

The Effects of Public Procurement on Sustainability in the EU: A Mixed-Method Analysis

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Abstract Public procurements account for nearly one fifth of the European gross domestic product. Recently, policy-holders in the EU have propounded the use of public procurements for green and sustainable purposes. The aim of this paper is to examine the relationship between public procurements efficiency and sustainability outcomes. The study is based on a mixed method approach. In the quantitative analysis, the paper explores the statistical relationship between public procurement efficiency and sustainability outcomes, such as Natural capital, Social capital, Intellectual capital, Governance, and Resource Intensity for 30 European countries. In the qualitative analysis, we provide in-depth explanation for the relationship between sustainability criteria and public procurements in the selected sample of countries.

Keywords: • public procurement • sustainability • green public procurements • public procurement efficiency

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1 Introduction

Public procurements are at the forefront of public administration scholars' and practitioners' agenda in the last few decades (Knight, 2007). The main reason for such an intensive attention is due to the fact that approximately one fifth of the European GDP is related to public procurements (Milosavljevic, Milanovic & Benkovic, 2016). Accordingly, public procurements utterly affect the way in which taxpayers' money is used. Thus, the central issue for the efficiency of public procurement system is related to the value-for-money purchases of goods, works and services for public purposes (Jovanovic, Zarkic Joksimovic & Milosavljevic, 2013). However, public procurements are used not only to improve the market efficiency of the public sector. They also contribute to the implementation of a myriad of different nation-wide policies. For instance, they are used to spur the innovation outcome, to balance regional and national development and to achieve various desirable social and sustainability-related outcomes (Milosavljevic, Dobrota & Milanovic, 2018). The subsequent one is the focal point of this paper.

The very interaction between public procurements and sustainability might not be a novel topic. A current body of knowledge is anchoring the sustainability impacts of public procurement (Uyarra, et al., 2017). Not even the financial crisis has slowed down the development of environmental initiatives in public procurement policies (Nikolaou & Loizou, 2015). Witjes & Lozano (2016) have proposed a framework for linking sustainable public procurement and sustainable business models. Sönnichsen & Clement (2020) conducted a comprehensive literature review, and concluded that 'literature primarily covers three areas with regard to circular public procurement: organizational aspects, individual behavior and operational tools.' Nevertheless, most of the prior work is related to the national, subnational or institutional levels (i.e. Mélon, 2020). A paucity of studies have examined the influence of public procurement policy effects on sustainability in comparative means. To the best of authors' knowledge, the only systematic large-scale international study of sustainable public procurement practices was conducted by Brammer & Walker (2010). However, the study is based on objective measures rather than respondents' perceptions.

The aim of this paper is to examine whether public procurements affect the achievement of sustainability goals. In particular, we used a mixed method approach to: 1) quantitatively asses the relationship between public procurement efficiency and sustainability indicators (such as Natural capital, Social capital, Intellectual capital, Governance, and Resource Intensity) and 2) conduct in-depth analysis of the interplay between sustainability and public procurements for the selected set of European countries.

The remainder of this paper is organized in the following order. Section 2 reviews the extant literature related to sustainable public procurements. Section 3 depicts on the methodology used in the study and provides an explanation of the approach used for the analysis. Section 4 elaborates on the results of the study. Section 5 provides a discussion for the main findings,

contributions and implications. This section also deals with the main limitations and further recommendations. The last section is reserved for the concluding remarks.

2 Literature overview

Public procurement refers to the acquisition of goods, services and works by the public sector organizations through public contracts (Kiiver & Kodym, 2014). Over the years, there has been an increase in the utilization of public procurement as a mean to achieve policy objectives that stand outside the simple act of buying a good or service in the EU (Telles & Ølykke, 2017). As public procurement makes a notable portion of the GDP of each EU member state, they are seen as an important mean to reduce environmental impact of purchased products through the whole life cycle (Parikka-Alhola, 2008). By inputting environmental management practices into public procurements, both economic and environmental performance can be improved (Schaltegger & Synnestvedt, 2002).

Sustainable procurement has been receiving an immense attention lately. The growing need for the inclusion of environmentally sensitive issues in public policies has forced policy-holders and decision-makers to include more of the sustainable and “green” elements into the public procurement processes. In the European Union, for instance, contracting authorities in most cases have at least one ‘green’ criterion for awarding the contract to procurers. The ‘older’ member states with the longer tradition in public procurements have nearly a half of all criteria related to environmental factors (Dragos & Naemt, 2013).

Sustainability of public procurements has attracted the attentions of scholars as well (McCrudden, 2004; Brammer & Walker, 2011). Several terms are used interchangeably to address the elements of public procurement sustainability, such as Green Public Procurement (Michelsen and de Boer, 2009), Sustainable Public Procurement (Preuss, 2009), and Environmental Responsible Public Procurement (Li & Geiser, 2005). In the broadest sense, the concept of sustainable public procurement is related to the contexts in which environmental issues are taken into account within the procurement process. However, there are some distinct features of these interchangeably used terms. Green public procurements assume that contracting authority is supposed to procure goods, services and/or works with decreased negative effects to environment throughout the life cycle compared to the goods, services and/or works with the same primary function that would be procured (EC, 2016). On the other side, sustainable procurement refers to the process in which contracting authority should reach the balance between three dimensions of sustainable development – economic, social and environmental - during all the phases of procurement process (EC, 2016).

Terminology aside, green and sustainable procurements are still at its infancy when from a scholarly perspective. The European Commission Directions from 2014 envisaged more strategic use of public procurements for various environmental, social and

industry/innovations goals. This is a strong political basis for any further development of sustainable public procurements. However, skepticism is still present among the experts. For instance, scholars have been emphasizing potential non-legal barriers to sustainable public procurement (Faracik, 2018). Even when included in calls for tenders, “it is not necessarily the case that they [environmental concerns] are integrated into the final contract clauses” (Palmujoki, Parikka-Alhola & Ekroos, 2010). A question is also raised with regards to the capacity of the public procurement experts and clerks to implement environmental measures when initiating and conducting tenders (Carlsson & Waara, 2006). Furthermore, the most important bias is a potential trade-off between the efficiency and incorporation of new green elements which can path the way for misuse and discriminatory practices (Semple, 2012).

Environmental factors can be taken into account at each stage of a procurement process (Parikka-Alhola, 2008), including the selection of award criteria. In this sense, environmental factors can feat only MEAT and ‘if they are linked to the call for tender objective, they do not provide the contracting authority an unrestricted freedom of choice and, finally, they are expressly mentioned and comply with EU principles’ (Testa, et al., 2012). In the Fifth generation of EU public procurement directive, environmental characteristics are explicitly listed as an important non-price related criterion for the procurement award (SIGMA/OECD, 2016).

Simultaneously with the growth of the scholarly and practical body of knowledge, the awareness of the effects of governments’ buying on environmental development continues to grow. Tátrai (2015) claims that that market players today apply a substantially broader interpretation of sustainability in public procurement than at the beginning of this century. There are at least three major rationales for the inclusion of environmental aspects into the procurement processes. First, government expenditures make a great portion of total consumption in each and every European country. As public procurements hold for nearly one fifth of GDP of European countries – varying from 10.5 per cent in Cyprus to 30.6 per cent in Netherlands (Schulten, et al., 2012), governments can directly affect the environmentalism in purchasing for a substantial portion of total national consumption. Second, citizens’ pressure for environmentalism considerably shapes governmental spending. As for the case of the EU countries, recent study shows that citizens still find cost-effectiveness and domestic favoritism as important factors, but the most important one is the support for the objectives of sustainable procurement (Keulemans & Van de Walle, 2017). Even from a grand scheme of things, citizen-centrism plays a pivotal role in shaping public policies around the Old Continent (Kostic et al., 2013) Third, governments can use their immense purchasing power to influence behavior and attitudes of suppliers (Walker & Brammer, 2009), thus spilling over the culture of environmentalism to the private sector organizations. However, this might be a two-way street, since a number of legal entities have already adopted some concepts of corporate social responsibility (Vlastelica et al., 2018).

Although the need for the inclusion of sustainability criteria in public procurement in Europe is evident, a number of interrogatives have been hitherto posed. From a grand scheme of things, Ollson & Öjehag-Pettersson (2020) claim that unsustainability as a market failure makes sustainability only a voluntary ambition of procuring organizations. In line with the aforementioned, Gelderman, Semeijn & Bouma (2015) find that the inclusion of sustainability criteria in tendering procedure is just a mean of creating public visibility and electoral support for party-political councilors, and a mean to support different stakeholders for procurement managers. Having this mind, sustainability is seldom unnaturally imposed to contracting authorities. On the other side, most of the concurrent strategies and guides for the inclusion of sustainability criteria are based on the ambition rather than real decision-making and policy-holding tools (Montalbán-Domingo, et al., 2018). Finally, some concerns have been raised even on the supply side. Public procurement law might be an effective tool for EU to achieve the objective of sustainable development, but it can only be as effective when corporations and SMEs who supply contractors recognize the importance of sustainability (Sjåfjell, 2018). Accordingly, we still lack the real evidence on whether and how green public procurements affect sustainability (Lăzăroiu et al., 2020).

3 Methods

This study uses mixed method approach to analyze the relationship between sustainability and public procurement efficiency. First, we elaborate on the methods of quantitative analysis. However, we recognize that it is difficult for governments to reach sustainability objectives with their present-day public procurement system-related decisions (Pot, 2020), which might impact the short-term relationship between the public procurement efficiency and sustainability. Accordingly, we extend our study with some findings on sustainability outcomes of public procurements in selected European countries. Following other mixed-method (Benkovic et al., 2011) and comparative (Milosavljevic, Milanovic & Milosevic, 2016) studies in the area of public administration research, we aim to benefit from both quantitative and qualitative analysis.

3.1 Methods for the quantitative analysis

As the aim of the study was to analyze the relationship between public procurement efficiency and sustainability, the first step was to develop the variables.

The first set of variables in the study were the dimensions of the national sustainability. Perera, Chowdhury & Goswami, (2007) find that sustainable public procurement »is about integrating environmental and social criteria into public procurement processes and decisions«. Alongside raising the economic efficiency, public procurements are also supposed to consider environmental and social factors throughout the process. Accordingly, we assume that Natural capital, Social capital, Intellectual capital,

Governance, and Resource Intensity are the main factors of country's sustainability (SolAbility, 2019).

The second set of variables is aimed at defining the public procurement efficiency. Efficiency of public procurements is vividly debated topic. The most important public procurement efficiency factors prescribed by the European Commission are number of bidders, number of calls for bids, aggregation, award criteria, decision speed and reporting quality. Extant literature offers similar indications of public procurement efficiency. For instance, Gupta (2002) finds that the number of bidders affects the price efficiency and finds that 6 to 8 candidates are needed in order to reach highest competitiveness. Also, Grega & Nemeč (2015), based on their empirical study conducted in Slovakia, reported that the award criteria significantly affect the efficiency. Although the Single Market Scoreboard metrics is the most reliable source of public procurement performance indicators, the integration of partial indicators has been criticized in the scholarly literature. For instance, Milosavljević, Milanović & Benković (2016) argue that this matrix is 'based solely on the outputs', thus capturing only a portion of determinants affecting the efficiency. Also, the composite value based on individual measures is weighted using subjective coefficients. For the purposes of this study, the data on public procurement efficiency from the Single Market Scoreboard is decomposed in order to create an unbiased composite rank for the examined countries. Although a wide spectrum of approaches has been used for the aggregation of individual indicators into a single measure or rank, most of the extant approaches rely on subjective weighting of factors. The subjectivity is inherent even to the Single Market Scoreboard approach as the original weights rely on a highly biased and one-sided approach. In order to solve this problem, this study is based on Composite I-distance Indicator approach (Dobrota & Dobrota, 2016). An objective measure of public procurement efficiency on the national level is given in Milosavljević, Dobrota & Milanović (2019). Using the same Composite I-Distance Indicator for public procurement efficiency, we composed value-for-money indicators of the Single Market Scoreboard into a singular measure.

The variables and measures presented above are entered into Statistical Package for Social Science and analyzed accordingly. For the analysis of individual variables, we used descriptive statistics – means and standard deviations. For the Composite I-distance indicator, we used Pearson moment two-tailed partial correlation coefficient. Interdependence of variables was analyzed with non-parametric Spearman's correlation coefficients.

3.2 Methods for the qualitative analysis

Quantitative analysis can depict some specificities and peculiarities of the interplay between public procurements and sustainability. However, we extend the analysis by delineating some experiences with incorporating environmental factors into public procurement processes. The focal point of this section is an overview of cases for the use

of sustainable criteria in the public procurement processes of a handful of European countries. We selected few countries from three strata based on the public procurement efficiency. For these countries, we provided in-depth explanation of the relationship between public procurements and sustainability achievements.

4 Results

4.1 Findings from the quantitative analysis

The Global Sustainable Competitiveness Index (GSCI) measures the ability of national economy to generate and sustain inclusive wealth without diminishing the future capability of sustaining or increasing current wealth levels. The model is based on 5 factors of equal importance: Natural capital, Social capital, Intellectual capital, Governance, and Resource Intensity (SolAbility, 2019). The starting idea is that there is strong, statistically significant, positive correlation between those factors and Public procurement efficiency. Original data on sustainability dimensions (i.e. numerical score for each factor) are taken from The Sustainable Competitiveness Report for 2019. The CIDI score is taken from Milosavljević et al. (2018). Based on described sources, the data used for quantitative analysis are presented in Table 1.

Table 1: Original data on sustainability dimensions and public procurement efficiency

Country	Natural capital	Social capital	Intellectual capital	Governance	Resource Intensity	Public procurement efficiency [CIDI score]
Austria	43.4	57.0	56.1	60.9	53.5	62.52
Belgium	30.3	56.2	58.0	57.8	54.5	66.43
Bulgaria	53.5	46.0	45.7	60.2	40.4	36.56
Croatia	57.0	47.2	48.5	58.5	59.8	29.36
Cyprus	28.1	50.9	46.6	52.1	51.4	28.09
Czechia	35.6	52.0	58.5	66.3	53.3	33.46
Denmark	46.8	55.3	63.6	59.3	59.8	73.79
Estonia	63.3	51.9	50.4	62.5	46.5	39.07
Finland	62.3	58.8	59.3	61.3	55.6	56.09
France	46.4	51.9	54.6	53.7	53.1	68.16
Germany	36.4	56.4	60.6	64.1	50.1	60.33
Greece	40.8	43.6	46.9	54.7	51.3	35.61
Hungary	44.4	45.0	50.9	58.3	47.4	36.48

Country	Natural capital	Social capital	Intellectual capital	Governance	Resource Intensity	Public procurement efficiency [CIDI score]
Iceland	58.0	58.4	55.4	58.6	56.0	85.7
Ireland	46.4	49.7	47.2	66.5	58.4	69.54
Italy	41.1	52.2	48.8	55.4	52.1	37.73
Latvia	56.7	47.2	44.1	63.0	61.1	40.78
Lithuania	52.3	48.1	43.0	52.8	56.8	44.55
Luxembourg	40.2	57.2	49.7	61.6	63.5	64.21
Malta	28.7	51.4	47.1	55.0	50.8	57.1
Netherlands	34.4	56.8	56.4	58.1	46.9	77.33
Norway	59.1	58.6	64.3	52.3	50.3	73.27
Poland	43.7	50.2	51.1	64.2	50.4	34.55
Portugal	45.5	52.6	51.6	55.4	50.6	51.22
Romania	51.2	47.5	40.8	58.8	55.7	29.82
Slovakia	40.5	50.6	47.8	60.5	58.8	26.37
Slovenia	43.0	53.4	59.0	64.3	49.3	33.98
Spain	44.2	50.6	42.6	55.7	49.2	47.41
Sweden	63.7	58.3	66.1	51.1	63.8	78.29
United Kingdom	34.6	48.9	62.1	55.8	62.5	76.6

Natural capital score varies from 28.10 to 63.70 with average value of 45.72. Highest ranking countries are characterized by water availability, rich biodiversity, available agricultural land and reach energy resources. High natural capital is present in Scandinavian countries while Cyprus and Malta are at the bottom of analyzed group of countries. Social capital index is less dispersed than natural capital index, but it is still dominated by Scandinavia while Greece is at the bottom. This is not surprising having in mind that this index measures availability and affordability of health care services, quantitative equality within society, crime levels and similar aspects of social cohesion. When it comes to intellectual capital, Sweden is characterized by highest availability of intellectual capital what means that it has strong basis for innovation capability, development of entrepreneurship and sustainable balance between service and manufacturing sectors while Romania is at the bottom. The governance ranking is led by Ireland, followed by the Czech Republic, Slovenia, Poland and Germany meaning that ranking is dominated by Central and Eastern Europe countries. Finally, high quality resource management (resource intensity) is immanent to Sweden, Luxembourg and UK.

The countries in the lower ranks will, generally, suffer substantial higher costs and challenges to maintain their economic growth.

The results of CIDI score indicate that the best ranked country is Iceland, followed by Sweden, the Netherlands, the United Kingdom and Denmark. Very huge difference between minimum (26.37) and maximum (85.7) value shows that analyzed countries are very different in terms of public procurement efficiencies.

Table 2: Descriptive statistics

	Min	Max	Mean	STD
Natural capital	28.10	63.70	45.7200	10.21160
Social capital	43.60	58.80	52.1300	4.37872
Intellectual capital	40.80	66.10	52.5600	7.03570
Governance	51.10	66.50	58.6267	4.31660
Resource Intensity	40.40	63.80	53.7633	5.56364
Public procurement efficiency	26.37	85.70	51.8133	18.26674

The results of correlation analysis are presented in Table 3. From purely quantitative perspective there is statistically significant correlation between social capita and CIDI score and between intellectual capital and CIDI score. In general, this is in line with other studies that find positive relationship between the efficiency and innovations in the public sector (Radonic & Milosavljevic, 2019). Surprisingly, we did not find statistically significant relationship between public procurement and governance. This is particularly odd since the EU has been envisaged as a diffusion agent for public procurement governance in a number of concurrent studies (Ladi & Tsarouhas, 2017).

Table 3: Correlation matrix

	2	3	4	5	6
Natural capital	.046	.028	.015	.136	.135
Social capital		.701**	.002	.064	.578**
Intellectual capital			.062	.073	.543**
Governance				-.006	-.199
Resource Intensity					.218
Public procurement efficiency					

4.2 Findings from the qualitative analysis

As mentioned in the methodology section, we selected few countries from three strata based on the public procurement efficiency. The first-tier sample are the cases of Sweden

and France, the second-tier countries encompass Spain and Finland, and from the third tier we selected Poland, Slovenia and Croatia.

Sweden. The office for public procurement in Sweden – the National Agency for Public Procurement (NAPP, 2020) dedicates a lot of attention to the issue of sustainable procurement: a) environmental procurement (“green” procurement criteria which could or must be used in the evaluation of tenders, divided into three categories: “basic”, “advanced” and “spearhead”), b) innovation procurement (good examples from practice), and c) social procurement. The key challenges encountered during promotion and implementation of socially responsible public procurement principles are lack of capability and experience among contracting authorities and other participants in procurement process, lack of clear guidelines and support, lack of supporting infrastructure (e-tools, platforms for planning and follow-up) including reluctance of private sector and bidders. Also, the big challenge is measurement of benefits resulting from application of predefined criteria what might have, negative, counter effects and even harmful impact on competition (The Swedish procurement monitoring report 2018).

France. The latest publicly available statistics concerning public procurement dates from 2013. Environment related clauses (“green procurement”) were used in 6.7 % of procurement procedures (in 8.6 and 8.7 % of procurement procedures conducted at, respectively, the state and local authorities’ levels) and considerably less frequently by utilities which used those clauses only in 0.2 % of their public procurement procedures. National Action Plan for Sustainable Public Procurement is implemented through 52 actions with the aim to fully incorporate practice of sustainable public procurement by top management through better planning, anticipation of professionalization of public procurers. The objectives set by the State Procurement Direction for 2020 for all state buyers and agencies are that 30% (in number) of purchases above EUR 90,000 include environmental clauses and 15% (in number) of purchases above EUR 90,000 include social clauses. Using e-procurement platform and other specialized software the Economic Observatory of Public Procurement (OEAP) monitors annually the inclusion of sustainability clauses in contracts above EUR 90,000.

Spain. There is no aggregated statistical data concerning application of environment and innovation related criteria but anecdotal information available in the Internet indicates that the issue of application of sustainable criteria is getting more and more relevance both at the level of the State as well as autonomous communities. For example, the government of Aragón set the target of 3 % of innovation in public procurement in 2020. For example, analysis of sustainable public procurement in Valencia region showed that environmental criteria are used in 19.7% of the works tendered. The usage of this criteria is higher in the civil engineering subsector for projects tendered by regional administration compared to high volume projects with large budgets (Fuentes-Bargues et al., 2019). Also, Fuentes-Bargues et al. (2018) show that use of environmental criteria in the works tendered by Spanish universities is low (19,2%) and they are, mostly, related

to improvements in the energy efficiency of the property and equipment but there is no objective approach for evaluation of impact on the environment.,

Finland. In 2009, Finland has issued resolution according to which environmental standards have to be included in all purchases made by central Government by 2015, and in at least half of all purchases by municipalities and local governments by the end of 2015. Therefore, Finland is considered as pioneer in implementation and promotion of principles of sustainable public procurement. In addition, in 2013, Finnish Government announced that 1% of total public procurement will be allocated to sustainable environmental and energy solutions while Smart Procurement program, launched in the same year, helped SMEs to offer their products and services and encouraged them to bid. According to the survey carried out by Keino (2018), around 30% of public procurement in Finland included sustainability perspective. In most cases, sustainability targets are related to energy efficiency, reducing waste, and reducing emission. Analyzed by procurement type service procurement (40%), material procurement (40%) and building contract procurement (39%) are the most common types with sustainability targets. The most common verification method is provider's statement (57%) while independent certificate provided by a third party is the least used verification method in the material procurement (19%). The goal of environmental policy, adopted by Helsinki, is that by 2020 all purchases made by the City will contain environmental criteria. Other sustainable procurement targets are very ambitious and Helsinki should become carbon neutral city by the year 2035.

Poland. In 2016 the Public Procurement Office of the Republic of Poland (UZP, 2020) conducted fairly detailed research among contracting authorities concerning application of environmental considerations and innovation in public procurement. The results were published in the annual report of the PPO concerning functioning of the public procurement system in Poland in 2016. Accordingly, environmental considerations (aspects) were used by 209 contracting authorities in 599 public procurement procedures. Ecological aspects, requirements, conditions were applied at various stages of public procurement (starting from the description of public procurement until the selection of the best tender). The more detailed statistics concerning green procurement is as follows: a) in 54 public procurement procedures the contracting authorities made reference, in the conditions for participation in public procurement procedures (the selection criteria) to systems and measures of environmental management, b) in 199 procedures the description of the object of public procurement contained environmental requirements (conditions) concerning execution of contracts, c) in 116 public procurement procedures environmental labels were applied in the description of the object of public procurement and in 40 cases in the criteria for evaluation of tenders (award criteria), and d) in 200 cases the contracting authorities made reference in the award criteria to other environmental criteria (including energy efficiency).

Slovenia. The Public Procurement Directorate in Slovenia publishes in its annual reports very detailed information about application of environmental and social considerations in public procurement (http://djn.mju.gov.si/resources/files/Letna_porocila/Stat_por_JN_2016.pdf). According to annual report for 2016 environmental aspects (at least one) were used in 30.37 % of public procurement procedures. The PPD published also detailed statistics concerning stages (elements) of the procurement process where those considerations were used in 2016. Accordingly, environmental aspects were present in the technical specifications (59.8 %), the object of the public procurement (7.14 %), selection criteria (conditions for participation) (23.91 %), award criteria (23.89 %), conditions for execution of contracts (terms of contracts) (1.19 %) and other aspects of public procurement process (7.14 %).

Croatia. According to the annual statistical report of the Public Procurement Office the contracting authorities awarded, in 2016, 65 contracts in which green public procurement criteria were used (57 contracts by public contracting authorities and 8 by utilities). As for public contracting authorities, they awarded 3 public contracts concerning waste disposal works, refurbishment of the facades and road maintenance facilities. 45 “green” public contracts were awarded for the procurement of IT equipment, office supplies, office furniture, electricity, motor vehicles and 9 contracts for cleaning services and the printing service. With regards to the utilities, they awarded “green” contracts for the purchase of electricity, chemicals for the treatment of cooling water, equipment for the desulphurization of a pumping station and procurement of fuels.

5 Discussion

5.1 Key findings and contributions

In this study we used mixed method approach to analyze the relationship between sustainability and public procurement efficiency. According to the results of quantitative analysis, there is no strong correlation between analyzed public procurement efficiency and sustainability indicators (Natural capital, Social capital, Intellectual capital, Governance, and Resource Intensity) and Composite I-Distance Indicator (CIDI) that is used as a proxy for public procurement efficiency. Statistically significant correlation exist only between social capital and intellectual capital while other indicators are not correlated with CIDI.

After quantitative analysis, we extend our study with some findings on sustainability outcomes of public procurements in selected European countries. As expected, there are significant differences between sustainable public procurement practices and current stage of their development even between EU countries. The main findings are that training, the strength of social entities, political willingness and dedication to the whole process are key factors to put in place strategies that will led to desired public procurement process.

5.2 Policy implications, limitations and further recommendations

Sustainable public procurement has become very popular over the last decade. With the growing need to address a number of environmental challenges, the agenda of policy makers in developed countries is increasingly incorporating elements of sustainable or “green” public procurement. In the European Union, for example, contracting authorities in most cases have at least one “green” criterion for awarding contracts to tenderers, and in older members with a longer history of environmental tradition, almost half of all contracts are awarded on the basis of environmental criteria.

Green and sustainable public procurement are concepts that are still evolving. The European Commission directives from 2014 introduced provisions on greater strategic use of public procurement in terms of environmental, social and industrial / innovation goals, which is the basis for further development in the field of sustainable public procurement. However, skepticism about real ranges is still present. Namely, there is a doubt that sustainability is in conflict with the traditional goal of efficiency and that the application of green criteria will pave the way for new forms of discrimination.

This study has a number of flaws which may affect the generalizability of the findings. As for the quantitative part of the analysis, we used highly aggregated data on both public procurements and sustainability. Follow-up studies should concentrate on tender-specific documentation, particularly from the Tender Electronic Database (Milosavljevic, Milanovic & Benkovic, 2017), and building on specific case studies (i.e. Benkovic, Krivokapić & Milosavljević, 2015). Second, the quantitative study should take into account other variables related to sustainability dimensions. An avenue for further research might be in the inclusion of additional variables, such as the behavior of public procurement officers (Grandia, 2016), or cultural constructs and peculiarities (Fuentes-Bargues, González-Cruz & González-Gaya, 2017), and many others. Accordingly, the real impact would be made with a holistic approach and general framework for the sustainability practice in public procurements (see Benkovic, Milanovic & Milosavljevic, 2017).

6 Conclusion

Green and sustainable public procurements have become an important instrument with a potential to correct the market inefficiencies related to unsustainable behavior of contracting authorities. This paper demonstrates that we still lack of clear conclusions on whether policy-holders can make significant impacts on sustainability outcomes by improving public procurement system. Even though the advances such as the inclusion of green criteria in tendering procedures seems to be a straightforward solution to the reduction of negative effects on sustainable development, this is rather process-based improvement than a holistic solution to economic, societal and environmental challenges.

References:

- Benković, S., Joksimović, N. Ž. & Kragulj, D. (2011) Risks of project financing of infrastructure projects in Serbia. *African Journal of Business Management*, 5(7), pp. 2828-2836.
- Benkovic, S., Krivokapić, J. & Milosavljević, M. (2015) Application of the Public-Private Partnership Organizational Structure in the Improvement of Business Operations of Public Sector Enterprises in Serbia, *Lex Localis - Journal of Local Self-Government*, 13(3), pp. 397-417, [https://doi.org/10.4335/13.3.397-417\(2015\)](https://doi.org/10.4335/13.3.397-417(2015)).
- Benkovic, S., Milanovic, N. & Milosavljevic, M. (2017) A Framework for the Evaluation of the Feasibility of Public-Private Partnership in Local Government in Serbia, *Journal of Entrepreneurship, Management and Innovation*, 13(4), pp. 7-23.
- Brammer, S. & Walker, H. (2011) Sustainable procurement in the public sector: an international comparative study, *International Journal of Operations & Production Management*, 31(4), pp. 452-476. doi:10.1108/01443571111119551.
- Carlsson, L. & Waara, F. (2006) Environmental concerns in Swedish local government procurement, In: Thai, K. V. & Piga, G. (eds) *Advancing Public Procurement: Practices, Innovation and Knowledge-Sharing* (Boca Raton: PrAcademics Press), pp. 239-256.
- Dobrota, M. & Dobrota, M. (2015) ARWU ranking uncertainty and sensitivity: What if the award factor was Excluded?, *Journal of the Association for Information Science and Technology*, 67(2), pp. 480-482, <https://doi.org/10.1002/asi.23527>.
- Dragos, D. & Neamtu, B. (2013) Sustainable public procurement: life-cycle costing in the new EU Directive proposal, *European Procurement & Public Private Partnership Law Review*, 8(1), pp. 19-30, <https://doi.org/10.21552/eppl/2013/1/159>.
- EC (2016) *Green and Sustainable Public Procurement*. Brussels: European Commission, available at: http://ec.europa.eu/environment/gpp/versus_en.htm (November 9, 2020).
- Faracik, B. (2018) Non-legal Barriers to Sustainable Public Procurement in Poland. *European Procurement & Public Private Partnership Law Review*, 13(3), pp. 184-197, <https://doi.org/10.21552/eppl/2018/3/5>.
- Fuentes-Bargues, J. L., González-Cruz, M. & González-Gaya, C. (2017) Environmental criteria in the Spanish public works procurement process, *International Journal of Environmental Research and Public Health*, 14(2), p. 204.
- Fuentes-Bargues, J., Ferrer-Gisbert, P. & González-Cruz, M. (2018) Analysis of Green Public Procurement of Works by Spanish Public Universities, *International Journal of Environmental Research and Public Health*, 15(9), p. 1888, <https://doi.org/10.3390/ijerph15091888>.
- Fuentes-Bargues, J. L., Ferrer-Gisbert, P. S., González-Cruz, M. C. & Bastante-Ceca, M. J. (2019) Green Public Procurement at a Regional Level. Case Study: The Valencia Region of Spain, *International Journal of Environmental Research and Public Health*, 16(16), p. 2936, <https://doi.org/10.3390/ijerph16162936>.
- Gelderman, C. J., Semeijn, J. & Bouma, F. (2015) Implementing sustainability in public procurement: The limited role of procurement managers and party-political executives, *Journal of Public Procurement*, 15(1), pp. 66-92, <https://doi.org/10.1108/jopp-15-01-2015-b003>.
- Grandia, J. (2016) Finding the missing link: Examining the mediating role of sustainable public procurement behaviour, *Journal of Cleaner Production*, 124, pp. 183-190.
- Grega, M. & Nemeč, J. (2015) Factors influencing final price of public procurement: evidence from Slovakia, *Procedia Economics and Finance*, 25, pp. 543-551, [https://doi.org/10.1016/s2212-5671\(15\)00768-6](https://doi.org/10.1016/s2212-5671(15)00768-6).
- Gupta, S. (2002) Competition and collusion in a government procurement auction market, *Atlantic Economic Journal*, 30(1), pp. 13-25, <https://doi.org/10.1007/bf02299143>.

- Jovanović, P., Žarkić Joksimović, N. & Milosavljevic, M. S. (2013) The efficiency of public procurement centralization: empirical evidence from Serbian local self-governments, *Lex Localis - Journal of Local Self-Government*, 11(4), pp. 883–899, [https://doi.org/10.4335/11.4.883-899\(2013\)](https://doi.org/10.4335/11.4.883-899(2013)).
- Keino (2018) Sustainability of public procurement in Finland, available at: <https://www.hankintakeino.fi/en/sustainable-and-innovative/statistics-finland/innovativeness-and-sustainability-public-1> (November 9, 2020).
- Keulemans, S., & Van de Walle, S. (2017) Cost-effectiveness, domestic favouritism and sustainability in public procurement. *International Journal of Public Sector Management*, 30(4), pp. 328–341, <https://doi.org/10.1108/ijpsm-10-2016-0169>.
- Kiiver, P. & Kodym, J. (2014) *The Practice of Public Procurement: Tendering, Selection and Award* (Intersentia).
- Knight, L. (2007) Public procurement in perspective, *Public Procurement*, pp. 16–24, <https://doi.org/10.4324/noe0415394048.ch2>.
- Kostić, S. C., Okanović, M., Milosavljević, M. & Vukmirović, J. (2013) Antecedents of citizens' satisfaction with local administration in Serbia, *Transylvanian Review of Administrative Sciences*, 9(40), PP. 22-34.
- Ladi, S. & Tsarouhas, D. (2017) International diffusion of regulatory governance: EU actorness in public procurement, *Regulation & Governance*, 11(4), pp. 388–403, <https://doi.org/10.1111/rego.12163>.
- Lăzăroiu, G., Ionescu, L., Uță, C., Hurloiu, I., Andronic, M. & Dijmărescu, I. (2020) Environmentally responsible behavior and sustainability policy adoption in green public procurement, *Sustainability*, 12(5), p. 2110, <https://doi.org/10.3390/su12052110>.
- Li, L. & Geiser, K. (2005) Environmentally Responsible Public Procurement (ERPP) and its implications for Integrated Product Policy (IPP), *Journal of Cleaner Production*, 13(7), pp. 705–715, <https://doi.org/10.1016/j.jclepro.2004.01.007>.
- McCrudden, C. (2004) Using Public Procurement to Achieve Social Outcomes, *Natural Resources Forum*, 28(4), pp. 257–267, <https://doi.org/10.1111/j.1477-8947.2004.00099.x>.
- Mélon, L. (2020) Sustainable public procurement best practices at sub-national level, *European Procurement & Public Private Partnership Law Review*, 15(2), pp. 138–161, <https://doi.org/10.21552/eppl/2020/2/7>.
- Michelsen, O. & de Boer, L. (2009) Green procurement in Norway; a survey of practices at the municipal and county level, *Journal of Environmental Management*, 91(1), pp. 160–167, <https://doi.org/10.1016/j.jenvman.2009.08.001>.
- Milosavljević, M., Dobrota, M. & Milanović, N. (2018) A New Approach to the Evaluation of Public Procurement Efficiency among European Countries, *European Review*, 27(02), pp. 246–259, <https://doi.org/10.1017/s1062798718000777>.
- Milosavljevic, M., Milanović, N. & Benković, S. (2016) Politics, Policies and Public Procurement Efficiency: A Quantitative Study of 25 European Countries, *Lex Localis - Journal of Local Self-Government*, 14(3), pp. 537–558, [https://doi.org/10.4335/14.3.537-558\(2016\)](https://doi.org/10.4335/14.3.537-558(2016)).
- Milosavljevic, M., Milanovic, N. & Benkovic, S. (2017) Waiting for Godot: Testing Transparency, Responsiveness and Interactivity of Serbian Local Governments, *Lex Localis - Journal of Local Self-Government*, 15(3), 513–528, [https://doi.org/10.4335/15.3.513-528\(2017\)](https://doi.org/10.4335/15.3.513-528(2017)).
- Milosavljević, M., Milanović, N. & Milošević, N. (2016) Accrual accounting in the public sector of Adria countries: Comparative study, *International Context of Business Environment*, 31.
- Montalbán-Domingo, L., García-Segura, T., Sanz, M. A. & Pellicer, E. (2018) Social sustainability criteria in public-work procurement: An international perspective, *Journal of Cleaner Production*, 198, pp. 1355–1371, <https://doi.org/10.1016/j.jclepro.2018.07.083>.

- National Agency of Public Procurement (2015) <https://www.upphandlingsmyndigheten.se/en> (November 9, 2020).
- Nikolaou, I. E. & Loizou, C. (2015) The Green Public Procurement in the midst of the economic crisis: is it a suitable policy tool?, *Journal of Integrative Environmental Sciences*, 12(1), pp. 49–66.
- Olsson, D. & Öjehag-Pettersson, A. (2020) Buying a sustainable society: the case of public procurement in Sweden, *Local Environment*, 25(9), pp. 681–696, <https://10.1080/13549839.2020.1820471>.
- Palmujoki, A., Parikka-Alhola, K. & Ekroos, A. (2010) Green public procurement: analysis on the use of environmental criteria in contracts, *Review of European Community & International Environmental Law*, 19(2), pp. 250–262.
- Parikka-Alhola, K. (2008) Promoting environmentally sound furniture by green public procurement, *Ecological Economics*, 68(1–2), pp. 472–485, <https://doi.org/10.1016/j.ecolecon.2008.05.004>.
- Perera, O., Chowdhury, N. & Goswami, A. (2007) *State of Play in Sustainable Public Procurement* (Winnipeg, Canada: International Institute for Sustainable Development).
- Pot, W. D. (2021) The governance challenge of implementing long-term sustainability objectives with present-day investment decisions, *Journal of Cleaner Production*, 280, p. 124475, <https://doi.org/10.1016/j.jclepro.2020.124475>.
- Preuss, L. (2009) Addressing sustainable development through public procurement: the case of local government. *Supply Chain Management, An International Journal*, 14(3), pp. 213–223, <https://doi.org/10.1108/13598540910954557>.
- Radonić, M. & Milosavljević, M. (2019) Human Resource Practices, Failure Management Approaches and Innovations in Serbian Public Administration, *Transylvanian Review of Administrative Sciences*, Special Issue December 2019, pp. 77–93, <https://doi.org/10.24193/tras.si2019.5>.
- Schaltegger, S. & Synnøstvedt, T. (2002) The link between “green” and economic success: environmental management as the crucial trigger between environmental and economic performance, *Journal of Environmental Management*, 65(4), pp. 339–346, <https://10.1006/jema.2002.0555>.
- Schulten, T., Alsos, K., Burgess, P. & Pedersen, K. (2012) Pay and Other Social Clauses in European Public Procurement. An Overview on Regulation and Practices With a Focus on Denmark, Germany, Norway, Switzerland and the United Kingdom. Study on Behalf of the European Federation of Public Service Unions (EPSU), Düsseldorf.
- Simple, A. (2012) Reform of the EU Procurement Directives and WTO GPA: Forward Steps for Sustainability?, *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.2089357>.
- SIGMA/OECD (2016) *Public procurement – setting the award criteria*, available at <http://www.sigmaxweb.org/publications/Public-Procurement-Policy-Brief-8-200117.pdf> (November 9, 2020).
- Sjåfjell, B. (2018) Sustainable public procurement as a driver for sustainable companies? The interface between company law and public procurement law; *Sustainable Public Procurement Under EU Law*, pp. 182–205, <https://doi.org/10.1017/cbo9781316423288.011>.
- SolAbility (2019) *The Sustainable Competitiveness Index 2018*, available at: <http://solability.com/solability/sustainability-publications/the-global-sustainable-competitiveness-index-2> (November 31, 2020).
- Sönnichsen, S. D. & Clement, J. (2020) Review of green and sustainable public procurement: Towards circular public procurement, *Journal of Cleaner Production*, 245, p. 118901, <https://doi.org/10.1016/j.jclepro.2019.118901>.

- Tátrai, T. (2015) Stages of development towards sustainable public procurement, *International Public Procurement*, pp. 271–286, https://doi.org/10.1007/978-3-319-13434-5_14.
- Telles, P. & Ølykke, G. S. (2017). Sustainable Procurement: A Compliance Perspective of EU Public Procurement Law, *European Procurement & Public Private Partnership Law Review*, 12(3), pp. 239–252, <https://doi.org/10.21552/eppl/2017/3/7>.
- Testa, F., Iraldo, F., Frey, M. & Daddi, T. (2012) What factors influence the uptake of GPP (green public procurement) practices? New evidence from an Italian survey, *Ecological Economics*, 82, pp. 88–96, <https://doi.org/10.1016/j.ecolecon.2012.07.011>.
- Uyarra, E., Flanagan, K., Magro, E. & Zabala-Iturriagoitia, J. M. (2017) Anchoring the innovation impacts of public procurement to place: the role of conversations, *Environment and Planning C: Politics and Space*, 35(5), pp. 828–848, <https://doi.org/10.1177/2399654417694620>.
- UZP (2020) <https://www.uzp.gov.pl/en> (November 9, 2020).
- Walker, H. & Brammer, S. (2009) Sustainable procurement in the United Kingdom public sector, *Supply Chain Management: An International Journal*, 14(2), pp. 128–137, <https://doi.org/10.1108/13598540910941993>.
- Vlastelica, T., Kostic, S. C., Okanovic, M. & Milosavljevic, M. (2018) How corporate social responsibility affects corporate reputation: Evidence from an emerging market, *JEEMS Journal of East European Management Studies*, 23(1), pp. 10-29.
- Witjes, S. & Lozano, R. (2016) Towards a more Circular Economy: Proposing a framework linking sustainable public procurement and sustainable business models, *Resources, Conservation and Recycling*, 112, pp. 37–44, <https://doi.org/10.1016/j.resconrec.2016.04.015>.