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Research Article

The definition and monitorization of innovation procurement policies in the EU Countries

Definición y seguimiento de las políticas de contratación pública de innovación en los países de la Unión Europea

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Abstract: Public procurement emerges as a potentially powerful instrument for stimulating R&D, with the goal of supplying leading markets for new technologies. The research paper intends to introduce a better understanding of responsibilities and definition activities and monitorization of innovation procurement policies (IPP) in European countries. By identifying key factors responsible for defining such policies alongside monitoring mechanisms used currently or proposed going forward, it provides useful recommendations based on past learnings aimed at enhancing overall effectiveness over time. The main result of this research suggests that policymakers should focus on developing more robust innovation procurement policies that prioritize long-term benefits rather than short-term cost savings.

Keywords: innovation procurement; pre-commercial procurement; innovation policy; innovation; procurement policy.

Resumen: La contratación pública emerge como un instrumento potencialmente poderoso para estimular la I+D, con el objetivo de abastecer a los mercados líderes de nuevas tecnologías. Este trabajo de investigación pretende introducir una mejor comprensión de las responsabilidades y actividades de definición y seguimiento de las políticas de contratación pública para la innovación (PPI) en los países europeos. Al identificar los factores clave responsables de la definición de dichas políticas junto con los mecanismos de supervisión utilizados en la actualidad o propuestos de cara al futuro, proporciona recomendaciones útiles basadas en aprendizajes pasados destinadas a mejorar la eficacia general a lo largo del tiempo. El principal resultado de esta investigación sugiere que los responsables políticos deberían centrarse en desarrollar políticas de contratación pública de innovación más sólidas que den prioridad a los beneficios a largo plazo en lugar de priorizar el ahorro de costes a corto plazo.

Palabras clave: contratación de innovación; contratación pre-comercial; política de innovación; innovación; política de contratación.

1. Introduction

Public procurement emerges as a potentially powerful instrument for stimulating Research and Development (R&D), with the goal of supplying leading markets for new technologies. Economic agents are encouraged to spend money on research. Competition is shifted from an exclusive focus on price to solutions that offer the greatest advantage to users during the life cycle of the purchase.

For political decision makers from various European Union (EU) State-Members, the countries' goal – the ones that have an innovation public procurement (IPP) policy – consists of encouraging their public entities to adopt R&D public contracts and/or innovative solutions. An innovation procurement policy aims to provide a supportive framework, eminently macro-contextual, with the intent to encourage public entities to subscribe to modernization, as a priority strategy, in the public services modus operandi. Complementarily, it provides support guidelines to the creation of acquisition entities groups, as well as providing guidelines for the awareness of public entities regarding carrying out market research and cost-benefit analysis in their procurement activities.

According to the Swedish agency for innovation policy (VINNOVA, 2006), public procurement constitutes, in its genesis, an administrative function, as the public contracts managers/jurists are not, the majority of the time, included in the managing team. As claimed by Vinnova, public procurement is not yet considered a strategic issue in the European public entities. In that regard, in 2015, European Research Area and Innovation Committee (ERAC) releases an opinion on innovation public procurement, in which highlights the potential to increase the demand of innovative products and services and their potential for promoting global economic growth. So, they appeal to State-Members for setting national percentual goals for IPP, for developing action plans and financial tools. Through this European view, recommendations and policy options are proposed to the Council and the Commission, as guidelines for the State-members.

This has, essentially, reinforced what had been altered in 2014, in the European legislation, regarding research and public contracts[1]. As such, it emphasizes the catalyst role of public contracts for more business innovation and a more prosper and swift relationship between the public and private sectors. Furthermore, few public contracts in Europe are geared towards innovation, despite the new open opportunity associated with the 2014 Directives.

The main purpose and contributions of this paper are to provide a better understanding of innovation procurement policies in European countries, analyzing the factors for defining such policies, including role and responsibilities with special focus on political commitment (Section 2); the European monitoring systems for IPP are emphasized, both in their present stronger and weaker points (Section 3); conclusions and policy implications are systematized through lessons to EU countries to improve future performance of innovation public procurement policy field (Section 4).

In this research paper, we use literature review and analysis of existing innovation procurement policies across European countries, including the analysis of data from the TED Tenders Electronic Daily Database (Supplement to the Official Journal of the EU).

2. Factors for the definition of a European Innovation Procurement Public Policy

There quite a few implications regarding innovation public procurement of strategic level, and regarding implementation. Firstly, the necessity to strengthen the incentives to innovation procurement is highlighted, as well as the formulation of a strategic agenda in the field. The challenge consists in developing a national policy vision and a more reliable commitment from the private sector. Secondly, an implementation of methods for the improvement innovation promotion efficiency, in procurement, is emphasized. Here the challenge consists in the development of methodologies and expertise that revise the public responsibility's structure, elucidating about the regulation and strengthening the innovation potential in the small and medium enterprises (SMEs). Finally, in third place, the results monitorization of the public sector for the promotion of IPP, with the purpose of giving public entities administrations a foundation of rigorous and data-driven decisions.

[1] 2014 Public Procurement Directives on the basis of Article 14 of Directive 2014/24/EU, Article 32 of Directive 2014/25/EU.

2.1. Strategic perspective

The formulation of policies aimed to IPP vary between the European countries, since some of them already find themselves in a quite advanced development stage, with strategies and action plans dedicated to innovation procurement, while other State-members still haven't even addressed this field of innovation policy in their governmental goals. This fact is perfectly noticeable when countries that show political ambitions for IPP are compared and analyzed. It should be highlighted, according to Sousa et al. (2021), that an action plan's aim is to mobilize resources and competences through tools and measures dedicated to innovation procurement (which are not referenced in other horizontal/sectorial policy strategies).

The governmental practices of an IPP policy vary a lot in Europe. Although some countries have formulated strategic documents, the IPP policy measures are often, executed in a scattered form, resulting in a reduced acceptance from the market. According to the pioneer report "The Strategic Use of Public Procurement for Innovation in the Digital Economy" (European Commission, 2020), only 4 of the 27 countries in the EU present a specific action plan for innovation procurement (such as, Austria[2], Finland, Netherlands[3], and Belgium), besides, only the first three commit to have concrete actions and objectively identify the key-factors for the implementation of each proposed action. In the Belgian strategic case for the IPP, material and budget resources for the set of action included in the plan are not specifically defined, as well as the decision-making structures for the R&D and innovation acquisitions that require approval from contracting entities and/or from local, regional, and national scope policy makers. It is relevant to refer that, according to Domingos (2020), for public contracts to have the same effect on public entities development, the status of the processes should be elevated to a central management issue, which implies a certain high level of specialty from the procurement employees.

It is important to mention that five European countries, despite not having an action plan for IPP, throughout the years, have been tracing innovation procurement policy goals, based on specific budgets and a clear commitment of the main agents. Namely Estonia[4], Greece[5], France or Sweden[6].

It is noted that an innovative public procurement policy can present at the national, regional, or local level, while being oriented to a certain sector or being defined as a more transversal innovation strategy that stablishes an interconnection with the other innovation instruments (in both sides of the market)[7] (Domingos, 2020). It is also important to understand in what way innovation procurement is conveyed as a priority strategy in the sectorial policy framework, namely in the 10 public activity sectors, identified in the 2014 Directives in regard to public procurement.

Considering each sector separately, innovation procurement is more frequently used as a priority strategy in the policy measures and the environmental sector programmes (in about 30% of the State-Members), followed by the health and social services, public transport and constructions sectors (in about 20% of the EU countries). The sectors in which the IPP is taken as a priority policy less frequently are the education, culture and religion sectors (in about 5% of the EU countries) and, finally, the water and postal sectors (both exist in about 3% of the EU countries).

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[2] See https://www.ioeb-innovationsplattform.at/ (Consulted between May and July 2022).

[3] See https://www.pianoo.nl/nl (Consulted between May and July 2022).

[4] See https://eas.ee/innovatsiooni-edendavate-riigihangete-programm/ (Consulted between May and July 2022).

[5] http://www.promitheus.gov.gr/webcenter/faces/oracle/webcenter/page/scopedMD/sd0cb90ef_26cf_4703_99d5_1561ceff660f/Page119.jspx?_afrLoop=8483923094685589#%40%3F_afrLoop%3D8483923094685589%26_adf.ctrl-state%3Dmcd3bu0d1_53 (Consulted between May and July 2022).

[6] See https://www.upphandlingsmyndigheten.se/innovation-i-upphandling (Consulted between May and July 2022).

[7] E.g., Sweden presents a specific national policy for the water sector that mentions innovation procurement as a relevant tool for reaching the policy goals.

Furthermore, the country that prioritizes more innovation procurement, regarding sectors, is Austria, which presents a score of 60% since the acquisition of R&D and innovation took place in 6 of the 10 economic activity sectors. Then follows the United Kingdom and Finland (both with a score of 50%), proceeded by Ireland[8] and the Netherlands (both with a score of 40%). This conjuncture indicates that the remaining 14 EU countries still have not incorporated innovation public procurement in the strategy of other activity sector (European Commission, 2021).

Considering what has been shown, it is relevant to mention that Austria developed an action plan about innovation procurement ("Austrian Strategy for Research, Technology and Innovation"), which includes the institutional government and defines specific tasks between the ministries and governmental authorities, with the intent of training public entities for IPP (European Commission, 2021).

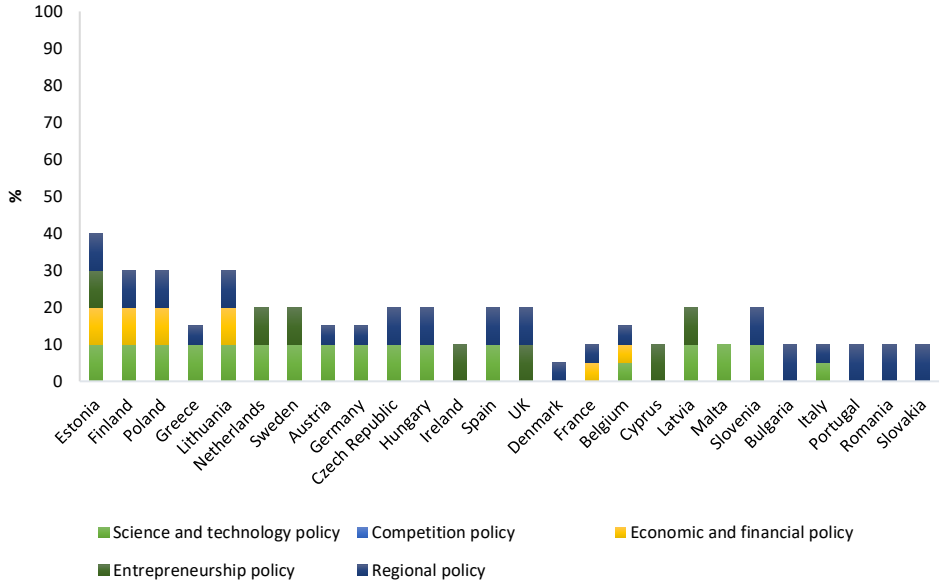
As shown in Figure 1, it is quickly noticeable that the country with the best performance is Estonia, in which innovation procurement is present in every identified horizontal policy, with the exception of competition policy. In the opposite position, there is Luxembourg, revealing the (still) weak strategic scenario of IPP, in a transversal perspective. Regional policy, and science and technology policy are the ones that promote the strategic importance of innovation public procurement the most, in the most part because of the inner connection of IPP to the scientific research and technological development activities. The entrepreneurship policy and the economic and financial policy are a strong mechanism for the realization of structural reforms and of the modernization of the public sector. It should be noted that, for 6 of the 28 European countries under analysis, the use of innovation procurement in the entrepreneurship policy field is associated with the creation of more competitive firms in the country. The Netherlands aims specifically at the SMEs and start-ups, while in Ireland, the innovation contracts are used to incentive small businesses to participate in public tenders. On the other hand, only 6 countries - Belgium (BE), Estonia (EE), Finland (FI), France (FR), Lithuania (LT), Poland (PL) - recognize the strategic importance of IPP for the economic growth and for optimizing the financial sustainability of the public services. For example, in Finland, the IPP is frequently adopted to direct investments and acquisition budgets for the development of new innovative solutions, while in Belgium, that strategic role is only recognized in the Flanders region.

Despite the clear benefits of the competition policy, none of the analyzed countries has associated innovation procurement guidelines in its competition policy, in particular in matters related to equitable, transparent and non-discriminatory opportunities for every economic agent in the procurement market.

Despite the notorious necessity of a coherent strategic structure, the implementation of these action plans seems indispensable. However, the IPP policy is generally implemented in a fragmented way. More holistic innovation systems include a set of measures on innovation procurement, covering activities for awareness, legal support services, intermediation support between the supply and the demand side, and financial instruments (Santos, 2016). In general, the strategic government, the awareness from the interested parties, the developments of competences and the co-financing Grant to the practice of IPP are crucial incentive elements of a competent public procurement policy (Hervás et al., 2014). Therefore, it is intended to understand the scenario of European countries in this matter.

[8] See http://procurementtransformationinstitute.com/pti-europe/ (Consulted between May and July 2022).

Figure 1. Horizontal policies that prioritize the IPP in the EU[9].



Source: Author's elaboration. Adapted from European Commission (2021).

2.2. Implementation

In a public policy perspective, the transformation of an action programme in practice is not automatically guaranteed since the implementation in a determining stage for understanding the relationship between a decision and the results obtain from that decision. Therefore, it is important to analyze the provisioning processes of institutional, organizational and financial resources. This way, the assessment of the achievement deficit or the deviations between what is programmed and what is effected are crucial (Rodrigues & Araújo, 2017). The implementation of a new policy measure implies a considerable progress in the public sector, in terms of being open to promoting more innovative products, processes and services. According to the European Commission (2021), the policy goal for every State-Member consists in reaching, at least, 2.5% of the acquisitions in R&D (in the percentage of the total value of public acquisitions), and 15-20% in innovation procurement of innovative solutions in Europe (in the percentage of the total value of public acquisitions).

It can, then, be verified that from the 27 EU countries, including the United Kingdom as the 28th country, only 6 of the State-Members consider the IPP in their global budget plans. In this specific case, according to Domingos (2020), with a more uniform global European scenario, in terms of the strategic use of innovation procurement, in sight, it seems crucial to have change agents with the technological knowledge about the implementation fundamentals of pre-commercial procurement (PCP) and public procurement of innovative solutions (PPI) (i.e., competitive dialogue, negotiation procedure or innovation partnership) and the recurrence of intensive methods and techniques that can generate systematic reports that act as a foundation for a potential national or regional innovation procurement policy, identifying weaknesses and differentiating domains. For the effect, activities, such as meetings with experts in PCP and PPI, meetings with countries governments collaborators that are already in a more advanced and developed stage, in regard to the formulation of a public policy related to innovation procurement, and the recurring analysis of theoretical and practical studies about the IPP, are crucial. It is important that public entities, as potential buyers, change their risk averse attitude. So, decision-makers should be aware of the real impact of PCP/PPI failure, in terms of career

[9] In this study, United Kingdom is considered beside the rest of the State-Members.

penalties for the acquisition entities managers, since there are no longer any incentives for the public entities to assume the risks that the innovation contracts might hold (Borrás & Edquist, 2013; Hervás et al., 2014).

This stage of the political cycle – the implementation – implies a great involvement with the interested parties in the design and implementation of the IPP policy. This way, Carayannis (2013) claims that an ownership mindset should be adopted, through the objective awareness of the necessity of the PCP and PPI policy.

The contracting entities, namely the governmental agencies and the public institutions, based on the mission oriented to collective well-being in a certain scientific sector/field of public activity, can coordinate the implementation of policy dedicated to the IPP, through a bottom-up[10] approach. The implementation stage implies the involvement of (a) a significative diversity of agents with a relative autonomy and negotiation ability, (b) administrative systems organized by sectors and executions levels, and (c) coordination requirements, and vertical/horizontal control (Lipsky, 1980).

2.3. Activities and incentives to support innovation procurement in EU countries

According to the VINNOVA report (2006), the realization of an innovation procurement policy, despite not being mandatory, implies a set of activities that should be conducted in the implementation stage of an innovation public procurement policy. Nevertheless, the lack of know-how and experience in innovation procurement creates a barrier to the realization of the activities mentioned above. To accelerate the knowledge in these topics, several European countries have been stablishing operational measures to boost the technical and legal competences in IPP, namely through competence centers. The European Commission (2020) presents a set of national tools, essential for the implementation of an effective innovation public procurement policy: the existence of a central website, good practices, trainings and workshops, handbooks and guidelines, support to public procurers, networking of procurers, and competence center.

Therefore, the countries that promote innovation procurement the most and that are better prepared for the implementation of an IPP policy are Austria, Finland, the Netherlands and Sweden. However, only 18 countries fulfill at least one of the operational requirements advised by the 2015 community opinion and mentioned in the European Commission report (Table 1). It is relevant to mention that the most promoted activity is the elaboration of handbooks and guidelines for innovation procurement (18 countries of the 28 countries in analysis). These manuals, in majority of large format and free access, include several topics about innovation procurement, are intended for the contracting entities, decision-makers and other interested parties in this issue. Sweden should be highlighted for having multiple handbooks on Swedish strategy for IPP, its legal framework, definitions and examples of successful cases of implementation procedures of innovation procurement. Also, the Slovenian Ministry of Public Administration, in cooperation with public and private entities, shows a guidance with guidelines about IPP procedures in the strategic sectors of construction and environment. On the other hand, the existence of an official website for this topic is the least effective activity in the European countries.

[10] According to Sebatier (1986), bottom-up models compose the reverse analytic perspective, since that part of the agents in the implementation base levels, such as administrative agents, seek to identify which factors cause the distance between the decisions and the actual realization.

Table 1. Activities to support innovation procurement, in 2021.

Activity	Target	No. of countries (N)
Central website	**Austria**, Belgium, **Finland**, Lithuania, **Netherlands**, Portugal, Spain, **Sweden**	8
Good practices	**Austria**, Belgium, Denmark, Estonia, Finland, Germany, **Netherlands**, Portugal, **Sweden**, UK	10
Trainings and workshops	**Austria**, Belgium, Estonia, **Finland**, France, Germany, Hungary, Lithuania, **Netherlands**, Poland, Portugal, Slovakia, Slovenia, **Sweden**, UK	15
Handbooks and guidances	**Austria**, Denmark, Estonia, **Finland**, France, Germany, Hungary, Ireland, Italy, Lithuania, Luxembourg, **Netherlands**, Poland, Slovakia, Slovenia, Spain, **Sweden**, UK	18
Support to public procurers	**Austria**, Belgium, **Finland**, France, Germany, Lithuania, **Netherlands**, Slovenia, **Sweden**, UK	10
Networking of procurers	**Austria**, Belgium, **Finland**, France, Germany, Luxembourg, **Netherlands**, Portugal, Slovenia, Spain, **Sweden**, UK	12
Competence centre	**Austria**, Belgium, **Finland**, France, Germany, Hungary, Luxembourg, **Netherlands**, Portugal, Slovenia, Spain, **Sweden**, UK	13

Note: In **blue** are the European countries that present all the activities to support the promotion and awareness of innovation public procurement, indicated by the 2015 ERAC opinion.

Source: Author's elaboration. Adapted from European Commission (2020).

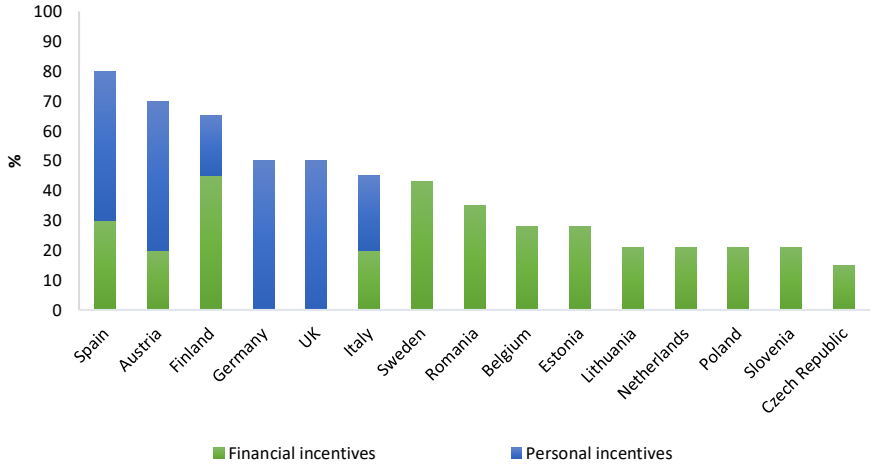
The Austrian PPPI website[11] shows information and documentation about the legal framework, the political context (including its action plan), successful cases and financial incentives for innovation procurement. It also shows a digital platform that instigates the interaction between the supply and demand sides of the market, guaranteeing a greater correspondence between the public needs and the market's offer. In Lithuania, the Ministry of Economy provides information about successful PCPs and about European financing opportunities. Furthermore, the Dutch competence center in IPP (PIANOo) presents highly specialized and multifaceted website with documentation and resources about national policy initiatives, workshops, themed trainings and examples of national and international successful projects.

Through a system of incentives for innovation procurement, firms (including the SMEs) are encouraged to participate in public tenders, and they share the risks and benefits of the innovation development. Therefore, the governmental action plans should present financial policy measures as well as 'softer' tools, such as rewards and distinctions[12].

According to the constant information of the European Commission (2020), 16 countries of the 28 countries considered for analysis, present instruments dedicated to IPP that allow for a reduction of innovation financial risk (mentioned in the previous subchapter). In this domain, the best performance comes from Spain[13], Austria and Finland, which are also the only countries that show financial and personal incentives on a national level. On the other hand, 43% of the European countries have not created tools to encourage and boost the practice of IPP (Figure 2).

[11] See https://www.ioeb-innovationsplattform.at/ (Consulted between May and July of 2022).
[12] See https://eic.ec.europa.eu/eic-funding-opportunities/eic-prizes/european-innovation-procurement-awards_en (Consulted between May and July of 2022).
[13] See https://www.cdti.es/index.asp?MP=100&MS=899&MN=3 (Consulted between May and July of 2022).

Figure 2. Incentives (financial and personal) in the European countries, in 2021.



Source: Author's elaboration. Adapted from European Commission (2021).

From the 28 countries in analysis, only 13 show a system of financial incentives to encourage more national innovation procurement. Specifically, Finland provides grants to public entities that cover about 50% of the total responsibility in the preparation phase of the IPP procedure (i.e., the technological development, pilot-tests and compliance stages). The Finnish financial incentives are available to projects that might also be receiving community co-financing. Besides, in Sweden, there are monetary incentives to stimulate public entities to make more innovative administrative contracts; these incentives are eligible for every type of contract, sector, or extent (local, regional, or national), despite being receiving co-financing from any EU programme or not. However, countries like Romania that show a financial incentives system for innovation procurement are not given complementary grants to projects that are already being co-financed by the EU, in parallel (e.g., through the programme Horizon 2020). Spain shows, in fact, financial incentives for IPP, but this budget is not open to every type of public buyers in the country, being only eligible for projects of specific sectors (e.g., health, security and defense).

It is also noticeable that, in the majority of the countries that have incentives, the personal incentives are underused. Austria, Spain, Finland, Italia[14] and the UK developed personal incentives systems to encourage public entities to invest in IPP, even if that support appears through different methods (Table 2).

[14] See https://www.consip.it/innovazione/esperienze-internazionali/procurement-dell-innovazione (Consulted between May and July of 2022).

Table 2. Financial and personal incentives discrimination (28 European countries), in 2021.

Country	Financial incentives				Personal incentives	
	Financial incentives (presence)	For all type of innovation procurement	Applicable to all procurers countrywide	Funding available for EU financed projects	Personal incentives (presence)	Applicable to all procurers countrywide
Austria	X		X		X	X
Belgium	X	X		X		
Bulgaria						
Croatia						
Cyprus						
Czech Republic	X					
Denmark						
Estonia	X	X	X			
Finland	X	X	X	X	X	
France						
Germany					X	X
Greece						
Hungary						
Ireland						
Italy	X	X			X	
Latvia						
Lithuania	X	X	X			
Luxembourg						
Malta						
Netherlands	X	X				
Poland	X	X				
Portugal						
Romania	X	X	X			
Slovakia						
Slovenia	X	X				
Spain	X	X			X	X
Sweden	X	X	X	X	X	X
UK					X	X

Source: Author's elaboration. Adapted from European Commission (2021).

To be noted, the formulation and implementation of a system of incentives by the State-Members, having in consideration its political and cultural specificities, can effectively encourage certain sectors and domains to acquire more innovation (Farshchian et al., 2020). This policy may involve grants programmes with co-financing for innovation contracts from public entities. As a result, procurement should evolve to an open innovation process, where the co-creation between technological suppliers and end users should be inevitable. This way, in the action plans of the European countries governments should contain financial support measures for IPP (Flanagan *et al.*, 2011). According to ERAC (2015), the European Commission should promote the formulation of knowledge sharing interface in the EU about innovation public procurement, based on mutual learning and on advice on financing measures; through the collection, selection and dissemination of practical knowledge and individual support to the State-Members alongside with a hierarchy of needs according to the EU strategic priorities[15].

[15] According to the ERAC's opinion (2015), each State-Members should include guidelines, good practice examples, standardized documentation for tenders, workshops and formative courses on awareness and efficient learning of the innovation procurement matters. In order to leverage this process, it appears to be a priority the existence of a National

3. Innovation Public Procurement evaluation and monitoring tools in EU countries

Policy evaluation is a systematic and analytical activity. Therefore, for the definition of targets and their monitoring, a systemic policy of innovation public procurement should be formulated and implemented in a first step, for the purposes of achieving an innovation friendly procurement market across Europe (Chesbrough & Ghafele, 2014; Santos, 2016).

Expectations on the impact of innovation procurement are high, despite the budgetary constraints associated with innovation. Joint procurement must be measured, so setting targets and an integrated monitoring framework are urgently needed. Member States such as France, Spain, and the Netherlands already present quantitative IPP targets, while other countries such as Austria, Belgium, Finland, Germany, Lithuania, and Sweden are still debating this government objective. In effect, the monitoring of innovation procurement outcomes is still residual, and although the first group of countries mentioned already carry out monitoring activities, there are still no standard indicators for assessing the innovation public procurement activity. According to Sousa et al. (2021), the European Commission should encourage the progress of an integrated monitoring system, which allows the measurement of expenditure on innovation procurement and the assessment of the outcomes and outputs of completed IPP procedures (Table 3).

According to the European Commission *website*[16] regarding innovation procurement, up to the year 2022 no country has a holistic and systematic impact measurement system. Still, Member States such as Austria, Belgium, Estonia, Finland, and Slovakia possess domestic databases with relevant information on some PCP and PPI procedures carried out in recent years.

Nine European countries provide data on innovation public procurement spending, five of which do so through a structured measurement system. It should be noted that Austria has been implementing a comprehensive IPP monitoring system since 2013, which includes reports and evaluation of the activities carried out by all parties present in innovation procurement procedures. In Belgium, a measurement system has been developed and is applied in the Belgian e-Procurement platform as well as the regional contract management system (e-Delta), thus easily distinguishing innovative tenders from traditional contracting. In 2017, Slovakia introduced a system to identify green, social and/or innovation procurement purchases; however, this instrument only identifies the object of the contract, making the production of statistical results impossible. In Germany, since 2021, buyers are required to provide specifications on all public procurement activities, namely for purchases below the EU threshold. Finally, it is important to highlight the system adopted by Estonia for measuring IPP spending, particularly for its structure and effectiveness in attempting to monitor and identify potentially innovative bids in the e-Procurement system. The remaining EU countries do not regularly measure this topic, nor do they have structured systems for assessing the potential impacts of adopting this type of procedure. Even so, it is worth noting that, since 2020, in Sweden, Lithuania, and Portugal[17] studies on the innovation public procurement market are being carried out (Sousa et al., 2021).

Contact Point for the horizontal promotion of existing European programmes on this topic (*e.g.*, Horizon 2020 and COSME).

[16] See https://ec.europa.eu/growth/single-market/public-procurement/strategic-procurement/innovation-procurement_en (Consulted between May and July 2022).

[17] See https://www.compraspublicasinovacao.pt/ (Consulted between May and July 2022).

Table 3. European countries with national monitoring systems, in 2021.

Country	Monitoring system		Assessment system	
	Presence	Structured approach	Presence	Structured approach
Austria	X	X		
Belgium	X	X		
Bulgaria				
Croatia				
Cyprus				
Czech Republic				
Denmark	X			
Estonia	X	X		
Finland	X		X	
France				
Germany	X	X		
Greece				
Hungary				
Ireland				
Italy				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands	X			
Poland				
Portugal				
Romania				
Slovakia	X	X		
Slovenia				
Spain				
Sweden				
UK	X		X	

Source: Author's elaboration. Adapted from https://ec.europa.eu/growth/single-market/public-procurement/strategic-procurement/innovation-procurement_en

4. A proposal for impact indicators for Innovation Public Procurement

According to the European Commission (2021), the most recurrent type of approaches and techniques for monitoring consists of qualitative research and methods, namely case studies and interviews with beneficiaries. This scenario exposes one of the main limitations of the definition of an innovation procurement policy: the absence of quantitative data for ex-post evaluation, in a first instance, and the need for new mixed-method approaches for a clear and rigorous measurement of the effects of this type of instrument at the economic and social level, in a subsequent instance.

Existing and emerging IPP action plans should include both qualitative (*e.g.*, measuring awareness of innovation procurement) and quantitative targets (*e.g.*, dedicated budgets to innovation procurement). To this end, according to Santos (2016), it is essential to establish a robust control and intelligence system for the analysis of innovation policies, under the coordination, in this specific case, of government agencies oriented towards innovation, public procurement, administrative modernization, or a mixed-work between them. Specifically, mechanisms for monitoring and managing the various PCP/PPI projects must be developed,

through periodic reports containing detailed and updated information on the implementation stage of the object of the contract (Flanagan et al., 2011).

It is important to assess the impact of the innovation public procurement policy from a macro-contextual perspective, taking into account the major policy objectives set out in the 2014 Public Procurement Directives, as follows: *(a)* stimulate technological innovation and foster economic and social growth; and *(b)* provide new effective and innovative solutions to meet public needs. From these two broad objectives, the following possible impact indicators for Member States are suggested (Table 4).

Table 4. Proposed impact indicators to be adopted in government agencies responsible for IPP.

Impact indicator	Externalities
Number of business opportunities for suppliers participating in PCP/PPI	Growth in employment and sales.
Level of improvement in quality and efficiency generated by PCP/PPI for the public body	Cost reduction.
Level of energy efficiency/dematerialisation associated with the incorporation of innovation in the *modus operandi* of the public entity	Environmental protection/reduction of CO_2 footprint achieved with the new solution.

Source: Author's elaboration.

For a better understanding of the relevance of a national IPP intelligence and monitoring system, the following is a qualitative approach to the analysis of the main systems of EU Member States.

Indeed, the Austrian Action Plan[18] provides some measures to assess and compare innovative contracts, considering the following four levels of analysis: *(a)* impact on business (*i.e.*, on companies' incentive to innovate), *(b)* impact on service (*i.e.*, level of increase in public service rendered to citizens), *(c)* impact on performance (*i.e.*, increase of the efficiency of the contracting public entity), and *(d)* the existence of a contribution to current major societal challenges.

In the French case, one of the measures taken to achieve the 3% target already mentioned is the implementation of a new "tick" on the State Procurement Platform to indicate whether it corresponds to an IPP (in the form of a PCP/PPI). Since 2015, the government has prioritized the development of innovation procurement contracts, with a target of 2% of the volume of public contracts awarded to innovative SMEs. Also in that year, the government includes IPP performance measurement in its public procurement policy system. Thusly, in all contracts awarded it is possible to verify the public/societal needs, the total amounts in innovation procurement contracts awarded by economic activity sector, and the total amounts in innovation procurement contracts awarded by SMEs. In the same logic, in the UK, from 2015 onwards, performance evaluations of PCP/PPI projects have been developed, in order to assess the effectiveness of the established processes, and to analyse the impact of the innovation acquired in the public service, albeit through qualitative methodologies (European Commission, 2021).

[18] To achieve robust results, a simple set of indicators is formulated in 2015 by the *PPPI Steering Group* and *Statistics Austria*, focusing on three quantitative indicators: procurement of newly developed products or services for the public entity, first commercial acquisition of products or services, and the dissemination of innovative products or services. *See* https://procure2innovate.eu/austria/ (Consulted between May and July 2022).

It should be noted that the innovative public procurement market, according to the European Commission (2020, 2021) is a market that encourages the implementation of IPP on a large scale, and results from the combination of the use of specific techniques to foster innovation in public procurement, namely intellectual property rights (IPR) default regime, value for money award criteria, and preliminary market consultation. The opening of the national public procurement market to innovations from across the EU single market is another important variant to consider (Chesbrough & Bogers, 2014). Based on the evidence presented in the *CORDIS*[19] base, Belgium, Ireland, and France are the best performers in this respect. Table 5 below systematizes the degree of innovation in the public procurement market in the EU28.

Table 5. Propensity for innovation in the public procurement system, in 2021.

Country	IPR regime	Value for money award criteria	Preliminary market consultation
Austria			
Belgium	X	X	
Bulgaria			
Croatia			X
Cyprus			
Czech Republic			
Denmark			X
Estonia	X	X	
Finland	X	X	X
France	X	X	
Germany		X	
Greece			
Hungary	X	X	
Ireland	X	X	X
Italy		X	X
Latvia			
Lithuania			
Luxembourg	X	X	
Malta			X
Netherlands		X	X
Poland		X	
Portugal		X	
Romania			
Slovakia			
Slovenia	X	X	
Spain	X	X	
Sweden			
UK	X	X	X

Source: Author's elaboration. Adapted from https://ec.europa.eu/growth/single-market/public-procurement/strategic-procurement/innovation-procurement_en

Specifically, 11 European countries are promoting an IPR allocation regime that aims to balance the need to obtain the best value for money for the public entity with the need to promote innovation. Such a scenario happens when IPR are under the control of technology providers while granting rights of use to the public entities that purchase these innovative solutions. According to the *CORDIS* database, the European average for the IPR default regime is 38%, as

[19] See https://cordis.europa.eu/en (Consulted between May and July 2022).

19 countries do not adopt such a standard IPR allocation regime – in fact, they have not defined any IPR allocation regime in procurement in general. Only Belgium and Spain[20] already have a national procurement law that defines a standardized IPR regime, which automatically applies to both public buyers (usage rights) and suppliers (ownership rights).

In the overwhelming majority of Member States, the national public procurement system (*i.e.*, the public procurement law, guidelines, and general terms and conditions for government contracts) does not define a standard IPR allocation regime. The responsibility to allocate IPR in public procurement in a way that encourages innovation and is in compliance with applicable copyright is left to the discretion of the public buyer itself. However, given that many public entities are not well informed or qualified on these issues, this approach is prone to potential errors and disputes between the demand and supply sides of the market (Table 6).

Table 6. Features of IPR regime, in 2021.

Features of the IPR regime	Country
IPR default regime that leaves IPR ownership with suppliers and usage rights with public procurers in public procurement law.	BE, ES
IPR default regime that leaves IPR ownership with suppliers and usage rights with public procurers in general terms and conditions for government contracts.	CH, FI, FR, UK
IPR default regime that leaves IPR ownership with suppliers and usage rights with public procurers in official guidelines.	EE, HU, IE, LU, SI
No IPR default regime in public procurement law, guidelines, or general terms and conditions for government contracts.	AT, CY, CZ, DE, DK, EL, HR, IT, LT, LV, MT, PL, PT, RO, SE, SK
IPR default regime that keeps all IPR rights with the public procurer.	NL

Source: Author's elaboration.

With regard to the use of value for money as award criteria, in 2021, the European average, considering public procurement contracts published in *TED*[21], is 42% (Sousa et al., 2021). The best performing countries are the UK, France, Ireland, and the Netherlands. All other countries award their public contracts based solely on lowest price considerations. Similarly, when assessing the use of preliminary market consultations, it is found to be a rare practice across Europe. On average, only 9% of Prior Information Notices (PINs)[22] published in TED concerned the announcement of a preliminary market consultation, where the performance of the Netherlands, Finland, and the UK is worth highlighting.

To sum up, given the residual scenario of monitoring and evaluation of effects and results of this policy area, it is assumed that Member States, advised by the European Commission, should encourage concrete and joint training actions on the theme of evaluation of innovation policies. In terms of systematization, it is suggested that certain domains of the IPP policy be prioritized: emerging ones, which correspond to activities and lines of action to be consolidated,

[20] See https://contrataciondelestado.es/wps/portal/plataforma for more details on the Spanish public procurement platform (Consulted between May and July 2022).
[21] See https://ted.europa.eu/udl?uri=TED:NOTICE:520728-2020:TEXT:EN:HTML (Consulted between May and July 2022).
[22] A PIN provides early information about the expected starting date and purchase volume for PCP, and about the open market consultation that is organized in preparation of this procurement.

representing an important base of relevant resources and opportunities but whose value is still below its potential; and wildcard ones, which concern areas with potential for articulation between each other, and which may constitute opportunities for societal development and produce previously unnoticed competitive advantages.

5. Conclusions and policy implications

A strategic procurement policy should bring together future needs and future supply at an early stage. Procuring innovation entails several risks (*e.g.*, technological, organizational, and social risks), and risk aversion makes it challenging to use procurement to stimulate innovation, particularly in the case of procurement of innovations from SMEs, and in the PCP (pre-commercial procurement) typology which involves significant amounts of R&D.

The 2014 legislation has stimulated an increased interest in public procurement by EU member states, that is now perceived as an attractive and viable instrument for implementing innovation policy. European innovation procurement policy should aim to put in place the necessary incentives, but also the necessary skills and capabilities to enable policy makers to launch cohesive strategies and action plans, and for public entities to allow themselves to modernize and make strategic decisions that stimulate innovation. Such strategic commitment, though it is the basis for successful implementation, is not homogeneous across Europe. The governance challenges of moving towards an approach that recognizes the potential importance of the impacts of innovation procurement are significant. Even more profound are the challenges associated with the need to monitor, evaluate, and attribute innovation impacts to public action. There are no organized, integrated, and potentially transferable systems in place in Member States.

The reduction of the current entropy regarding the definition of an IPP policy across the various EU Member States can be catalyzed not only through proactive and holistic thinking on how best to meet government objectives and vertical targets on these issues, but also through greater dissemination of this policy area in European bodies, with an account of IPP success stories and dynamic public-private working groups. It is possible to summarize the priority level of the EU countries in terms of political commitment. Table 7 indicates that demand-side innovation policy is not among the highest priorities of recently adopted national innovation strategies.

Table 7. Level of priority of innovation public procurement policy in EU countries and UK.

Level of priority	Country
High priority	Austria, Finland, Netherlands, Sweden, Belgium
Medium-high priority	Lithuania, United Kingdom, Slovenia, Germany, France, Spain, Estonia
Medium priority	Italy, Slovakia, Denmark, Hungary, Cyprus, Malta, Greece
Medium-low priority	Ireland, Poland, Portugal, Latvia, Czech Republic
Low priority	Romania, Luxembourg, Bulgaria, Croatia

Note: This categorisation is based on OECD Science, Technology and Industry Outlook 2010 policy questionnaire.

Source: Author's elaboration.

From an empirical perspective, progress in this policy area may be linked to sectoriality. Approaches suggest that demand-side innovation policies have the greatest leverage when combined with sectoral government objectives. Public procurers in a specific sector (e.g., public transport) are more encouraged to undertake innovation procurement when innovation

procurement is embedded as a strategic objective in the national policy frameworks and action plans that set the priorities for their specific sector. Consequently, public policies seem to find in innovation procurement a favourable framework for development and appropriation to the current circumstances of competitiveness and societal development.

At the same time, the global nature of the innovation process gives the public procurement approach an unprecedented relevance as a technical and conceptual body of political influence. This importance of IPP and intersection with public policy action enables a better understanding of the development space of innovation procurement in the EU. The 2014 legislation, combined with the European funding made available for innovation procurement, has stimulated an increased interest in public procurement by EU member states.

In resume, policymakers can use the results of this research and these recommendations in the design of new policy frameworks aimed at enhancing overall effectiveness over time and should focus on developing more robust innovation procurement policies that prioritize long-term benefits rather than short-term cost savings.

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