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Failed Procurements as a Measure of Public Procurement Performance

Tünde Tátrai[1] · Péter Juhász[2] · Gyöngyi Vörösmarty[1] · Dávid Tresó[3]

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Abstract
The European Tenders Electronic Daily database offers an opportunity to explore the specifics of variables in public procurement notices. The characteristics of non-awarded LOTs within procurement procedures are the subject of the current study. Based on the research, a relationship can be identified between unsuccessful procedures and the awarding criteria, the type of contracting authority, the subject of the procurement, the source of financing, and the type of procedure. The interpretation of the results also contributes to a clearer understanding of the conditions for public procurement performance, serving actors in the public procurement community, including scholars, policymakers, and implementers.

Keywords Transaction cost theory · Public procurement performance · Non-awarded procedures · Efficiency

Introduction

Measurement of performance is a central theme of public procurement research. The related studies support both the public governance perspective, which emphasizes effectiveness, and efforts to ensure better procurement outcomes (for example Diggs & Roman, 2012). The growing importance of this research is underscored by the continuously increasing value of public spending (OECD, 2025).

✉ Tünde Tátrai
tunde.tatrai@uni-corvinus.hu

[1] Department of Supply Chain Management, Corvinus University of Budapest, Budapest, Hungary

[2] Department of Corporate Finance, Corvinus University of Budapest, Budapest, Hungary

[3] Tigra Ltd., Budapest, Hungary

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Research on public procurement performance encompasses multiple levels of analysis. In this regard, the OECD–SIGMA (2016) framework provides a comprehensive conceptualization, identifying three interdependent levels of performance.: (i) the performance of the national public procurement system, (ii) the performance of contracting authorities, and (iii) the performance of individual contracts. Studies typically focus on assessing and promoting efficiency and effectiveness across these three levels (Patrucco et al., 2016). However, it is increasingly evident that in the case of emerging procurement areas – such as healthcare (Harland et al., 2021, Garcia Altés et al. 2023), defense (Droff & Malizard, 2023), and other crisis-related domains (Turudic, 2020, Fazekas et al., 2025) – traditional performance indicators may not fully capture the complexity of procurement objectives. In these contexts, the nature of the demand itself highlights the critical importance of supply continuity and responsiveness.

Research tends to concentrate primarily on successful procedures, while relatively little attention has been paid to the analysis of failed or unsuccessful tenders. There is a notable lack of studies investigating failed procedures, and the success or failure of procedures themselves is rarely included among the associated performance indicators. Moreover, the underlying reasons for unsuccessful lots within procurement procedures remain largely underexplored in the literature. This paper aims to contribute to filling this gap by examining how the characteristics of the procedures (decision factors and external factors) relate to failure. It also examines how these relationships can be interpreted through the lens of transaction cost theory. Non-award outcomes are directly linked to both efficiency and the preservation of competition. When a procedure fails, this can result in several adverse consequences, such as unmet demand, increased uncertainty for market participants, and growth in both direct and indirect costs.

Building on the work of Casady et al. (2023), our hypotheses are grounded in a theoretical framework based on transaction cost economics. These hypotheses were tested using data from the TED (Tenders Electronic Daily) database. Through this approach, our research seeks to enhance the conceptual understanding of procurement efficiency and interpret key phenomena, offering insights that have both theoretical significance and practical relevance.

The paper is structured as follows. The literature review presents key findings from prior research that applies transaction cost theory to public procurement, connecting these insights to broader empirical studies examining procurement efficiency using large-scale datasets. This is followed by a description of the research methodology. The core of the paper presents the empirical analysis based on TED data, evaluates the hypotheses, and concludes with a discussion of the findings.

Literature review

Understandings of Efficiency and Effectiveness

To lay the groundwork for our analysis of unsuccessful public procurement procedures, we begin by reviewing relevant findings from the literature. The literature

review underpinning the research framework first examines existing interpretations of performance measurement in public procurement. The issue of efficiency and effectiveness lies at the core of public procurement research, as the more optimal use of resources can help achieve governmental and societal objectives. Scholars have identified several avenues for enhancing efficiency, including the nature of regulation (Kingler, 2020), the characteristics of the bidding process (Kakwesi & Nyeko, 2019), and the role of various stakeholders (Balaeva et al., 2022; Patrucco et al., 2021). Both industry-specific and cross-country comparative studies have also revealed important correlations (Kumar et al., 2015; Milosavljević et al., 2021; Tátrai et al., 2024).

The reinterpretation and refinement of performance indicators is a recurring theme in the literature. For example, Raymond (2008) proposes key benchmarks, including value for money, ethics, competition, transparency, and accountability. The European Commission's Single Market and Competitiveness Scoreboard (SMCS, 2023) includes twelve indicators – such as single-bidder procedures, direct awards, price-only award criteria, and decision-making speed – that enable the cross-country comparison of procurement performance. Most indicators relate to successful procedures (such as SME winners), but unsuccessful procedures are also included in indicators based solely on the number of procedures (such as direct contracts).

Flynn (2018) introduced a six-dimensional indicator framework, with report quality emerging as a novel metric. Boykin et al. (2025) argue that public procurement performance can be assessed through input, transformation, and output indicators; however, these dimensions should be evaluated in relation to one another. In this context, efficiency represents the performance of the transformation function, but it must be interpreted in conjunction with output effectiveness. That is, transformational efficiency should be assessed in terms of its contribution to broader outcome-oriented goals. The evaluation of indicators related to transformational activities associated with effectiveness clearly highlights that performance can only be considered satisfactory if the procedure is successful.

TED in Public Procurement Research

In public procurement research, the structured analysis of data is increasingly important, particularly in the context of big data approaches aimed at assessing efficiency and effectiveness (Fazekas & Sanchez, 2021; Prier et al., 2018; Zeisel, 2020). A range of studies have addressed specific aspects of public procurement performance based on the TED database, such as performance measurement (Flynn, 2018), pricing mechanisms (Placek et al., 2019), the causes of procedural delays (Placek, 2020), the characteristics of voluntary ex-ante notices (Prier, 2021a), the determinants of decision-making speed (Prier, 2021b), year-end spending patterns (McCue et al., 2021), and the rebates achieved through centralized procurement (Chiappinelli, 2020). These detailed investigations contribute to a more nuanced understanding of procurement effectiveness and the conditions under which competition can be successfully ensured. Moreover, such studies also enhance transparency (Soylu et al., 2022), as they frequently expose data quality issues that would otherwise remain hidden. Open access to procurement data – including both contract notices and data-

bases – enables a broader base of stakeholders to engage with and scrutinize public procurement processes.

Overall, studies based on the Tenders Electronic Daily (TED) database have examined a wide range of relationships related to public procurement; however, investigations specifically addressing procurement failure remain highly limited.

Transaction Cost Economics in Public Procurement

In public procurement research, economic theories are often chosen as the analytical lens, and transaction cost theory is one of them (Flynn & Davis, 2014). Transaction Cost Economics (TCE) provides a useful framework for analyzing efficiency and buyer–supplier relationships by focusing attention on management costs. The theory's name suggests that there are costs associated with transactions between buyers and suppliers: ex ante costs are those incurred before and in order to make an economic exchange, while ex post costs are those incurred after the exchange (Coase, 1937). Although the two costs arise independently, they must be considered together (Williamson, 1985), and TCE focuses on how to keep these costs low (Williamson, 2009). In an extended sense, the theory is present in buyer–supplier research associated with a number of other relevant concepts, such as the frequency of transactions, the risk of contracts, and the presence of asset specificity in the buyer–supplier relationship (Ketokivi & Mahoney, 2020). TCE theory, in contrast to earlier economic theories, depicts the links between stages of the production process as breaks (interfirm links) that have associated costs, including information costs, negotiation costs, and enforcement costs, which can fundamentally determine supply chain structures and their efficiency (Hobbs, 1996).

However, a persistent challenge in Transaction Cost Economics-based research lies in the inherent difficulty of accurately identifying and quantifying the reported transaction costs. Research based on TCE thus focuses attention on how to identify the latter. Nemec et al. (2020) point to the additional costs of public procurement bureaucracy and their significance by comparing ex-ante, ongoing, and ex post costs in the public and private sectors. Their results indicate that transaction costs can be substantial, accounting for up to 5–6% of the contract value. Similar results were obtained by Balaeva et al. (2022), although the latter estimate the average at 1% of the contract value; however, for low-value procedures, this can be as high as 8%. This is essentially a similar result to that found for the EU in a study by PWC (2011). Similarly, the conclusion of both studies is that it may be higher for lower-value contracts.

According to Placek et al. (2019), the core factors determining the level of transaction costs in public procurement are the quality of the legislative and regulatory framework; the type and method of procurement; the expected volume; management experience, especially on the procurer's side; post-award behavior; and the attitudes of participants. Catalão et al (2022) examine public project costs from the perspective of public administration. According to their research, institutional, legal, and regulatory frameworks, as well as economic cycles, all influence cost variations and overruns.

However, Yahaya et al. (2019) point out that the cost associated with eligibility documents (which are becoming increasingly important, e.g., in the context of sus-

tainability expectations) is very significant. Public procurement is also likely to perform better with less complex transactions – and when contracting complexity relates to safeguarding specific assets rather than environmental and behavioral uncertainty (Rokkan & Haugland, 2022).

Public Procurement Failure

With regard to performance and in TED based research failure receive comparatively limited attention. In the scarce literature of the topics comprehensive classification of the possible causes of procurement failure is provided by Sharma et al. (2019), who developed an extensive list of influencing factors across the entire procurement cycle that may facilitate procurement failure. Their framework primarily takes procuring entities, organizational characteristics, and environmental factors as its main points of departure. Other studies highlight that the sources of failure may also lie with suppliers or government officials (Tanaka & Hayashi, 2016). In the field of innovation procurement, Chicot and Matt (2018) distinguish between demand-side, supply-side, and user–supplier interaction failures. Thus, both the interpretation and manifestation of failure in public procurement are multifaceted. The risks arising from these failures are equally diverse (Sharma et al., 2019), most notably reflected in cost overruns and inadequate performance outcomes. At the same time, the very concept and interpretation of failure or unsuccessful outcomes are not applied consistently across this body of literature.

A special case of failure is when a procedure becomes unsuccessful. The reasons for this may be manifold, such as incorrectly tendered procedures, non-bidding, etc. However, they have both ex-ante and ex post cost-increasing effects and may lead to significant losses (Nemec et al., 2020).

The literature addresses this failure and its impact only marginally. The most extensive study of this kind (Casady et al., 2023), which analyzes the example of Danish local authorities, concludes that the likelihood of cancellation is greater for highly asset-specific investments and lower when governments have greater administrative capacity. Since lack of competition is the main reason for these cancellations (in line with the theoretical claims of Rokkan & Haugland, 2022), they suggest that public buyers should focus on capacity building and engaging market suppliers. Related to this topic is the research by Helby Petersen et al., (2022), which specifically examines transaction costs and, in the case of contracts with the government, points out that previous government contract experience reduces the risk of unsuccessful transactions. Based on the above, it is worth conducting further analyses to examine the causes of unsuccessful procedures and their transaction costs.

Research Model and Hypotheses

The primary objective of this study is to explore the phenomenon of failure called as non-award in the contract award notice as a critical yet often overlooked component of public procurement performance. While much of the literature focuses on successful procurement outcomes, the analysis of unsuccessful or non-awarded procedures

remains relatively under-researched, despite its relevance to overall system efficiency and the functioning of competitive markets. To address this gap, our research adopts the theoretical lens of transaction cost economics, which offers a useful framework for understanding the factors that may contribute to the failure of procurement procedures. The Tenders Electronic Daily (TED) database provides a robust and extensive source of structured procurement data (including call for competition and the award notices) across European countries, enabling large-scale empirical investigations. Drawing on this dataset, we develop and test a set of hypotheses to better understand the drivers of procedural failure and its implications for procurement performance.

Tenders Electronic Daily contains data on procurements in the European Union with a value above the EU threshold. Two different databases are distinguished: the Contract Notice (CN) database and the Contract Award Notice (CAN) database. TED contains the most important data on procedures in a consistent structure, which allows us to analyze the data links within the context of public procurement. The so-called "Void" variable that is contained in the CAN database refers to the parts of the procedure that have been unsuccessful. Inefficiency can be attributed to two causes: either no bids were received, or other reasons (for example, bids that were received were invalid, etc.). Unsuccessful procurement processes can, therefore, be examined in the period following the award of contracts; i.e., procedures that were cancelled by the contracting authority before contracts were awarded are not covered. In our case, it is possible to examine this variable for the period 2016–2023 using a database we built by consolidating publicly available datasets.

The coding structure is harmonised across Member States in accordance with EU reporting rules, enabling cross-country comparability. However, the level of detail on the specific reasons for the non-award remains limited. TED provides data only on the number of bids received; more detailed qualitative explanations are not systematically recorded.

Furthermore, we observe that missing values are more frequent in unsuccessful LOTs, suggesting that reporting discipline may be weaker in these cases. Thus, the number of bids received may often be missing for non-awarded LOTs. This limitation suggests that our analysis concentrates on the incidence of non-award rather than on detailed causal mechanisms behind each failure.

We therefore interpret "non-awarded" as an indicator of procedural failure, while acknowledging that the underlying administrative reasons may differ and are not fully visible in the dataset. This is exactly why we investigate the connection between being non-awarded and procedure or purchaser types, as those are more likely to be associated with administrative issues, while traits such as the type of item purchased or the number of offers received may be more closely linked to the procedure itself.

The procedures included in the database are based on the notices (ID_TYPE) that inform about the outcome of the procedures. The notices differ slightly for the so-called classic contracting authorities and utilities, for those that close the design contest procedure, those concerning social services, and those related to concessionary procurement. The variables that are examined are the same for all types of contract award notices and are presented in the same format, and the data are structured in the same way. Framework agreements and dynamic purchasing systems are not included in the database, as the published data do not allow for a structured analysis of the

results of multiple re-competitions when these methods are used. The analysis is carried out at the LOT level, as a procedure may result in several contracts being concluded for a standard procedure (open, restricted, or negotiated). Therefore, the result is not analyzed at the procedure level but at the LOT level if the procedure is split into lots.

As the TED database is publicly available and widely used, we have maintained the original variable names to ease understanding and result replication (See. Table 2). Where data was missing, we filled in the gaps with 'NA', thus creating a new category for the given variable. As unsuccessful calls are generally less important for data providers, we anticipate that missing data (the NA category) will be more prevalent in the case of non-awarded contracts.

In formulating our hypotheses, we used the findings of Casady et al. (2023) as a starting point. Our study adopts a broader scope, leveraging the opportunities provided by TED, as it examines the entirety of EU procurement procedures, rather than focusing solely on those of municipalities. This broader scope also constitutes a limitation, as our analysis is confined to the information available in TED, which pertains to procurements that meet the EU's public procurement value thresholds.In our model, we examine our hypotheses grouped into two categories, allowing us to place particular emphasis on the characteristics of the decision-making factors associated with the buyer and external factors that capture the characteristics of the broader environment (legal, financial) within which procurement takes place (Table 1).

Table 1 Framework of hypotheses

	Factors	Subfactors	Explanation
Decision-based factors	Awarding criteria		Lowest price criteria vs. most economically advantageous tender
	Type of procedure	Publication of contract notice	Procedure with prior publication vs. procedure without prior publication
		Negotiated procedure	Procedure with negotiation vs. procedure without negotiation
		Accelerated procedure	Accelerated procedure vs. non-accelerated procedure
	Type of subject matter		Goods vs. Services vs. Work
External factors	Type of contracting authority		Ministries vs. municipalities vs. utilities vs. bodies governed by public law vs. other organizations
		Central Purchasing Body	CPBs vs. non-CPBs
	Source of funding	EU-funded project	EU-funded projects vs. non-EU-funded projects

Decision-Based Factors

The decision-making process refers to factors that are contingent upon the contracting authority's choices. Among the most critical are the type of procurement procedure (e.g., negotiated or non-negotiated, publicly advertised or not), the awarding criteria (e.g., lowest price versus a combination of price and other qualitative factors), and the nature of the procurement demand (works, supplies, services). The types of procurement procedures, subject matters, and the possible configurations of awarding criteria are defined within the regulatory framework applicable to public procurement. These instruments enable procurement officers to accommodate the specific characteristics of the procurement object, the supplier market, and the nature of the demand.

The selected procedure may influence the likelihood of failure in two ways: first, it should reflect the risks inherent in the procurement situation; second, the application of certain types of procedure may itself entail risks. In cases involving high asset specificity and low procurement frequency, submitting a bid may be more challenging, thereby increasing the probability of errors.

We hypothesize that the awarding criteria – whether based solely on price or on the most economically advantageous tender (MEAT) – may be associated with procedural failure. High asset specificity tends to reduce the number of bidders, which in itself increases the likelihood of non-award. Price-based evaluation is straightforward for standardized products and involves a lower risk of error. It is also more easily supported by digital tools, allowing for faster and more cost-efficient evaluation in frequent, repetitive procurement scenarios. However, when the procurement object is more complex or the supply situation is uncertain, this may introduce greater ambiguity, thereby increasing the risk of unsuccessful procedures.

Negotiated procedures are typically employed for more complex procurement needs. Negotiation can help reduce uncertainty, which in turn may lower transactional costs. This is partially supported by Chong et al. (2014), while Wodimu et al. (2025) is consistent with the former findings. Since the MEAT criterion influences the evaluation, the diversity of evaluation factors, the applied methodology, the scoring system, and the potential use of subjective assessment criteria ultimately increase uncertainty, even if the parties are able to meet and discuss the details beforehand.

The more effectively contracting authorities can manage asset specificity, the lower the uncertainty and the greater the likelihood of a successful procedure.

Publicly advertised procedures may attract a larger pool of bidders (Atkinson, 2020), whereas non-public procedures allow contracting authorities to directly approach market actors who are more likely to submit a bid. We therefore hypothesize that in non-public procedures, contracting authorities tend to target economic operators who are capable of submitting a bid, whereas in public procedures, the submission of bids depends on the initiative of market actors, which increases uncertainty and may result in a complete absence of bids.

The use of accelerated procedures imposes time constraints, thereby increasing uncertainty, transaction costs, and the risk of procedural failure.

In the case of works, higher transaction costs are typically incurred, which may affect the likelihood of procedural failure. In contrast, for goods and services, it

is more complex to determine whether the procurement concerns standardized or highly specific items.

The related hypotheses are as follows:

(1) H1. If price is the only awarding criterion, the LOT is more likely to be successful.
(2) H2. If a negotiated procedure is used, the LOT is more likely to be successful.
(3) H3. If the procedure is published with a call for notice, the LOT is more likely to be unsuccessful.
(4) H4. If an accelerated procedure is initiated, the LOT is more likely to be unsuccessful.
(5) H5. If the subject matter of the procurement is works, the LOT is more likely to be unsuccessful.

External Factors

Certain factors that influence procedural failure stem from the inherent characteristics of the contracting authority or the financial sources. High procurement frequency often leads to centralized procedures. However, the variability of local conditions and any divergence from central expectations may result in increased uncertainty, which centralized bodies can only manage at the cost of higher transaction costs or increased error rates. In contrast, municipalities are typically 'closer' to the market, which may mean they have better market intelligence. This proximity can reduce uncertainty – even in cases of low procurement frequency, where institutional learning and expertise may not be fully developed.

In the case of EU-funded projects, both the procurement and control processes are governed by particularly complex regulations. Moreover, the procured goods or services are often highly specific and complex in nature, which increases uncertainty. At the same time, asset specificity tends to be more prevalent in such cases. These factors collectively raise the risk of errors, and consequently, the likelihood of procedural failure.

The related hypotheses are as follows:

(1) H6. If the contracting authority is a central purchasing body, the LOT is more likely to be successful.
(2) H7. If the contracting authority is a municipality, the LOT is more likely to be successful.
(3) H8. If the procurement is EU-funded, the LOT is more likely to be unsuccessful.

Results

First, we calculated the yearly proportion of unsuccessful procurement calls (Fig. 1). We found no public procurement calls reported as non-awarded from 2013 to 2015; therefore, we removed data from this period. While the proportion of unsuccessful calls was relatively low in 2016 compared to the other years, we retained that year in the database, as robustness checks did not reveal material differences in explanatory

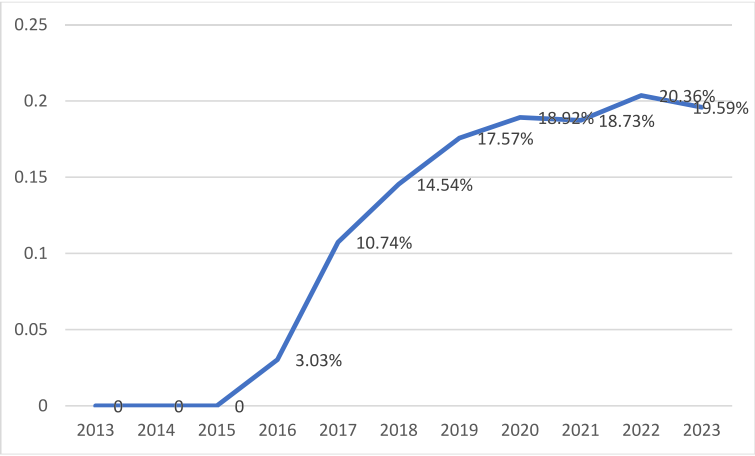

Fig. 1 Yearly proportion of public procurement calls in the TED database reported as Unsuccessful

variable effects when the 2016 data were dropped. Thus, our analysis covers details for 4,139,151 calls, of which 16.37 percent were unsuccessful during the period from 2016 to 2023.

In the next step, we used cross-tabulation analysis to identify variables in the database that were closely linked to the likelihood of a call being unsuccessful. Test results are summarized in Table 2.

Besides the variables containing information on the year of the announcement and the country where the call was published, we identified seven more variables from the TED database for which we can statistically reject the hypothesis of independence from the likelihood of the call being unsuccessful. We now review these variables and present findings from the cross-tabulation analysis.

"L" stands for the "Lowest price" method, while "M" represents the "Most economically advantageous tender" process. Some calls contain no information about the award criteria that were used (NA), which theoretically should not be an option. Based on the test results presented in Fig. 2, we suspect that the Lowest Price method is more likely to be associated with a higher cancellation rate.

TYPE_OF_CONTRACT. The variable refers to the item being purchased. The three options include W "Works" (construction), U "Supplies" (goods), and S "Services." Luckily, no data were missing. Based on Fig. 3, calls associated with the purchase of supplies were more likely to be cancelled than service or construction contracts.

TOP_TYPE. The variable refers to the type of procedure being used. Possible values are the following: award without prior publication of a contract notice (AWP), competitive dialogue (COD), negotiated without a call for competition (NOC/NOP), negotiated with a call for competition (NIC), open (OPE), restricted (RES), and innovative partnership (INP). We may conclude from Fig. 4 that open processes, processes negotiated with a call for competition, and processes using a competitive dialogue were cancelled more often.

Table 2 Test results for the connection between explanatory variables and Successful/Unsuccessful categories for the period from 2016 to 2023

Variable	Chi-Square Statistic	p-value	Degrees of Freedom	Cramer's V
CRIT_CODE = awarding criteria (only price, most economically advantageous tender)	18 475,16	0,00%	2	0,0668
TYPE_OF_CONTRACT = type of subject matter of the contract (work, supply, good)	11 395,01	0,00%	2	0,0525
TOP_TYPE = type of the procedure (open, restricted, negotiated with or without call for notice, competitive dialogue, innovation partnership)	27 594,52	0,00%	7	0,0816
B_ACCELERATED = indicated if the procedure is accelerated	5 251,94	0,00%	1	0,0356
B_EU_FUNDS = the procurement is funded by the EU	10 280,17	0,00%	2	0,0498
B_AWARDED_BY_CENTRAL_BODY = the procurement is managed by a central purchasing body	80 872,17	0,00%	2	0,1398
CAE_TYPE = type of the contracting authority	24 579,48	0,00%	4	0,0770
YEAR	71 924,62	0,00%	7	0,1318

B_ACCELERATED. The variable indicates whether the option to accelerate the procedure was used. As this is possible for negotiated, restricted, and (under the 2014 directives) open procedures, we needed to consider the cross-table and regression data, considering the close connection. Figure 5 indicates another anomaly in the database: when a call did not use the accelerated procedure, data providers tended to leave the box empty instead of typing "no." Thus, during further investigations, we treated "NA" here as equivalent to a "no." The data support the claim that accelerated processes are more likely to be cancelled.

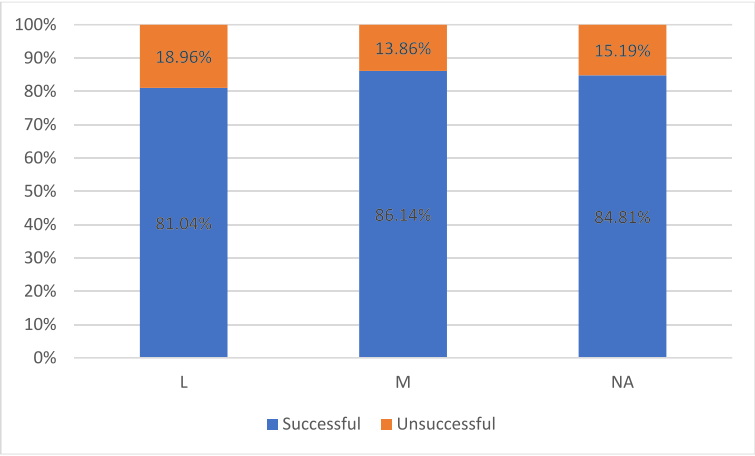

Fig. 2 Cross-tabulation analysis: CRIT_CODE and unsuccessful calls for the period 2016 to 2023

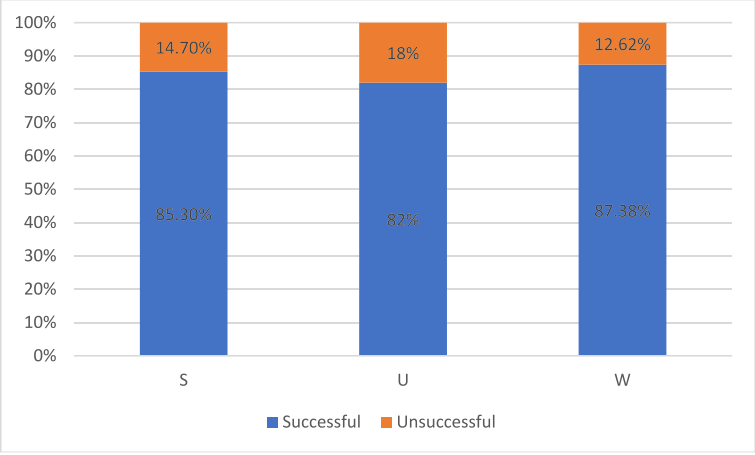

Fig. 3 Cross-tabulation analysis: TYPE_OF_CONTRACT and unsuccessful calls for the period 2016 to 2023

B_EU_FUNDS. The variable indicates whether the contract is related to a project or program financed using European Union funds. Figure 5 indicates that procurements funded by the EU are more likely to be unsuccessful.

B_AWARDED_BY_CENTRAL_BODY. This variable indicates whether the contract was to be awarded by a central purchasing body. Such calls are associated with a higher risk of failure (Fig. 4).

CAE_TYPE. The variable informs us of the type of contracting authority. While theoretically, a wide range of choices is available (Table 3), we only retained alternatives 1, 3, and 4, and all other possibilities were grouped as "Other." As Fig. 6 illustrates, the data suggest that calls were more often unsuccessful if the contracting body was a ministry or any other national or federal authority, a body governed by

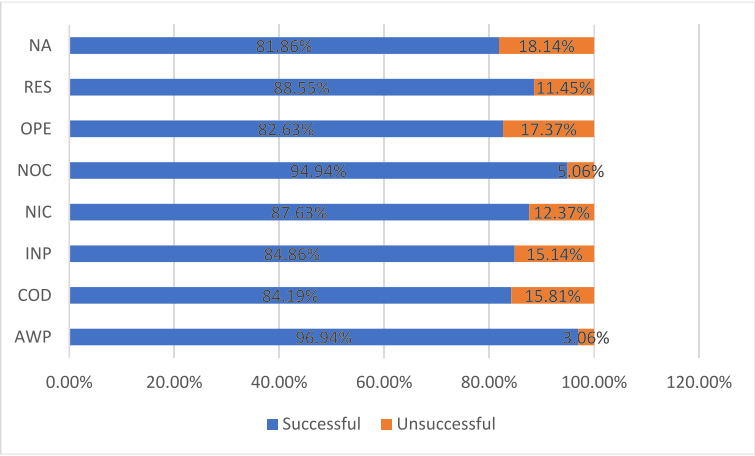

Fig. 4 Cross-tabulation analysis: TOP_TYPE and unsuccessful calls for the period 2016 to 2023

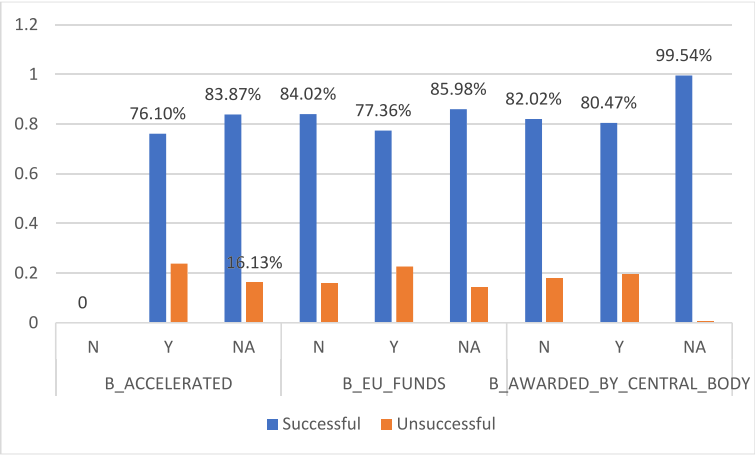

Fig. 5 Cross-tabulation analysis on B_ACCELERATED, B_EU_FUNDS, B_AWARDED_BY_CENTRAL_BODY, and unsuccessful calls for the period 2016 to 2023

public law, or a firm from the utility sector, while regional authorities were less likely to declare a call unsuccessful.

The crosstab analysis supported our assumption that the eight variables listed in Table 3 are not independent of a call being unsuccessful. However, theoretically, connections between the explanatory variables (multicollinearity) may have distorted results. For this reason, we also estimated logit regressions including all the explanatory variables and controlled for potential year- and country-specific effects. To do so, we converted the original category variables into dummy variables. The constant reflected the value "No" for the Boolean variables, and we maintained "NA" values as separate dummies where they existed. Otherwise, the constants represented the ods of Austria in 2016 for calls published by "Ministry or any other national or

Table 3 Probabilities of different CAETYPEs for the period 2016 to 2023

Name	Identifier	Proportion	N
Ministry or any other national or federal authority, including their regional or local subdivisions	1	8.06%	333,589
Regional or local authority	3	22.58%	934,817
Utilities sectors	4	6.49%	268,594
European Union institution/agency	5	0.13%	5308
Other international organisation	5A	0.01%	573
Body governed by public law	6	31.35%	1,297,628
Other	8	27.14%	1,123,488
National or federal Agency/Office	N	1.63%	67,306
Regional or local Agency/Office	R	2.30%	95,402
Not specified	Z	0.30%	12,446

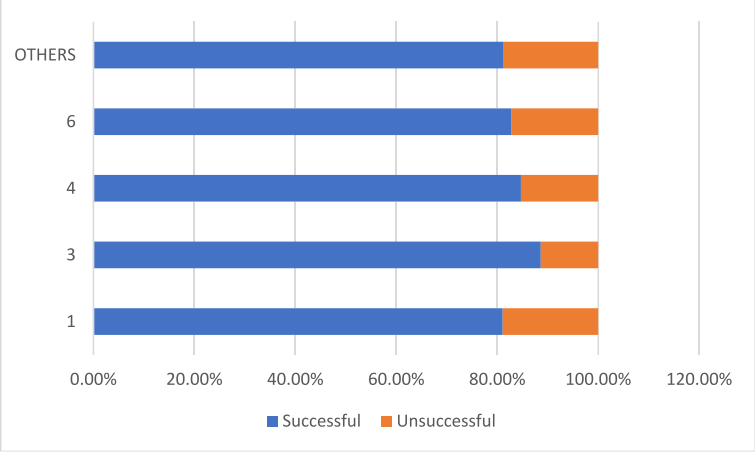

Fig. 6 Cross-tabulation analysis: CAE_TYPE and unsuccessful calls for the period 2016 to 2023

federal authority" (CAE_Type 1) of purchasing Services (TYPE_OF_CONTRACTS) in an "award without prior publication of a contract notice" type process (TOP_TYPE AWP) with a "Lowest price" selection criteria (CRIT_CODE L).

We estimated five models. First, no year or country control variables were used. Next, only the year (M2) or country (M3) variables were added. In M4, both of those control variables appeared, while M5 even included control variables for year-country cross effects. Regression results are summarized in Table 4.

Logit regression coefficients describe how the given variable would change the odds of the call being unsuccessful. To estimate the effect size, we need to raise e to the power of the coefficient. We interpret positive coefficients as increasing the likelihood of the call being unsuccessful, and negative coefficients as decreasing that like-

Table 4 Significant coefficients for the logit models

	M1	M2	M3	M4	M5
(Intercept)	−2.8080 ***	−3.4025 ***	−3.6789 ***	−4.1323 ***	−3.8243 ***
CRIT_CODEM	−0.3223 ***	−0.3004 ***	−0.1452 ***	−0.1370 ***	−0.1408 ***
CRIT_CODENA	−0.1136 ***	−0.1164 ***	0.1631 ***	0.1568 ***	0.1730 ***
TYPE_OF_CONTRACTU	0.0678 ***	0.0617 ***	−0.1360 ***	−0.1368 ***	−0.1350 ***
TYPE_OF_CONTRACTW	−0.1750 ***	−0.1594 ***	0.0935 ***	0.0944 ***	0.0955 ***
TOP_TYPECOD	1.5780 ***	1.6212 ***	1.7522 ***	1.7877 ***	1.8234 ***
TOP_TYPEINP	1.1751 ***	1.1769 ***	1.3190 ***	1.3272 ***	1.3529 ***
TOP_TYPENIC	1.3150 ***	1.3590 ***	1.5663 ***	1.6054 ***	1.6302 ***
TOP_TYPENOC	0.1124 ***	0.1349 ***	0.1001 **	0.1369 ***	0.1737 ***
TOP_TYPEOPE	1.5479 ***	1.5825 ***	1.5405 ***	1.5815 ***	1.6100 ***
TOP_TYPERES	1.0026 ***	1.0304 ***	1.2512 ***	1.2760 ***	1.3200 ***
TOP_TYPENA	1.8300 ***	1.9131 ***	1.8670 ***	1.9462 ***	1.8972 ***
B_ACCELERATEDY	0.3087 ***	0.2824 ***	0.3019 ***	0.2829 ***	0.2830 ***
B_EU_FUNDSY	0.4176 ***	0.3962 ***	0.3128 ***	0.3043 ***	0.3014 ***
B_EU_FUNDSNA	0.1727 ***	0.2421 ***	0.1130 ***	0.1621 ***	0.1455 ***
B_AWARDED_BY_CENTRAL_BODYY	0.1228 ***	0.1225 ***	0.3858 ***	0.3769 ***	0.3679 ***
B_AWARDED_BY_CENTRAL_BODYNA	−3.8045 ***	−3.3938 ***	−3.7400 ***	−3.4046 ***	−3.2573 ***
CAE_TYPE3	−0.4676 ***	−0.4657 ***	−0.1263 ***	−0.1292 ***	−0.1272 ***
CAE_TYPE4	−0.1171 ***	−0.1228 ***	−0.1681 ***	−0.1714 ***	−0.1677 ***
CAE_TYPE6	−0.1101 ***	−0.1023 ***	−0.0454 ***	−0.0456 ***	−0.0478 ***
CAE_TYPEOTHERS			0.0831 ***	0.0785 ***	0.0811 ***
YEAR control		X		X	X
COUNTRY control			X	X	X
YEAR and COUNTRY cross-effect control					X
McFadden's Pseudo-R^2	5.6974%	6.0032%	8.4986%	8.6971%	9.2342%
McKelvey & Zavoina's Pseudo-R^2	4.9520%	5.2107%	7.2959%	7.4598%	7.9018%
Cragg & Uhler's (Nagelkerke's) Pseudo-R^2	8.3942%	8.8328%	12.3675%	12.6454%	13.3946%

*$p<5\%$; **$p<1\%$; ***$p<0{,}01\%$

lihood compared to the variable value reflected in the equation's constant. Based on the regression results, most explanatory variables retained their sign and explanatory power even when controlled for various year and country effects. The three changes of the sign have been highlighted using a grey background.

Using the "Most economically advantageous tender" criterion, which offers more room for the contracting entity to handpick winners, decreases the chance of a call being declared unsuccessful. We also confirm that compared to calls for buying services, purchasing goods and supplies (U) and construction works (W) (TYPE_OF_

Contract) have different likelihoods of being unsuccessful. When controlled for time and country, calls for work are slightly more likely to be unsuccessful, while calls for supplies have a far lower chance. Based on our results, all procedure types are more likely to be unsuccessful than "award without prior publication of a contract notice" processes. Especially "competitive dialogue" (COD), "negotiated with a call for competition" (NIC), and "open" (OPE) methods are prone to relatively high failure risk. We may assume that the relatively high coefficient of the answer "NA" is due to data providers not recording details for unsuccessful calls. To sum up, calls with less room for bidding competition seem more likely to be successful, which may raise concerns about some contracting entities non-awarding calls because they do not receive the best offer from their preferred bidder. (Fig. 7).

Calls using the accelerated process, those using EU funding, and those awarded by a central purchasing body have a significantly higher chance of being non-awarded. The type of contracting authority (CAE_TYPE) also plays a determining role in failures. Compared to the calls published by the Ministry or any other national or federal authority, those of regional or local contracting bodies, the utility sector, and public-law-governed bodies are more likely to remain successful (Fig. 8).

Year and country effects may also be of interest. Figure 9 shows estimated year coefficients for Models 2 and 4. All coefficients shown were significant, except for 2017 in M4, which was replaced with zero.

As indicated earlier in the initial presentation of the descriptives, 2016 was associated with a very small proportion of reported unsuccessful calls. Thus, it is no surprise that all other years are connected with a higher likelihood of failure. Nevertheless, after a steady climb and a peak in 2022, the likelihood of failures somewhat fell in 2023.

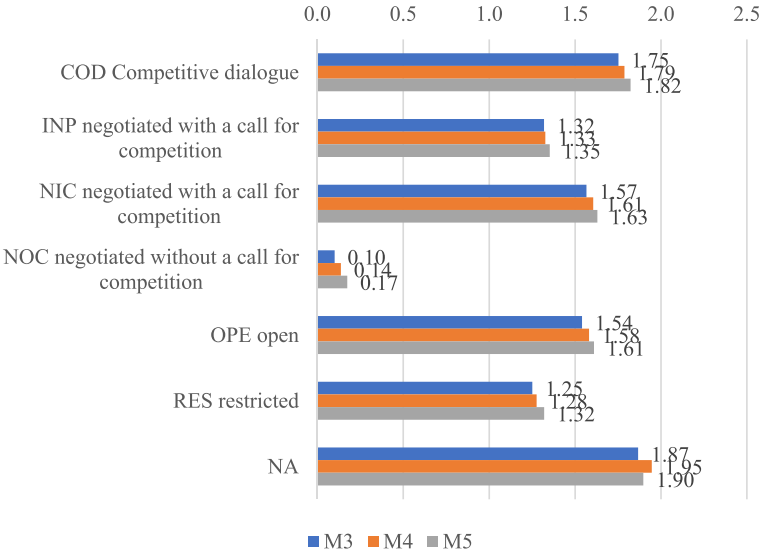

Fig. 7 Relative likelihood of call being unsuccessful compared to "award without prior publication of a contract notice" (AWP) method (non-linear logit regression coefficients)

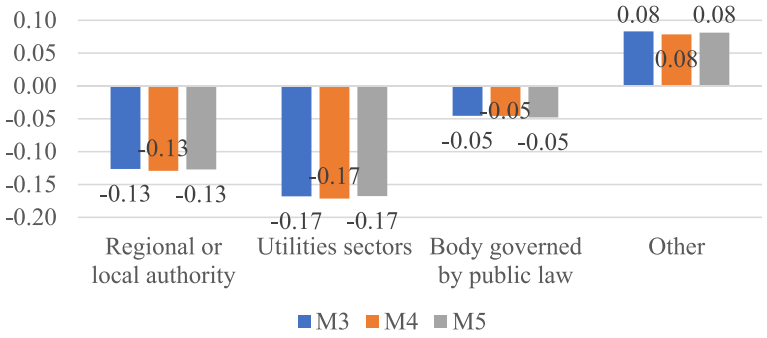

Fig. 8 Relative likelihood of call being unsuccessful for different contracting bodies compared to "Ministry or any other national or federal authority" (non-linear logit regression coefficients)

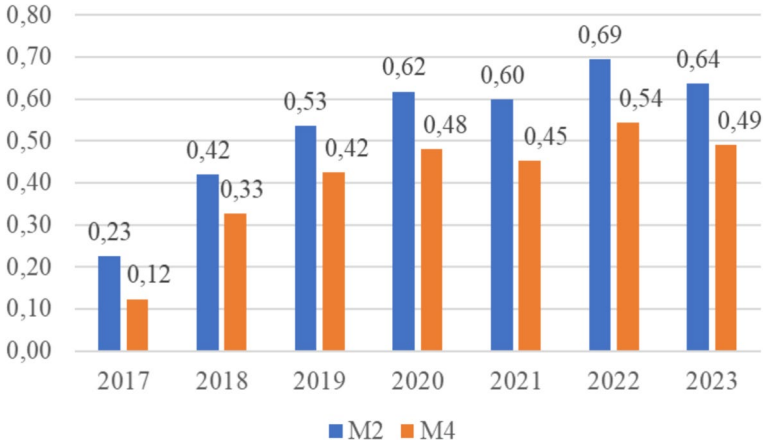

Fig. 9 Relative likelihood of calls being unsuccessful for different years compared to 2016 (non-linear logit regression coefficients)

Discussion

Findings Related to the Decision-Based Factors

Based on the results associated with the decision-making process, hypotheses H1, H2, and H5 were not supported, while H3 and H4 were confirmed. This implies that although the use of the most economically advantageous tender (MEAT) criterion increases uncertainty – since the ranking is not determined solely by price – procedures relying exclusively on price-based evaluation tend to be less successful. Therefore, in cases involving more complex procurement objects, environmental criteria, or competition based on technical parameters, the likelihood of procedural success is higher.

In contrast, the use of negotiation does not exhibit this positive effect. Although negotiations can reduce risk and foster mutual understanding of complex procure-

ment needs, the expected positive relationship between negotiation and procedural success was not supported.

However, procedures conducted without prior publication of a contract notice tend to be more successful. This confirms our assumption that direct market engagement and pressure on contracting authorities to identify suitable bidders without public advertisement result in higher success rates. This represents a challenge for efforts to reduce the use of non-public procedures, as the goal should be to achieve at least comparable success rates in publicly advertised procedures. The findings suggest that market actors either do not respond to public calls or, if they do, are not capable of submitting successful bids. This clearly highlights the importance of direct "procurement marketing" by contracting authorities, which is at least as crucial as the detailed publication of notices, the clarity of documentation and procedural rules, and the comprehensibility and market compatibility of technical specifications and contract terms.

Accelerated procedures are more likely to result in failure, which is not a surprising outcome. This underscores the importance of allowing sufficient time for bidders to prepare their offers. Time savings should not be pursued at the expense of procedural effectiveness, as this increases uncertainty.

Findings Related to External Factors

Of the three hypotheses related to external conditions, H6 was rejected, while H7 and H8 were supported. The results indicate that the most complex, asset-specific construction projects tend to have lower success rates, whereas supply-related procedures are more prone to failure. In the case of more complex procurement items, greater complexity entails higher risk, the management of which requires time and expertise, which is provided more successfully by contracting authorities in the context of works.

A notable result is that central purchasing bodies tend to exhibit a higher incidence of unsuccessful procurement procedures. This highlights that the transaction-cost-reducing effect of economies of scale is not straightforward. Increased market visibility and the more assertive engagement of larger market actors may produce countervailing effects. Overall, the activities of central purchasing bodies do not guarantee procedural success and, in fact, the latter perform worse than decentralized entities.

A key result is that among different groups of contracting authorities, municipalities conduct the most successful procurement procedures. Because of the proximity to the market, direct service orientation, and the diversity of procurement needs, they achieve better outcomes than non-municipal entities, including ministries, public service providers, and bodies governed by public law.

The findings indicate that the regulatory requirements associated with EU-funded procedures and the risk of financial clawback indeed increase uncertainty and risk. The rate of procedural failure is higher in EU-funded procurements compared to those financed from domestic sources.

Given that the outcomes are less favorable in cases involving simpler evaluation criteria, the procurement of supplies, and the use of accelerated procedures, it can be

concluded that, from a public procurement perspective, better results are achieved in professionally more complex procurements that require greater preparedness. These are precisely the cases for which the risks and uncertainties are inherently higher. Consequently, the costs associated with process management – aimed at mitigating these risks – may be higher, yet the likelihood of success is also greater.

However, when external environmental conditions are more complex – such as involving a central purchasing body or the intricacies of EU-funded projects – the effectiveness of the procedure is not guaranteed, despite the higher costs resulting from more complex processes, regulatory frameworks, and administrative burdens. This can be offset by more direct market engagement, as evidenced by the better outcomes associated with municipal procurements and procedures conducted without prior publication. Nevertheless, such advantages are not necessarily replicable through procedural fine-tuning or negotiation, as the probability of success in negotiated procedures is comparable to that of non-negotiated ones.

Overly complex coordination processes – such as competitive dialogues or innovation partnerships involving extensive and costly engagement with supply chain actors – do not yield proportionate success. In fact, the application of these types of procedures has notably declined.

Both contracting authorities and bidders estimate their own costs and the likelihood of success. The procurement performance of contracting authorities largely depends on their ability to engage the market – that is, whether a sufficient number of valid bidders are willing to actively participate in the procurement process. If the initial procedure fails, the transaction costs for the contracting authority become extremely high. Meanwhile, bidders can continuously monitor the costs of preparing and managing the procedure and may opt out if these costs become excessive.

Bidders assess the transaction costs associated with the procedure, contract award, and contract execution. If participation in public spending is deemed unattractive due to excessive complexity or bureaucratic administrative requirements, they will refrain from participating. Our research findings provide evidence for the higher non-award rates associated with EU-funded projects and negotiated procedures, which are burdened by more complex rules, procedural structures, and administrative requirements.

These results, in line with Williamson's (1981) evaluation of supply chain relationships, suggest that such relationships can be effectively managed using the Transaction Cost Economics (TCE) approach. This is reinforced by the more favorable outcomes observed in procedures without prior publication and municipal procurements, as well as in cases involving more complex procurement subjects and awarding criteria.

The level of transaction costs – whether low or high – across different markets does not necessitate an examination of the hierarchy within which the contracting authority conducts the procurement. Rather, it calls for assessing the extent of the resources that should be allocated to managing external relationships during the transaction, especially when the asset specificity, frequency, and uncertainty of the procurement subject are high.

If these factors are not properly managed, market coordination can easily lead to unsuccessful procedures. This implies that an inadequately chosen coordination

mechanism undermines procurement performance, as costs will significantly increase and the lead time for satisfying demand will be extended. Therefore, the evaluation of procurement performance must include the proportion and characteristics of non-awarded procedures. As our analysis reveals, contracting authorities have the opportunity to address market challenges during the preparation phase of the procedure, thereby increasing the likelihood of identifying interested economic operators and reducing uncertainty.

Conclusion

The PWC-Ecorys Study (2011) was the first to examine and quantify the costs of public procurement procedures in terms of man-days. Based on the data, approximately 300,000 man-days were spent annually by those involved in public procurement; however, the study does not address the consequences of inefficiency by identifying individual costs. The general approach is to consider only those costs directly incurred in the preparation, conduct, and completion of the procedure, as well as any legal remedies. In our article, we draw attention to the fact that market participants consider part of the transaction costs but are less likely to take into account the potential additional costs arising from a lack of results, even though this risk is particularly high in EU Member States. Since failure also affects subsequent repeat proceedings, an unsuccessful proceeding can actually increase costs several times over.

The research aims to identify the data links between the unsuccessful parts of procedures and the information contained in contract award notices. Our results show that the seven explanatory variables we selected remain significantly associated with the occurrence of unsuccessful calls, even after controlling for time and country specificity. Since the data content of contract notices is published, the outcome of procedures is not, in fact, independent of the way in which the conditions of the procedures were drafted. Therefore, the variables related to these conditions are likely to significantly influence the failure of calls. In terms of efficiency, this suggests that failure may be associated with the specific characteristics of these variables. Based on the research, a relationship can be identified between unsuccessful procedures and the awarding criteria, the type of contracting authority, the subject of the procurement, the source of financing, and the type of procedure. The result contributes to making public procurement more efficient, as it draws attention to what stakeholders should consider when preparing public procurement procedures and drafting legislation and public procurement policies.

During the research, it was not possible to examine procurements below the EU public procurement threshold, although this would be a very important task for the future. This is because, in the case of lower-value procurements, local suppliers and small and medium-sized enterprises in the countries concerned are more likely to be successful, which may also impact the success of the procedures. A limitation of the TED database is that it is not possible to quantify many types of costs; however, we assume that the transaction costs of a new procedure following an unsuccessful one are affected by the previous failure. Moreover, market participants also factor this into their pricing if they assess that they must participate in procedures associated

with calls regularly deemed unsuccessful by contracting authorities. In this regard, not only the procedure but also the contracting authority's reputation and ability to stimulate competition are influenced by the extent to which it is able to conduct successful procedures in the public procurement market.

In terms of further research opportunities, the next step could be to examine country-specific differences, focusing on the public procurement performance of developing countries or regions with more developed SMEs, while highlighting the defects that limit and influence successful procedures.

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Data Availability All data used in open data, available in www.ted.europa.eu.

Declarations

Ethical Approval None.

Informed Consent None.

Competing interests None.

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