely to implement CE clauses. Participation in training further strengthens institutional learning processes and supports the development of internal expertise.

Organizational characteristics also play an important role. Medium-sized municipalities and county-level units tend to achieve higher adoption rates, which may reflect greater administrative capacity, specialization, and access to professional expertise. In contrast, perceived administrative and legal barriers remain a significant constraint, reducing the likelihood of implementation. Formal procedures alone do not guarantee effective adoption and may instead reflect a reactive rather than strategically driven institutional approach.

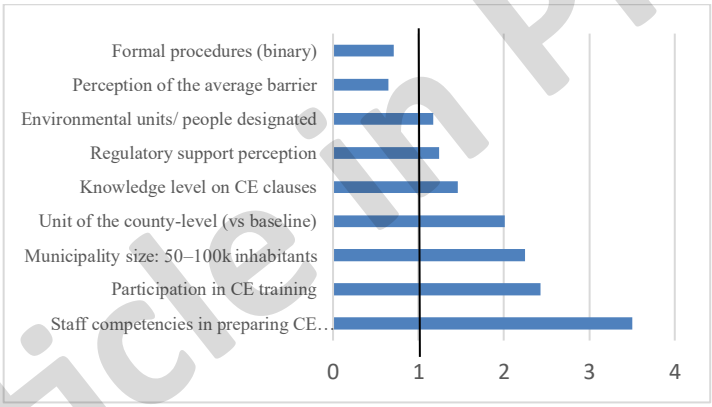


Figure 1. Logistic Regression Results – odds ratios. Source: own calculations.

Figure 1 presents the odds ratios obtained from the logistic regression model, illustrating the relative strength of the institutional and organizational determinants that influence the probability of adoption of the circular economy clause.

5. Conclusions

Research confirms that the successful implementation of circular economy (CE) clauses in public procurement largely depends on institutions and human capital, and only partly on regulatory conditions. The results show that local government units with the appropriately

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trained and skilled staff are more likely to implement CE principles in their procurement processes. Training programs and knowledge development turn out to be the most influential factors, pointing to the key role of building administrative capacity for sustainable public governance. Also, organizational traits such as the size and administrative level of local government units have an impact on the likelihood of including a CE clause. It can be observed that medium-sized municipalities and county-level entities are more prepared and adaptable, which might be linked to their more flexible organizational structures and better access to professional expertise.

In contrast, perceived procedural and legal barriers continue to limit the practical application of CE clauses. The negative association between barrier perception and implementation underscores the importance of simplifying regulatory frameworks and improving legal clarity. Interestingly, the presence of formal procedures alone does not guarantee higher implementation rates, suggesting that procedural formalization without corresponding competencies and training may remain ineffective.

From a policy perspective, the study emphasizes that strengthening institutional capacity through targeted training, dissemination of best practices, and inter-municipal knowledge exchange should be prioritized over merely expanding legislative requirements. The findings suggest that sustainable procurement policies can be implemented most effectively if they are supported by organizational learning processes and enabled by administrative support tools.

In a broader context, the findings contribute to the ongoing debate on sustainable development governance by demonstrating that the transition toward circular economy practices in public administration depends not only on macro-level policy initiatives but also on micro-level institutional readiness. Future research may extend this analysis by incorporating longitudinal data and cross-country comparisons to better understand the dynamics of institutional adaptation and policy diffusion within the European Union.

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