

Article

# Procedures for Awarding Work Contracts in Europe

Edyta Plebankiewicz 

Faculty of Civil Engineering, Cracow University of Technology, 31-155 Krakow, Poland;  
edyta.plebankiewicz@pk.edu.pl

**Abstract:** Choosing a contractor with the best competencies is particularly important, especially in construction contracts. Using data available on the opentender.eu platform, information for 2022 was compiled regarding the size of the public procurement market and the procedures used in public procurement for construction works in European countries. The most common procedure used under the European Union Directive for awarding work contracts, in most countries, is the open procedure. The largest share of this procedure, amounting to over 95% of all proceedings, is in the countries Croatia, Cyprus, Greece, Latvia, and Poland. On the other hand, there are countries where the procedures proposed in the Directive are used to a small extent. In order to distinguish groups of European Union countries characterized by a similar structure of public procurement for work, the joining (tree-clustering) algorithm was used. This will provide insights into the strategies of countries in this area. Knowledge of the advantages and disadvantages of the various procedures may improve the public procurement system.

**Keywords:** work contracts; procurement system; contractor selection



**Citation:** Plebankiewicz, E. Procedures for Awarding Work Contracts in Europe. *Buildings* **2024**, *14*, 883. <https://doi.org/10.3390/buildings14040883>

Academic Editors: Pramen P. Shrestha, Kishor Shrestha and Yongjian Ke

Received: 30 January 2024

Revised: 12 March 2024

Accepted: 22 March 2024

Published: 25 March 2024



**Copyright:** © 2024 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

The legal basis for the selection of public procurement procedures in the countries of the European Union is Directive 2014/24/EU of 26 February 2014 on public procurement. According to European Union (EU) regulations, a public owner can use one of several procedures. Various procedures have different options for assessing the contractor and evaluating the tender, and each has both advantages and disadvantages. Knowing them allows one to choose the most effective procedure, tailored to the conditions of a given order.

An inadequate procurement system can result in poor-quality buildings delivered late, at overestimated costs, and by an antagonistic executive team [1,2]. At the same time, research shows that construction practitioners have increasingly become aware of various procurement options [3] and understand that each procurement route contributes to project success to diverse degrees [1,4].

EU countries, in terms of contracts below certain values, may shape their own solutions regarding the structure of their procurement procedures. Data from 2022 on the use of public procurement procedures in individual EU countries were analyzed. Using the cluster method, EU countries were grouped depending on the use of public procurement procedures for construction works. This will provide insight into the strategies of countries in this area. Procurement systems in EU countries are constantly improving, and knowledge of the advantages and disadvantages of the various procedures may improve the public procurement system.

## 2. Literature Review

The choice of an appropriate procurement procedure is the first step toward construction project success [5]. Many authors have devoted their research to the selection of the most appropriate procurement method [6–8]. To build procurement system selection models, authors have used various methods and mathematical tools, such as the Delphi method [9]; fuzzy logic [10]; and the analytical hierarchy process [11].

Even though all public procurement systems are guided by similar principles, such as non-discrimination, equal treatment, transparency, and proportionality, there are procedural differences between countries. Fuentes-Bargues et al. [12] discuss environmental criteria in Spanish procurement procedures. Jimoh et al. [13] describe public procurement work selection criteria in Nigeria. Rahmani et al. [14] present an overview of construction procurement methods in Australia. Smith et al. [15] analyze the procurement of construction facilities in China. Rajeh [16] conducted research aimed at managing the time spent on procurement activities. According to a study in New Zealand, every day, project managers spend about 50% of their time on procurement systems. The objective of another paper [17] was to examine strategies in construction contract arrangements and procurement practices applied to the US construction industry.

Many works are devoted to procurement selection criteria. The aim of one paper [3] was to establish the fuzzy membership function of procurement selection criteria through an empirical study conducted in Australia. This topic is also discussed in [1,18]. Construction procurement procedures require careful risk management [4,19–21]. Based on contract data available from the U.S. federal government, for fiscal years 2015 to 2018, Atkinson [22] tries to decide what federal procurement data say about the nature of full and open competition in practice. The advantages and disadvantages of individual public procurement procedures (open, restricted, negotiated, etc.), as well as the possibilities of improving their effectiveness, are discussed, for example, in [23–26].

The goal of the study by [27] was to identify, assess, and rank the most relevant aspects in tender appraisal, taking into account their interconnection. One paper [25] is a piece of applied research presenting the development of a new, cost-effective procurement strategy for public works geared at the EU's legal framework. The study by Jelodar [28] proposes a framework of actions and seven strategies that can facilitate attributes associated with relationship quality evaluation in a construction project's procurement practices.

Public procurement is increasingly seen as an important potential instrument of innovation policy [29,30]. Choosing a given procurement method results in certain differences in the criteria and rules for selecting a contractor and a tender. These issues are discussed, for example, in [31,32]. Chong and Preece [33] showed that the characteristics of organizational principles are complementary to procurement systems. A mechanism for assessing the key areas of compatibility was developed using the McKinsey 7 S model. On the other hand, Eriksson and Westerberg [34] claim that cooperative procurement procedures have a positive influence on project performance.

The most important procurement topics addressed by the researchers are summarized in Table 1.

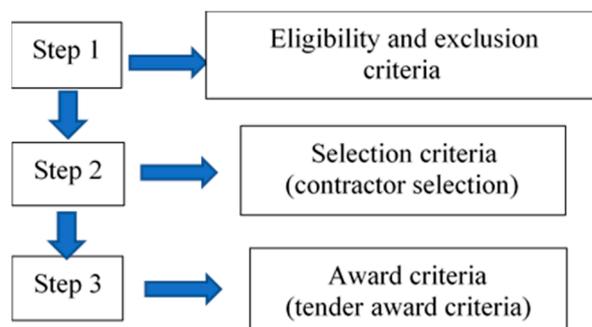
**Table 1.** Literature summary table.

|   | Authors   | Year                               | Main Topic   | Methods   |
|---|---|------------------------------------|--|---|
| 1 | Naoum and Egbu [1]; Zhao et al. [8]; Ng et al. [3]; Luu et al. [7]; Luu et al. [18]; Jimoh et al. [13]; Smith et al. [15] | 2002; 2003; 2004; 2005; 2016; 2022 | Procurement selection criteria                           | A state of the art; a review; an empirical survey; Fuzzy logic; a case-based reasoning approach |
| 2 | Marinelli and Antoniou [25]   | 2020                               | Procurement strategy                                     | A literature review   |
| 3 | Franz and Leicht [17]; Cheung et al. [11]; Rahmani et al. [14]; Rajeh et al. [16]   | 2001; 2016; 2015; 2017             | Procurement selection method                             | A literature review; a survey; AHP; a survey  |
| 4 | Fuentes-Bargues et al. [12]; Yu and Morotomi [31]   | 2017, 2022                         | Green public procurement criteria                        | Study; project and tendering documents  |
| 5 | Alhazmi and Mccaffer [6]  | 2000                               | Procurement system selection model                       | A survey  |
| 6 | Atkinson [22]; Chever et al. [24]   | 2017; 2019                         | Full, open, restricted competition in public procurement | Study; contract data  |

### 3. Legal Basis for Awarding Work Contracts in Europe

According to Directive 2014/24/EU of the European Parliament, when awarding public contracts above a certain value (called a threshold), provisions should have national coordination. Nowadays, for public works contracts, the threshold is EUR 5,382,000.

Contract award methods vary somewhat from one procedure to another. In general, the two basic stages are the selection of contractors (based on legibility, exclusion criteria, and contractor selection criteria) and the selection of a tender (based on the award criteria). It should be noted here that the Directive distinguishes clearly between selection criteria and award criteria. This is schematically illustrated in Figure 1.



**Figure 1.** Steps in contractor and tender selection.

The criteria in step 1 of the selection procedure constitute the basis for excluding a contractor from the procurement procedure. Here, the Directive lists both criteria that are obligatory for the contracting authority (for instance, participation in a criminal organization or corruption) and optional ones (for example, when the contractor is bankrupt). Contractor selection criteria may relate to (a) the suitability of pursuing the professional activity; (b) economic and financial standing; and (c) technical and professional ability. All requirements shall be related and proportionate to the subject matter of the contract.

Contract award criteria should allow for the selection of the most economically advantageous tender. The most economically advantageous tender should be identified on the basis of the price or cost, using a cost-effectiveness approach, such as life-cycle costing. Other criteria may concern, in accordance with the Directive, such aspects as the following:

- (a) Quality, including aesthetic and functional characteristics, accessibility, environmental, and innovative characteristics;
- (b) The experience and qualifications of staff assigned to perform the contract;
- (c) Technical assistance and after-sales services.

The contracting authority should also determine the weights of the tender award criteria.

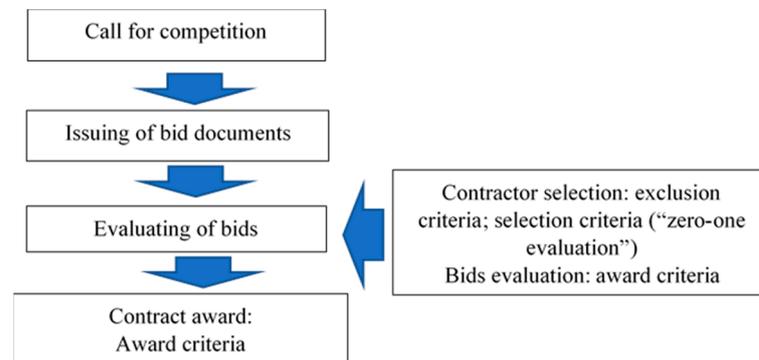
### 4. Procurement Procedures

According to the EU Directive, the public owner can use one of the following procedures: an open procedure, a restricted procedure, a negotiated procedure with prior calls for competition, a competitive dialog, or an innovation partnership. In the following section, procedural flowcharts are presented, highlighting the steps in the selection of contractors and tender evaluation.

#### 4.1. Open Procedure

In open procedures, any interested contractor can submit a tender in response to a call for competition. An open procedure is a “one step” procedure—the selection of contractors and tender evaluation are in one step. Contractors submit both qualification (selection) information and tender at the same time. The public owner can assess the competence of contractors but only in a “zero-one” way, that is, to check whether the contractor meets the basic, specified requirements. There is no stage of pre-selection of contractors, which does not allow for a

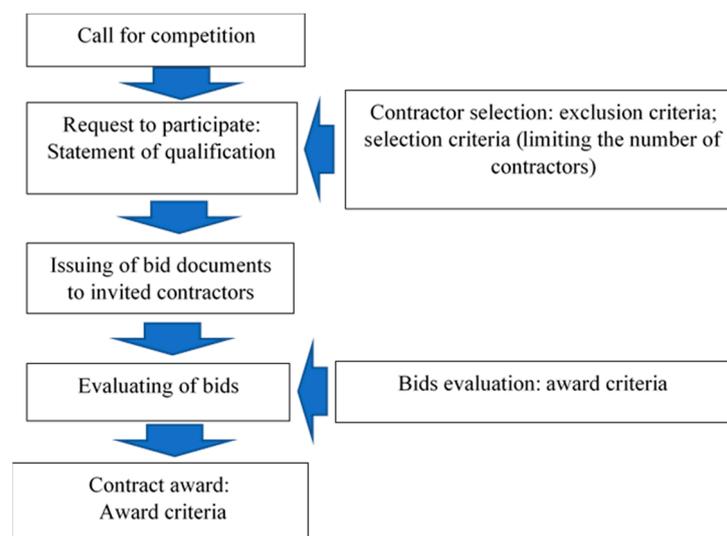
thorough understanding of the contractors' qualifications. The tender is selected only on the basis of criteria relating to the bid. These criteria cannot relate to the competence of the contractors. The evaluation stages in the open procedure are shown in Figure 2.



**Figure 2.** Stages in open procedure.

#### 4.2. Restricted Procedure

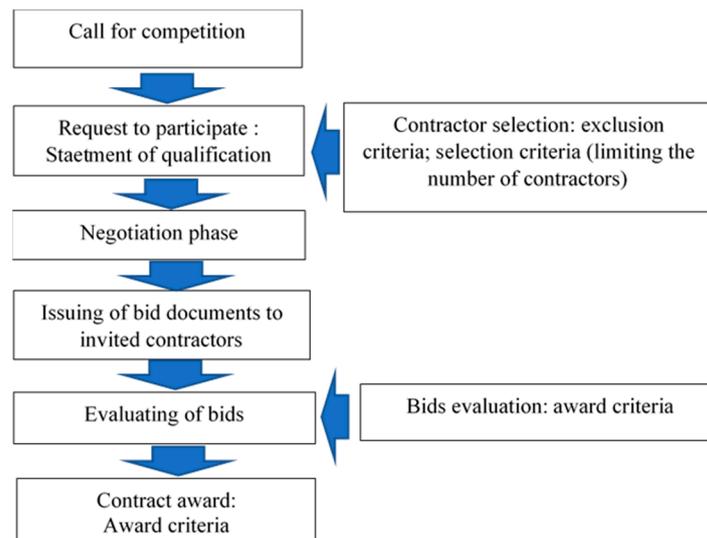
In restricted procedures, any contractor can submit a request to participate in a response to a call for competition. In a request to participate, the contractor provides the information for qualitative selection. Only contractors invited by the public owner can submit a tender. A restricted procedure is a “two-step” procedure. The contractor selection is clearly separate from the evaluation of the tender. The contracting authority has the opportunity to carefully assess the competence of contractors (pre-qualification) and limit their number to only the best (most qualified) ones. This means that not all of the contractors that qualify have to be invited to tender. No negotiations are permitted with contractors. The evaluation stages in the restricted procedure are shown in Figure 3.



**Figure 3.** Stages in restricted procedure.

#### 4.3. Negotiated Procedure with Prior Call for Competition

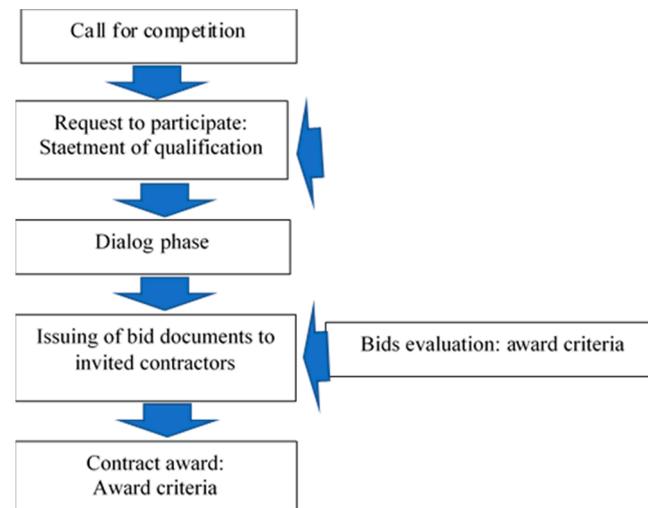
In negotiated procedures with a prior call for competition, any contractor can submit a request to participate. Only contractors invited by the public owner can participate in the negotiations. This case of the negotiated procedure is, therefore, a “two-step” procedure, with the possibility of both limiting the number of contractors and negotiating with them. The evaluation stages in the procedure are shown in Figure 4.



**Figure 4.** Stages in negotiated procedure with a prior call for competition.

#### 4.4. Competitive Dialog

Competitive dialogs refer to a “two-step” procedure similar to negotiated procedures with a prior call for competition. The difference is that, during the competitive dialog phase, all aspects of the project can be discussed by the contractors and the owner. When the public owner receives a proposal that meets his/her requirements, he/she can close the competitive dialog and invite tenders. Tenders can only be evaluated on the basis of the best price–quality ratio. Stages in the competitive dialog procedure are shown in Figure 5.



**Figure 5.** Stages in competitive dialog procedure.

#### 4.5. Innovation Partnership and the Negotiated Procedure without a Prior Call for Competition

In innovation partnerships, in the procurement documents, the public owner can identify the need for innovative work that cannot be bought on the existing market. The difference between this procedure and the negotiated procedure with a prior call for competition is the abandonment of a public announcement of the procedure and the limitation of contractors only to those invited by the public owner.

Stages in negotiated procedure without a prior call for competition are shown in Figure 6.

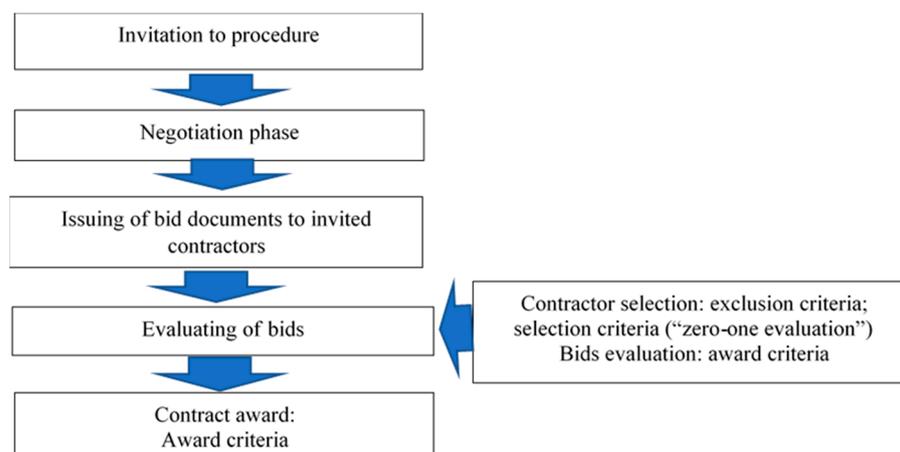


Figure 6. Stages in negotiated procedure without a prior call for competition.

## 5. Application of Public Procurement Procedures for Construction Works in EU Countries

Using data available on the opentender.eu platform, information for 2022 has been compiled regarding the size of the public procurement market and the procedures used in public procurement for construction work in EU countries. The results are summarized in Table 2.

Table 2. Public procurement for construction work in EU countries.

|    |                | Volume | Number | OP <sup>(1)</sup> | RP <sup>(2)</sup> | NPwith <sup>(3)</sup> | CD <sup>(4)</sup> | NP <sup>(5)</sup> | Other |
|----|----------------|--------|--------|-------------------|-------------------|-----------------------|-------------------|-------------------|-------|
| 1  | 2              | 3      | 4      | 5                 | 6                 | 7                     | 8                 | 9                 | 10    |
| 1  | Austria        | 406.6  | 5881   | 57.0              | 0.5               | 12.0                  | 0                 | 5.0               | 25.5  |
| 2  | Belgium        | 114.5  | 456    | 72.0              | 1.0               | 25.0                  | 2.0               | 0                 | 0     |
| 3  | Bulgaria       | 1800.0 | 4390   | 72.0              | 1.0               | 25.0                  | 1.0               | 1.0               | 0     |
| 4  | Croatia        | 3600.0 | 2690   | 97.0              | 0                 | 0.5                   | 0                 | 0                 | 2.5   |
| 5  | Cyprus         | 11.6   | 23     | 96.0              | 3.5               | 0                     | 0                 | 0.5               | 0     |
| 6  | Czech Republic | 1800.0 | 3545   | 24.0              | 7.0               | 1.0                   | 0                 | 1.0               | 67.0  |
| 7  | Denmark        | 244.2  | 238    | 19.0              | 35.0              | 42.0                  | 0.5               | 3.5               | 0     |
| 8  | Estonia        | 651.1  | 1373   | 88.0              | 7.0               | 1.5                   | 0                 | 3.5               | 0     |
| 9  | Finland        | 389.7  | 391    | 77.0              | 7.0               | 11.0                  | 4.0               | 1.0               | 0     |
| 10 | France         | 3800.0 | 18,610 | 44.0              | 1.0               | 4.0                   | 1.0               | 0                 | 50.0  |
| 11 | Germany        | 8300.0 | 13,881 | 93.0              | 1.0               | 4.0                   | 0                 | 2.0               | 0     |
| 12 | Greece         | 32.4   | 117    | 96.0              | 0                 | 4.0                   | 0                 | 0                 | 0     |
| 13 | Hungary        | 2900.0 | 3598   | 58.0              | 0.5               | 0.5                   | 0                 | 1.0               | 40.0  |
| 14 | Ireland        | 181.8  | 1591   | 35.0              | 46.0              | 16.0                  | 1.0               | 1.0               | 1.0   |
| 15 | Italy          | 979.1  | 536    | 92.0              | 4.0               | 2.0                   | 0.5               | 1.0               | 0.5   |
| 16 | Latvia         | 64.4   | 1876   | 96.0              | 1.0               | 3.0                   | 0                 | 0                 | 0     |
| 17 | Lithuania      | 58.2   | 120    | 92.0              | 3.0               | 5.0                   | 0                 | 0                 | 0     |
| 18 | Luxemburg      | 30.4   | 417    | 95.0              | 2.0               | 2.0                   | 0                 | 0.5               | 0.5   |
| 19 | Malta          | 6.6    | 36     | 89.0              | 3.0               | 6.0                   | 0                 | 2.0               | 0     |
| 20 | Netherlands    | 207.1  | 354    | 35.0              | 51.0              | 7.0                   | 6.0               | 1.0               | 0     |
| 21 | Poland         | 1100.0 | 941    | 97.0              | 1.0               | 0                     | 1.0               | 1.0               | 0     |
| 22 | Portugal       | 66.8   | 80     | 86.0              | 11.0              | 1.0                   | 0                 | 2.0               | 0     |
| 23 | Romania        | 2800.0 | 12,732 | 4.0               | 0                 | 0                     | 0                 | 0                 | 96.0  |
| 24 | Slovakia       | 237.7  | 1492   | 27.0              | 0.5               | 0.5                   | 0                 | 0                 | 72.0  |
| 25 | Slovenia       | 788.7  | 1685   | 88.0              | 2.0               | 4.0                   | 2.0               | 4.0               | 0     |
| 26 | Spain          | 7900.0 | 26,059 | 22.0              | 0                 | 0                     | 0                 | 2.0               | 76.0  |
| 27 | Sweden         | 1100.0 | 611    | 88.0              | 3.0               | 8.0                   | 0                 | 1.0               | 0     |

<sup>(1)</sup> Open procedure; <sup>(2)</sup> restricted procedure; <sup>(3)</sup> negotiated procedures with a prior call for competition; <sup>(4)</sup> competitive dialog; <sup>(5)</sup> negotiated procedure without a prior call for competition.

Column 3 of Table 2 provides the value of public procurement in millions of Euros, and column 4 shows the number of these contracts. Columns 5 to 10 contain the percentage share of orders carried out under a given procedure in terms of the total number of orders

in a given country. Table 3 presents basic statistical data on construction contracts in EU countries in 2022.

**Table 3.** Statistical data on construction contracts in EU countries in 2022.

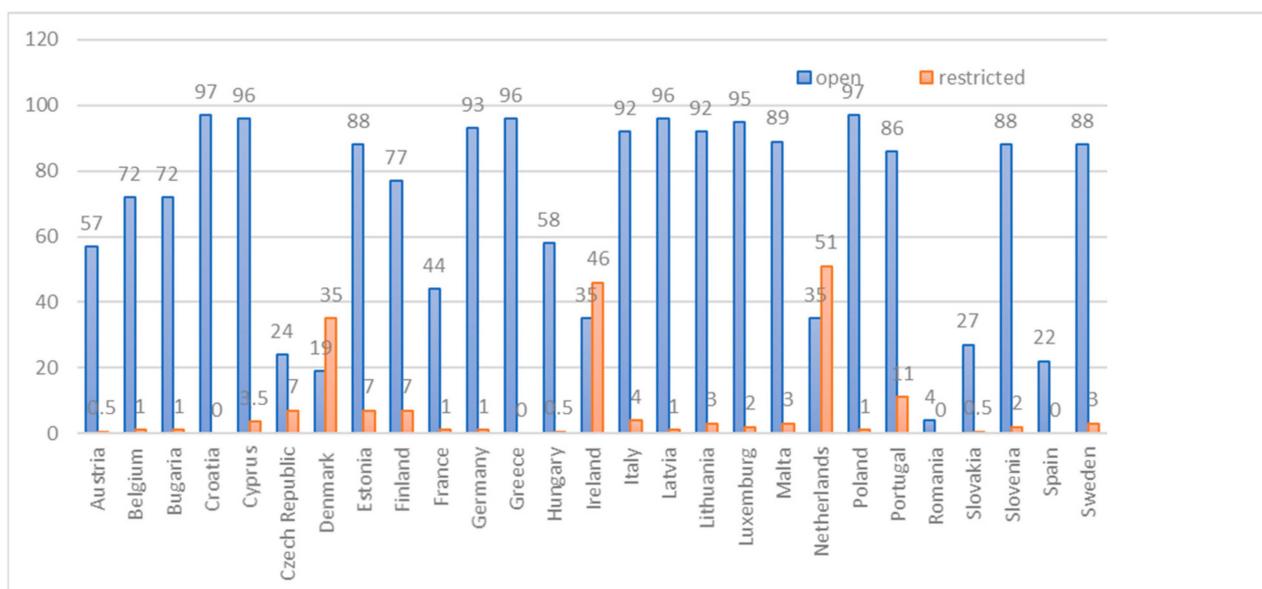
| Variable | Mean    | Median  | Sum        | Minimum | Maximum   | Lower (Quartile) | Upper (Quartile) | Std.Dev. |
|----------|---------|---------|------------|---------|-----------|------------------|------------------|----------|
| Volume   | 1465.59 | 406.60  | 39,570.90  | 6.60    | 8300.00   | 66.80            | 1800.00          | 2222.23  |
| Number   | 3841.59 | 1373.00 | 103,723.00 | 23.00   | 26,059.00 | 354.00           | 3598.00          | 6455.87  |
| OP       | 68.11   | 86.00   | 1839.00    | 4.00    | 97.00     | 35.00            | 93.00            | 30.27    |
| RP       | 7.11    | 2.00    | 192.00     | 0.00    | 51.00     | 0.50             | 7.00             | 13.75    |
| NPwith   | 6.85    | 4.00    | 185.00     | 0.00    | 42.00     | 0.50             | 8.00             | 9.86     |
| CD       | 0.70    | 0.00    | 19.00      | 0.00    | 6.00      | 0.00             | 1.00             | 1.40     |
| NP       | 1.26    | 1.00    | 34.00      | 0.00    | 5.00      | 0.00             | 2.00             | 1.36     |
| other    | 15.96   | 0.00    | 431.00     | 0.00    | 96.00     | 0.00             | 25.50            | 29.45    |

The presented data (Tables 2 and 3) show that the total value of construction contracts in 27 EU countries in 2022 amounted to almost EUR 40 million, and over 103,000 proceedings were conducted. In terms of the number of proceedings, Spain is the record holder, with over 26,000 proceedings carried out, with a relatively low value (EUR 7900 million). For comparison, in Germany, where the value of proceedings was the highest (EUR 8300 million), there were approximately half as many proceedings as in Spain. One of the main reasons may be the specificity of the procedures used in Spain, namely, a small share of open tendering, while a significant number of procedures were conducted in the approaching bidder (12,640) or mini-tender (1964) modes, which are usually related to low-value orders.

The most common procedure used under the Directive for awarding work contracts in most EU countries is the open procedure. On the other hand, there are countries where the procedures proposed in the Directive are used to a small extent, and other solutions are often used. In Romania, 99% of the procedures used are different from those listed in the Directive.

The use of individual procedures in countries such as Denmark, Ireland, and the Netherlands is interesting and slightly different. The use of open tendering is quite low here, but procedures outside the Directive are not used either. However, the share of restricted or negotiated procedures provided by the Directive is significant.

By far the most used procedures are open and restricted. Figure 7 shows the percentage share of these procedures in individual EU countries.



**Figure 7.** The percentage share of open and restricted procedures in individual EU countries.

The most common procedure used under the Directive for awarding work contracts in most EU countries is the open procedure. This is a procedure that does not allow for the pre-selection of contractors or a thorough evaluation of their competence. However, this is the most competitive procedure, providing potentially the widest access to participation in public procurement. The largest share of this procedure, amounting to over 95% of all proceedings, is in the countries Croatia, Cyprus, Greece, Latvia, and Poland.

*Cluster Analysis*

In order to distinguish groups of EU countries characterized by a similar structure of public procurement for work, a joining (tree-clustering) algorithm method was used. The goal of the joining algorithm is to join together objects into successively larger clusters, using some measure of similarity or distance. Ward’s method and the Euclidean distance measure were used for the analyses.

Ward’s method uses an analysis of variance approach to evaluate the distances between clusters. This method attempts to minimize the Sum of Squares (SS) of any two (hypothetical) clusters that can be formed at each step. All calculations were performed in the Statistica program. The obtained results are presented in Figure 8 and Table 4.

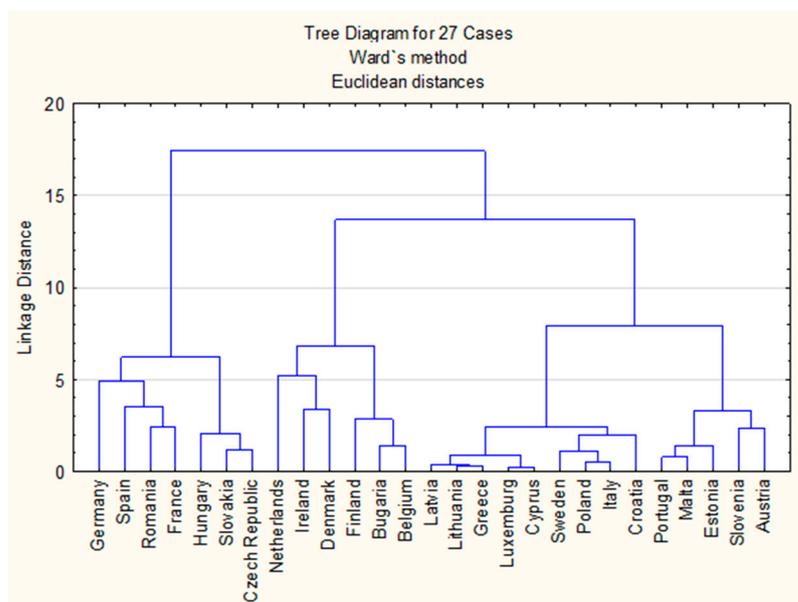


Figure 8. Tree diagram.

Table 4. The results of cluster analysis—joining (tree-clustering) algorithm (Ward’s method).

|                  |           | Volume       | Number     | OP (1)      | RP (2)     | NPwith (3) | CD (4)      | NP (5)      | Other       | Cluster |
|------------------|-----------|--------------|------------|-------------|------------|------------|-------------|-------------|-------------|---------|
| 1                | 2         | 3            | 4          | 5           | 6          | 7          | 8           | 9           | 10          | 11      |
| <b>CLUSTER 1</b> |           |              |            |             |            |            |             |             |             |         |
| 1.1              | Croatia   | 3600.0       | 2690       | 97.0        | 0          | 0.5        | 0           | 0           | 2.5         | 1       |
| 1.2              | Cyprus    | 11.6         | 23         | 96.0        | 3.5        | 0          | 0           | 0.5         | 0           | 1       |
| 1.3              | Greece    | 32.4         | 117        | 96.0        | 0          | 4.0        | 0           | 0           | 0           | 1       |
| 1.4              | Italy     | 979.1        | 536        | 92.0        | 4.0        | 2.0        | 0.5         | 1.0         | 0.5         | 1       |
| 1.5              | Latvia    | 64.4         | 1876       | 96.0        | 1.0        | 3.0        | 0           | 0           | 0           | 1       |
| 1.6              | Lithuania | 58.2         | 120        | 92.0        | 3.0        | 5.0        | 0           | 0           | 0           | 1       |
| 1.7              | Luxemburg | 30.4         | 417        | 95.0        | 2.0        | 2.0        | 0           | 0.5         | 0.5         | 1       |
| 1.8              | Poland    | 1100.0       | 941        | 97.0        | 1.0        | 0          | 1.0         | 1.0         | 0           | 1       |
| 1.9              | Sweden    | 1100.0       | 611        | 88.0        | 3.0        | 8.0        | 0           | 1.0         | 0           | 1       |
| <b>Mean</b>      |           | <b>775.1</b> | <b>815</b> | <b>94.3</b> | <b>1.9</b> | <b>2.7</b> | <b>0.17</b> | <b>0.44</b> | <b>0.39</b> |         |

Table 4. Cont.

|                  |             | Volume        | Number      | OP <sup>(1)</sup> | RP <sup>(2)</sup> | NPwith <sup>(3)</sup> | CD <sup>(4)</sup> | NP <sup>(5)</sup> | Other        | Cluster |
|------------------|-------------|---------------|-------------|-------------------|-------------------|-----------------------|-------------------|-------------------|--------------|---------|
| 1                | 2           | 3             | 4           | 5                 | 6                 | 7                     | 8                 | 9                 | 10           | 11      |
| <b>CLUSTER 2</b> |             |               |             |                   |                   |                       |                   |                   |              |         |
| 2.1              | Austria     | 406.6         | 5881        | 57.0              | 0.5               | 12.0                  | 0                 | 5.0               | 25.5         | 2       |
| 2.2              | Estonia     | 651.1         | 1373        | 88.0              | 7.0               | 1.5                   | 0                 | 3.5               | 0            | 2       |
| 2.3              | Malta       | 6.6           | 36          | 89.0              | 3.0               | 6.0                   | 0                 | 2.0               | 0            | 2       |
| 2.4              | Portugal    | 66.8          | 80          | 86.0              | 11.0              | 1.0                   | 0                 | 2.0               | 0            | 2       |
| 2.5              | Slovenia    | 788.7         | 1 685       | 88.0              | 2.0               | 4.0                   | 2.0               | 4.0               | 0            | 2       |
| <b>Mean</b>      |             | <b>547.3</b>  | <b>1315</b> | <b>81.6</b>       | <b>4.7</b>        | <b>4.90</b>           | <b>0.40</b>       | <b>3.30</b>       | <b>5.10</b>  |         |
| <b>CLUSTER 3</b> |             |               |             |                   |                   |                       |                   |                   |              |         |
| 3.1              | Czech R.    | 1800.0        | 3545        | 24.0              | 7.0               | 1.0                   | 0                 | 1.0               | 67.0         | 3       |
| 3.2              | France      | 3800.0        | 18.610      | 44.0              | 1.0               | 4.0                   | 1.0               | 0                 | 50.0         | 3       |
| 3.3              | Germany     | 8300.0        | 13.881      | 93.0              | 1.0               | 4.0                   | 0                 | 2.0               | 0            | 3       |
| 3.4              | Hungary     | 2900.0        | 3598        | 58.0              | 0.5               | 0.5                   | 0                 | 1.0               | 40.0         | 3       |
| 3.5              | Romania     | 2800.0        | 12.732      | 4.0               | 0                 | 0                     | 0                 | 0                 | 96.0         | 3       |
| 3.6              | Slovakia    | 237.7         | 1492        | 27.0              | 0.5               | 0.5                   | 0                 | 0                 | 72.0         | 3       |
| 3.7              | Spain       | 7900.0        | 26.059      | 22.0              | 0                 | 0                     | 0                 | 2.0               | 76.0         | 3       |
| <b>Mean</b>      |             | <b>3230.4</b> | <b>9213</b> | <b>38.9</b>       | <b>1.4</b>        | <b>1.43</b>           | <b>0.14</b>       | <b>0.86</b>       | <b>57.29</b> |         |
| <b>CLUSTER 4</b> |             |               |             |                   |                   |                       |                   |                   |              |         |
| 4.1              | Belgium     | 114.5         | 456         | 72.0              | 1.0               | 25.0                  | 2.0               | 0                 | 0            | 4       |
| 4.2              | Bulgaria    | 1800.0        | 4390        | 72.0              | 1.0               | 25.0                  | 1.0               | 1.0               | 0            | 4       |
| 4.3              | Denmark     | 244.2         | 238         | 19.0              | 35.0              | 42.0                  | 0.5               | 3.5               | 0            | 4       |
| 4.4              | Finland     | 389.7         | 391         | 77.0              | 7.0               | 11.0                  | 4.0               | 1.0               | 0            | 4       |
| 4.5              | Ireland     | 181.8         | 1591        | 35.0              | 46.0              | 16.0                  | 1.0               | 1.0               | 1.0          | 4       |
| 4.6              | Netherlands | 207.1         | 354         | 35.0              | 51.0              | 7.0                   | 6.0               | 1.0               | 0            | 4       |
| <b>Mean</b>      |             | <b>1589.5</b> | <b>4909</b> | <b>51.7</b>       | <b>23.5</b>       | <b>21.00</b>          | <b>2.42</b>       | <b>1.25</b>       | <b>0.17</b>  |         |

(1) Open procedure; (2) restricted procedure; (3) negotiated procedures with a prior call for competition; (4) competitive dialog; (5) negotiated procedure without a prior call for competition.

Cluster 1, which includes Croatia, Cyprus, Greece, Italy, Latvia, Lithuania, Luxemburg, Poland, and Sweden, is primarily characterized by a high share of open procedures (on average, 94.33% of the number of procedures). The remaining procedures for countries in this group are used sporadically. It can also be noted that both the value of construction contracts and the number of proceedings are at an average level compared with other countries. Cluster 2 includes the countries Austria, Estonia, Malta, Portugal, and Slovenia. It seems that the most characteristic feature here is the relatively small value and number of construction contracts. The share of open procedures is quite high (average 81.6%), but other types of procedures also appear here. Cluster 3, with the Czech Republic, France, Germany, Hungary, Romania, Slovakia, and Spain, primarily shows the high value of public procurement for construction works; the limited use of open procedures; and, instead, the use of their own (domestic) procedures. The exception when it comes to the use of procedures in this cluster is Germany, which was included in this group mainly due to the high value of orders. Cluster 4 clearly includes countries in which the share of open procedures is relatively low (on average, 50%), but the remaining procedures are those provided by the Directive (restricted; negotiation).

The second method used is k-means clustering. k-means clustering forms groups in a manner that minimizes the variances between the data points and the cluster's centroid. The k-means method will produce exactly k different clusters of the greatest possible distinction. A division into four clusters was used. Cluster 1 contains 4 cases, Cluster 2 includes 11 cases, and the remaining two clusters contain 6 cases each. The results of the k-means clustering method analysis are presented in Table 5.

**Table 5.** The results of cluster analysis—k-means clustering method.

| Cluster 1 | Distance  | Cluster 3      | Distance  |
|-----------|-----------|----------------|-----------|
| Austria   | 0.6725981 | Belgium        | 0.7304587 |
| Estonia   | 0.4547579 | Bulgaria       | 0.7853876 |
| Germany   | 1.123989  | Denmark        | 1.174565  |
| Slovenia  | 0.5409406 | Finland        | 0.7497651 |
|           |           | Ireland        | 0.7344917 |
|           |           | Netherlands    | 1.270742  |
| Cluster 2 | Distance  | Cluster 4      | Distance  |
| Croatia   | 0.5348216 | Czech Republic | 0.5033116 |
| Cyprus    | 0.1671929 | France         | 0.5791818 |
| Greece    | 0.2354173 | Hungary        | 0.6243328 |
| Italy     | 0.1354901 | Romania        | 0.5118901 |
| Latvia    | 0.2303691 | Slovakia       | 0.7329687 |
| Lithuania | 0.2289958 | Spain          | 1.172298  |
| Luxemburg | 0.1274988 |                |           |
| Malta     | 0.3698798 |                |           |
| Poland    | 0.2700242 |                |           |
| Portugal  | 0.4182882 |                |           |
| Sweden    | 0.2214395 |                |           |

It can be noticed that the division into clusters (Tables 4 and 5) is similar here, especially when it comes to k-means Cluster 3, which corresponds to Cluster 4 in Ward’s method, and k-means Cluster 2, which corresponds to Cluster 1 in Ward’s method. Differences occur mainly in relation to Germany, which, in the k-means method, is included in one cluster with Austria, Estonia, and Slovenia, but in Ward’s method, is in one cluster with Czech Republic, France, Hungary, Romania, Slovakia, and Spain.

## 6. Discussion

The most common procedure used under the Directive for awarding work contracts in most EU countries is the open procedure. Croatia, Cyprus, Greece, Italy, Latvia, Lithuania, Luxemburg, Poland, and Sweden in Cluster 1 (Ward’s method) and Cluster 2 (k-means method) are characterized by a high share of open procedures (on average, 94.33% of the number of procedures). It should be noted that these are the most numerous clusters in the analyses.

The open procedure is available to all interested contractors. This increases competition, and there is no favoritism toward any of the contractors. On the other hand, with a high level of interest and a significant number of contractors, this method can be a waste of contractors’ resources, as many of them will prepare bids that have no chance. In addition, knowing that their chances of winning the contract are slim, contractors may not analyze the contract in detail to determine the minimum price but instead quote a price that will bring them a profit if they win the contract. If the public owner chooses the lowest bid, he risks the contractor not being able to complete the project in a satisfactory manner.

There are countries where the procedures proposed in the Directive are used to a small extent, and other solutions are often used. This is particularly evident in countries belonging to Cluster 3 (Ward’s method) and Cluster 4 (k-means method). In Romania, 99% of the procedures used are different from those listed in the Directive, constituting the outright award procedure. This procedure is also used quite often in France. In Slovakia and the Czech Republic, the approaching bidder procedure is largely used. It should be noted that this type of procedure should be used mainly in “urgent” or “extremely urgent” procurements. This requires significantly shorter advertisement and decision periods

and simpler technical and administrative procedures. However, any form of competition restriction increases the risk of corruption; hence, it should only be used under very specific circumstances or in a limited timeframe. The advantage of negotiation is the opportunity to establish technical details and to accurately assess the competence and reliability of the contractor. A direct award also allows the owner to work with a contractor who is already known and with a good reputation.

The use of procedures other than those listed in the Directive may also be a barrier for contractors from other countries. An example is the already-discussed Spain, where the participation of foreign companies in public procurement is very low. The main reason is that foreign companies do not know about tender announcements. Generally, they are published by local and regional public entities. Public bodies very often provide only basic information without any guidance directed to foreign companies. Foreign companies are not confident in the Spanish public procurement system. According to [35], in Spain and France, the number of public construction contracts awarded to foreign companies is less than half a percent. Similar relationships are found in the other countries of the discussed clusters [36].

The use of individual procedures in countries belonging to Cluster 4 (Ward's method) and Cluster 3 (k-means method), Belgium, Bulgaria, Denmark, Finland, Ireland, and the Netherlands, is interesting and slightly different. The use of open tendering is quite low here, but procedures outside the Directive are not used either. However, the share of restricted or negotiated procedures provided by the Directive is significant. This results in easier access to public procurement in the country for foreign companies. According to a previously mentioned report [35], in Finland, around 15 percent of public construction contracts are awarded to foreign companies. The situation is similar in other countries belonging to Cluster 4 (Ward's method) and Cluster 3 (k-means method).

EU countries recognize the problem and are making changes accordingly. In the previously mentioned Romania, for example, the year 2022 was a record year in terms of introducing changes to the public procurement law.

## 7. Conclusions

Choosing a contractor with the best competencies for a given contract is particularly important, especially in construction contracts. The use of tendering procedures prevents bias in bid evaluations and allows for healthy competition between contractors. It also allows clients to select the contractor most suitable for a given contract.

The EU public procurement Directive specifies the rules for both the selection of contractors and the evaluation of tenders. Various public procurement procedures are also proposed here. In each of them, the process of evaluating the contractor and the offer is slightly different. Moreover, in contracts below certain values, EU countries may shape their own solutions regarding the course of the procedure. This paper characterizes the procedures provided by the Directive, paying attention mainly to the stages and methods of assessing contractors and tenders.

Then, based on the data available on the opentender.eu platform, data for 2022 regarding public procurement for construction works in individual EU countries were presented. This allowed us to better determine the differences in the use of individual procedures that occur in individual countries. Cluster analysis allowed for the designation of homogeneous groups of EU countries with similar policies and characteristics in the field of public procurement.

The most numerous clusters in the analysis show countries in which the share of open procedures is very high. On the other hand, in the cluster that includes Romania, Slovakia, and Spain, the procedures proposed in the Directive are used in only 20–30% of proceedings. This causes, among other things, problems in access to the public procurement market for foreign contractors. A different approach can be observed in Belgium, Bulgaria, Denmark, Finland, Ireland, and the Netherlands, which all belong to one cluster. Although the open

procedure is not the most commonly used here, the other procedures are in line with those outlined in the Directive.

The various procurement procedures have both advantages and disadvantages. It is difficult to point to one optimal procedure. Procedures must be tailored to the specifics of the contracts. EU countries are adopting different strategies here. Knowing the advantages and disadvantages of the different procedures, as well as the countries' strategies in terms of public procurement, can enable streamlining and improve the public procurement system in a country.

**Funding:** This research received no external funding.

**Data Availability Statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Conflicts of Interest:** The author declares no conflicts of interest.

## References

1. Naoum, S.G.; Egbu, C. Modern selection criteria for procurement methods in construction A state-of-the-art literature review and a survey. *Int. J. Manag. Proj. Bus.* **2016**, *9*, 309–336. [[CrossRef](#)]
2. Araújo, M.C.B.; Alencar, L.H.; Miranda Mota, C.M. Project procurement management: A structured literature review. *Int. J. Proj. Manag.* **2017**, *35*, 353–377. [[CrossRef](#)]
3. Ng, S.T.; Thanh, D.L.; Eng, S.C.; Ka Chi, L. Fuzzy membership functions of procurement selection criteria. *Constr. Manag. Econ.* **2002**, *20*, 285–296. [[CrossRef](#)]
4. Tookey, J.; Murray, M.; Hardcastle, C.; Langford, D. Construction procurement routes: Re-defining the contours of construction procurement. *Eng. Constr. Archit. Manag.* **2001**, *8*, 20–30.
5. Liu, B.; Huo, T.; Shen, Q.; Yang, Z.; Meng, J.; Xue, B. Which owner characteristics are key factors affecting project delivery system decision making? Empirical analysis based on the rough set theory. *J. Manag. Eng.* **2015**, *31*, 05014018. [[CrossRef](#)]
6. Alhazmi, T.; McCaffer, R. Project procurement system selection model. *J. Constr. Eng. Manag.* **2000**, *126*, 176–184. [[CrossRef](#)]
7. Luu, D.T.; Ng, S.T.; Chen, S.E. Parameters governing the selection of procurement system—An empirical survey. *Eng. Constr. Archit. Manag.* **2003**, *10*, 209–218.
8. Zhao, N.; Fei, J.Y.; Tookey, J. Construction procurement selection criteria: A review and research agenda. *Sustainability* **2022**, *14*, 15242. [[CrossRef](#)]
9. Chan, A.P.C.; Yung, E.H.K.; Lam, P.T.I.; Tam, C.M.; Cheung, S.O. Application of Delphi method in selection of procurement systems for construction projects. *Constr. Manag. Econ.* **2001**, *19*, 699–718. [[CrossRef](#)]
10. Chan, C.T.W. Fuzzy procurement selection model for construction projects. *Constr. Manag. Econ.* **2007**, *25*, 611–618. [[CrossRef](#)]
11. Cheung, S.O.; Lam, T.I.; Leung, M.Y.; Wang, Y.W. An analytical hierarchy process based procurement selection method. *Constr. Manag. Econ.* **2001**, *19*, 427–437. [[CrossRef](#)]
12. Fuentes-Bargues, J.L.; González-Cruz, M.C.; González-Gaya, C. Environmental criteria in the Spanish public works procurement process. *Int. J. Environ. Res. Public Health* **2017**, *14*, 204. [[CrossRef](#)]
13. Jimoh, R.A.; Oyewobi, L.O.; Aliu, N.O. Procurement selection criteria for projects in the public sector: Evidence from Nigeria. *Indep. J. Manag. Prod.* **2016**, *7*, 1096–1114. [[CrossRef](#)]
14. Rahmani, F.; Maqsood, T.; Khalfan, M. An overview of construction procurement methods in Australia. *Eng. Constr. Archit. Manag.* **2017**, *24*, 593–609. [[CrossRef](#)]
15. Smith, J.; Zheng, B.; Love, P.E.; Edwards, D.J. Procurement of construction facilities in Guangdong Province, China: Factors influencing the choice of procurement method. *Facilities* **2004**, *22*, 141–148. [[CrossRef](#)]
16. Rajeh, M.A.; Tookey, J.E.; Rotimi, J.O.B. Developing a procurement path determination chart SEM-based approach. *Constr. Manag. Econ.* **2015**, *33*, 921–941. [[CrossRef](#)]
17. Franz, B.W.; Leicht, R.M. An alternative classification of project delivery methods used in the United States building construction industry. *Constr. Manag. Econom.* **2016**, *34*, 160–173. [[CrossRef](#)]
18. Luu, D.T.; Ng, S.T.; Chen, S.E. Formulating procurement selection criteria through case-based reasoning approach. *J. Comput. Civ. Eng.* **2005**, *19*, 269–276. [[CrossRef](#)]
19. Liu, J.; Cui, Z.; Yang, X.; Skitmore, M. Experimental investigation of the impact of risk preference on construction bid markups. *J. Manag. Eng.* **2018**, *34*, 04018003. [[CrossRef](#)]
20. Xia, N.; Zou, P.X.; Griffin, M.A.; Wang, X.; Zhong, R. Towards integrating construction risk management and stakeholder management: A systematic literature review and future research agendas. *Int. J. Proj. Manag.* **2018**, *36*, 701–715. [[CrossRef](#)]
21. Mostafavi, A.; Karamouz, M. Selecting appropriate project delivery system: Fuzzy approach with risk analysis. *J. Constr. Eng. Manag.* **2010**, *136*, 923–930. [[CrossRef](#)]
22. Atkinson, C.L. Full and open competition in public procurement: Values and ethics in contracting opportunity. *Int. J. Public Adm.* **2019**, *43*, 1169–1182. [[CrossRef](#)]

23. Ling, F.Y.; Chan, S.L.; Chong, E. Predicting performance of design-build and design-bid-build projects. *J. Constr. Eng. Manag.* **2004**, *130*, 75–83. [[CrossRef](#)]
24. Chever, L.; Saussier, S.; Yvrande-Billon, A. The law of small numbers: Investigating the benefits of restricted auctions for public procurement. *Appl. Econ.* **2017**, *49*, 4241–4260. [[CrossRef](#)]
25. Marinelli, M.; Antoniou, F. Improving public works' value for money: A new procurement strategy. *Int. J. Manag. Proj. Bus.* **2020**, *13*, 85–102. [[CrossRef](#)]
26. Ellis, J.; Edwards, D.J.; Thwala, W.D.; Ejohwomu, O.; Ameyaw, E.E.; Shelbourn, M.A. Case study of a negotiated tender within a small-to-medium construction contractor: Modelling project cost variance. *Buildings* **2021**, *11*, 260. [[CrossRef](#)]
27. Naji, K.K.; Gunduz, M.; Falamarzi, M.H. Assessment of construction project contractor selection success factors considering their interconnections. *KSCE J. Civil Engin.* **2022**, *26*, 3677–3690.
28. Jelodar, M.B.; Yiu, T.W.; Wilkinson, S. A conceptualisation of relationship quality in construction procurement. *Inter. J. Project Manag.* **2016**, *34*, 997–1011. [[CrossRef](#)]
29. Georghiou, L.; Edler, J.; Uyerra, E.; Yeow, J. Policy instruments for public procurement of innovation: Choice, design and assessment. *Technol. Forecast. Social Chang.* **2014**, *86*, 1–12. [[CrossRef](#)]
30. Yu, C.; Morotomi, T. Impacts of green public procurement on eco-innovation: Evidence from EU countries. *GPPG* **2022**, *2*, 154–174. [[CrossRef](#)]
31. Maqsoom, A.; Bajwa, S.; Zahoor, H.; Dawood, M. Optimizing contractor's selection and bid evaluation process in construction industry: Client's perspective. *Rev. Constr.* **2019**, *18*, 445–458. [[CrossRef](#)]
32. Niewerth, S.; Vogt, P.; Thewes, M. Tender evaluation through efficiency analysis for public construction contracts. *Front. Eng. Manag.* **2022**, *9*, 148–158. [[CrossRef](#)]
33. Chong, H.Y.; Preece, C.N. Improving construction procurement systems using organizational strategies. *Acta Polytech. Hung.* **2014**, *11*, 5–20.
34. Eriksson, P.E.; Westerberg, M. Effects of cooperative procurement procedures on construction project performance: A conceptual framework. *Inter. J. Project Manag.* **2011**, *29*, 197–208. [[CrossRef](#)]
35. McKinsey & Company. Building across borders: The state of internationalization in European public construction tenders. In *Capital Projects and Infrastructure*; McKinsey & Company: Chicago, IL, USA, 2018.
36. European Court of Auditors. *Public Procurement in the EU: Less Competition for Contracts Awarded for Works, Goods and Services in the 10 Years Up to 2021- Special Report*; European Court of Auditors: Luxembourg, 2023.

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.