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Functional Public Procurement and Innovation – The Concepts

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Functional Public Procurement and Innovation – The Concepts

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Abstract

The literature on the relations between public procurement and innovation has been growing rapidly during the latest couple of decades. However, there are still conceptual problems and unclarities with regard to key concepts. The purpose of this conceptual paper is to sort out and specify the notions of “innovation”, “public procurement”, “product procurement”, “functional procurement” and “innovation partnerships” – as well as the relations between them.

Some findings in this paper are:

- The distinction between *product specifications* and *functional specifications* is a useful dichotomy when discussions of the relations between public procurement and innovation are pursued and when public procurement is carried out in practice. It can be instrumental in transforming procurement that prevents innovations into procurement that enhances innovations. The development of this dichotomy means that we have changed the conceptual framework needed to understand and explain the relationships between (different kinds of) public procurement on one hand and innovation on the other hand.
- Functional procurement is not only allowed by the EU procurement directives. It is *strongly encouraged* “and should be used as widely as possible”, according to the EU directives.
- “Innovation partnership” is a new procedure in the EU procurement directives. It is intended to also address R&D results and innovations as outcomes of public procurement processes. However, this procedure has not been used very much. One reason is that the directive *needs a much higher specificity* to become operatively useful. This procedure should also be related to functional public procurement.

Keywords: public procurement; “product procurement; functional procurement; innovation; innovation policy; innovation partnerships; demand-side innovation policy.

1. Introduction

Think back 200 years and imagine that all innovations, in the sense of new products, had not occurred since then. No cars, trains or aircraft, no modern medical equipment, no phones, no Internet, etc. This quick look in the rear mirror is enough to show that innovations are the force that has most transformed our societies.

Innovations have had an enormous significance as a force of change of our socio-economic, environmental, and political systems. For example, they have been the source of more than 90 percent of all increased productivity since 1870 (Baumol 2010). They have thereby been - and are - the most important source of creation of welfare, since the increased productivity can be used to raise wages, increase profits and elevate taxes. Innovations have also had a very large negative impact on the environment, climate and health. Currently, they are critical means to mitigate these negative consequences in the medium and long term.

Public procurement is when public agencies (national, regional, local) buy goods and services. It is a large part of the economy in many countries. Some indications of this are:

- The World Trade Organization covers public procurement of 1.7 trillion US dollars every year. (1 trillion is written with 12 zeros.)
- 250 000 public authorities in the EU spend around 14% of the EU GDP (almost €2 trillion) on public procurement per year.
- In some countries public procurement is 15 % or more of GDP.
- The value of the publicly funded R&D is about 1 % of GDP in the most advanced countries, i.e. public procurement is many times larger.
- In Peru, public procurement accounts for 50,7 % of public expenditures and 11,6 % of GDP.
- In South Korea, public procurement is 8 % of GDP.

The literature on the relations between public procurement and innovation has been growing rapidly during the latest couple of decades. However, there are still conceptual problems and unclarities. This is, for example, true for the notions of “functional procurement” and “innovation partnerships”. A purpose of this paper is therefore to try to sort out conceptual unclarities with regard to key concepts in the field, and regarding the relations between public procurement and innovation.

The share of procurement spending that stimulates innovation, by means of, for example, functional procurement remains insignificant (see further below). However, no detailed and comprehensive statistics on functional procurement exist to date (Edquist 2017, 2018). To create such data is an important task. To achieve this, we will construct a web-based survey on functional procurement.¹ This implies formulating questions on functional procurement that will be sent to all Swedish municipalities. In the same project, we hope to be able to develop a conceptual framework that is clear enough to serve as a basis for the formulation of the survey questions. This is attempted in this paper.

These survey questions must have two characteristics:

- They must be based on a conceptual framework that specifies all concepts that are important to the project.
- These concepts must be defined in a very clear and specific way to make sure that the respondents interpret them in the way intended.

2. What is public procurement?

To try to sort things out, we will below try to answer the following questions:

- *What* is being procured according to the EU Procurement Directives?
(= the result of the procurement)
- *How* should the procurement be pursued according to the EU Directives?
(= the process of procurement)

Public procurement is an interactive relation, normally between public buyers and private suppliers. Here we are particularly interested in the relations

¹ This is done within the research project “Functional public procurement for low-carbon innovations in the Swedish Municipal Sector”, carried out by Lars Bengtsson and Charles Edquist.

between public procurement and innovation, which will also lead us into a discussion of what we call “functional procurement”.

Public procurement is regulated by law in most countries. Here we will restrict ourselves to discussing the Directives decided upon by the European Union and (at least partly) adopted by all Member States. There must be no contradictions between the European Union Directives and the laws in the Member States.

The EU Directive on public procurement of 2014 specifies as follows: “The Union Directives on public procurement are not intended to cover all forms of disbursement of public funds, but only those aimed at the acquisition of *works*, *supplies* or *services* for consideration by means of a public contract.”² The specification of “works”, “supplies” and “services” is crucial. The three terms are used in the Directives 207 times, 120 times and 430 times respectively.

Instead of spending hours/days and many pages on trying to sort out in detail what these three terms exactly mean in the Directive text, we choose an unusual way of specifying the three terms: We quote the definition of public procurement in the Swedish procurement law which must be consistent with the European Directive: ”Denna lag gäller för upphandling som genomförs av en upphandlande myndighet (offentlig upphandling). Med upphandling avses de åtgärder som vidtas i syfte att anskaffa varor, tjänster eller byggtreprenader.” (Lag (2016:1145) om offentlig upphandling: § 2)

Retranslated into English the second sentence in the quote reads: “With procurement is meant the measures taken to buy goods, services or works (construction contracts)....”.

One conclusion that can be drawn from the law text is that *what* is being bought by means of the public procurement are material “goods”, intangible “services” or civil engineering “works” (or “buildings”).³ These are the only things that can be bought in public procurement and all goods, services and works are subject to the procurement Directives and must follow them. This should give a reasonably clear indication of what is meant by goods, services and works in the EU Directives.

² Directive 2014/24/EU of The European Parliament and of The Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, § 4. (The italics in the quote have been added by the current author.)

³ “Goods” and “services” are often together called “products”.

How the process of procurement shall be carried out is also prescribed in the Directives. There are, for example, six “procedures” according to which public procurement shall be carried out. They are:

- Open procedure
- Restricted procedure
- Competitive procedure with negotiation
- Competitive dialogue
- Innovation partnership
- Negotiated procedure without prior publication

Actually, much of the Directives (230 pages) are focussed on regulating procurement procedures, and we cannot here go into details on the description of these procedures. However, we will address the procedure of “innovation partnership” in section 3.4.

In most public procurement deals that are carried out, an existing product is described in the procurement documents. Often this description is quite—or even very—detailed (see [Edquist et al. 2000](#) for some examples). When such product specifications are used, we call this “product procurement”. *Hence, product procurement* is when existing products to be bought are described in the procurement documents.

This contrasts with “functional procurement”. *Functional procurement* is when a public agency buys products that perform functions that provide solutions to problems and when functional specifications are (also) used in the procurement documents. We will discuss this in section 3.2.

In section 3.2, we will also argue that the distinction between these two concepts is a simple, important, and useful dichotomy when discussions of the relations between public procurement and innovation are pursued and when public procurement is carried out in practice.

3. Concepts to capture relations between public procurement and innovations

As mentioned, we are, in this paper interested in the relations between public procurement and innovation – in the real world, but also as codified in the EU procurement regulations.

3.1. “Innovations” in the Oslo Manual

Let us start with a short discussion of what is meant by an “innovation” according to the Oslo Manual, which is the standard basis for such discussions. The general definition of innovation in the Oslo Manual is as follows:

“An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).” (OECD, Eurostat, 2018: 32) In other words, an innovation is the outcome, output or result of an innovation process, i.e. a new products or a new process.

Developing a prototype or a test series is obviously not enough for something new (a new creation) to qualify as an innovation. The new creation must also have been produced and sold to or used in a certain number of units (Edquist and Zabala-Iturrigagoitia 2020: 3). This definition is relevant to all sectors and units in an economy. We will use parts of this definition in the following.

According to the Oslo Manual “Innovation activities include all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm.” (OECD, Eurostat, 2018: 68).

Innovations in the sense of “outcome” are often divided into product innovations and process innovations (see above). Product innovations are new – or better – material goods as well as new intangible services. Process innovations are new ways of producing goods and services. They may be technological or organizational. (Edquist 2005: box 7.1, page 182)

In other publications, we address determinants of innovation processes in more detail (Borrás and Edquist 2019; Edquist and Laatsit 2022). In (Edquist 2005: 190-191, we provided a detailed list of 10 “activities” (in our sense) that are important for most systems of innovation. They are the determinants of innovation processes and - together - they define a system of innovation. Accordingly, we consider it very important to make a clear distinction between innovations as such (or as outcomes, outputs and results) on one hand, and determinants of innovation processes (which are actually “inputs” or “activities” in innovation efforts) on the other hand. Hence, we use the notion of “activities” in a different way than the OECD and Eurostat.

In addition, we want to mention that innovation activities do not necessarily lead to innovations (outcomes) *at all*. In the Oslo manual definition above the “innovation activities” are only “*intended*” to lead to innovations. These intentions may fail.

There is also a *specific* reason for distinguishing between product and process innovations in this paper. We are addressing only the procurement of goods, services, and buildings. This is what can normally be bought in public procurement. Therefore, process innovations are less relevant for this paper than product innovations.

3.2. “Public procurement and innovations” in the EU Directives

In section 2, we mentioned that the lion’s share of all public procurement is what we call “product procurement”, in which a product that the public organization wants to buy is described in the procurement documents. Such product descriptions may sometimes be quite detailed. Even obsolete products may be described in the documents. Potential suppliers then try to provide exactly the products described. Such product specification will not lead to innovations (new products).

Since the 1990’s, policy-makers, researchers and procurers have used terms such as “innovative procurement”, “innovation procurement”, “public procurement of innovation”, and similar notions. The probable reason is that they have seen a potential in enhancing innovations resulting from public procurement, given the large volumes of public procurement that we noted in section 1. The ultimate objective was that the resulting innovations, in turn, could increase productivity growth and mitigate the socio-economic and environmental challenges faced by municipalities as well as regional and national public agencies. Such challenges may be of many kinds: economic (low productivity), environmental, related to climate and health, etc. To mitigate such challenges is a matter of formulating appropriate *objectives* of public procurement and other innovation policy instruments.

In the EU Procurement Directives, certain terms are also used to capture “innovation” in a procurement context. Some of them are listed just below, taken from the text in the Directives, i.e., they are quoted “out of their context”.

- “Public procurement of innovation” (§ 47)
- “Innovation procurement” (§ 95 § 123)
- “Innovative solutions” (§ 43, (§ 49, article 26, article 31)
- “Public procurement to spur innovation” (§47)
- “Buying innovative products” (§ 47)
- “Innovative works” (§ 47, § 49)
- “Public procurement is crucial to driving innovation” (§ 95)
- “Innovation activities required for the development of an innovative solution not yet available on the market” (article 31)

If a product can be described *ex ante* (before it exists) in some detail, it is not an innovation. Only existing products can be described since we cannot predict the characteristics of innovations. What is called “innovation procurement” is therefore impossible – if it means that an innovation (a non-existing – new – product) shall be described. Hence, product procurement cannot lead to innovations.

Just like other researchers and policy advisors we have also, in previous studies, argued that innovations could be achieved by means of public procurement through describing products that did not exist (Edquist et al 2000, 2015; Edquist and Zabala-Iturriagoitia 2012, 2015, 2020). However, further reflection has made us conclude that this is not possible. The reason is that the term “innovation procurement” is contradictory and inappropriate since we cannot describe products that do not yet exist.

Here we want to refer to philosopher Karl Popper (1957). He pointed out that it is not possible to predict future knowledge. Anyone who claims that he can describe and predict future knowledge also claims that he already has this knowledge – although it does not exist. This is contradictory.⁴ What is true for knowledge in a general sense is also true for innovations.

Public agencies want to buy products (goods, services, and buildings) to *use* them for something. With the help of the products procured, public organizations usually want to achieve a goal or a mission, satisfy human needs, solve a societal problem, etc. The public agencies want to be able to address and meet challenges, i.e., have a function fulfilled. And this is done in the interest of the citizens.

⁴ Popper’s general interest was to prove that ‘for strictly logical reasons it is impossible for us to predict the course of history’. (Popper 1957: ix; Edquist, C and and Zabala-Iturriagoitia, J M 2020)

An alternative to product procurement is that the procuring public agency describes these problems, missions, or functions in the procurement documents. When such a description exists, we use the term ‘*functional procurement*’. *Functional procurement is when a public agency buys products that perform functions which provide solutions to problems described.*

In the case of functional procurement, the procuring agency specifies *what is to be achieved* rather than *how*. In the words of [Edler and Georghiou \(2007: 960\)](#) ‘for the tender process to induce innovation in the market place, it is indispensable that it is based on specifying functionalities rather than designs’.

Functional procurement *can* lead to new products (innovations), but does not have to. It *opens* for innovation ([Edler and Georghiou 2007](#); [Georghiou et al. 2014](#)). New products that did not exist when the procurement process started can be the result. These new products compete with existing products and can be selected by the procuring agency, if they fulfil the (functional) requirements to a larger degree than the old products, to a reasonable price. It is a matter of solving problems, satisfying needs and meeting challenges.⁵

This has led us to the following conclusion: From an innovation point of view, there are reasons to talk about, i.e., to create or construct, two main categories of public procurement namely:

- Procurement based on *product specifications (product procurement)*, i.e., when public organizations describe the products that it wants to buy.
- Procurement based on *functional specifications (functional procurement)*, i.e., when a public agency buys products that perform functions that provide solutions to problems and when functional specifications are (also) used in the procurement documents.

This dichotomy is simple, purposeful, effective, and sufficient to be a basis for the design of procurement processes that may lead to innovations. It can be

⁵ Obviously, this does not imply that all problems/needs can be solved/satisfied through public procurement. Of course, many social problems require social and political solutions instead (e.g., gender equality, social justice, etc.).

instrumental in transforming procurement that prevents innovations into procurement that enhances innovations. ([Edquist 2017](#)).⁶

The development of this dichotomy means that we have changed the conceptual framework needed to understand and explain the relationships between (different kinds of) public procurement on one hand and innovation on the other. It has also radically changed our perspective on how to pursue practical procurement activities in a way that enhances innovations.

3.3. Is functional procurement allowed?

As a matter of fact, the notion of functional public procurement and functional specifications are not new in the context of EU Procurement Directives. Text about “Specifications in terms of functional and performance requirements” has been included in the Directives since 2014 and has been strongly stressed:

- Functional specifications are proposed as a means to “avoid artificially narrowing down competition”.
- *Functional and performance-related requirements* are also appropriate “..... means to favour innovation in public procurement and *should be used as widely as possible*.”

That such a passage is included in a legal text is quite remarkable, and we therefore include a longer quote below highlighting some of its text in italics. The whole legal text, including the reference, is quoted just below.

“.....technical specifications should be drafted in such a way as to *avoid artificially narrowing down competition* through requirements that favour a specific economic operator by mirroring key characteristics of the supplies, services or works habitually offered by that economic operator. *Drawing up the*

⁶ In addition to this dichotomy, there are several other taxonomies of different kinds of innovations and different kinds of procurement. One example is the distinction between incremental and radical innovations. Another one is between regular product procurement and pre-commercial procurement. These other taxonomies are, however, not addressed in this paper. The reason is that we deal with the issue from an *innovation* point of view. If a public agency wants to influence the *direction* of innovation processes by means of public procurement, this can (only) be done by pursuing functional procurement. An important example in a world with serious climate problems is to require that fossil free products are the result of the procurement process. Functional procurement may, of course, also be pursued with environmental, medical, military, and other objectives.

technical specifications in terms of functional and performance requirements generally allows that objective to be achieved in the best way possible.

Functional and performance-related requirements are also appropriate (L 94/78 Official Journal of the European Union 28.3.2014 EN (1) Regulation (EC) No 593/2008 of the European Parliament and the Council of 17 June 2008 on the law applicable to contractual obligations (Rome I) (OJ L 177, 4.7.2008, p. 6) means to favour innovation in public procurement and should be used as widely as possible.” (Directive 2014/24/EU of The European Parliament and the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, 75.)

This means that the problems of inhibiting innovation associated with using “product procurement” and “innovation procurement” can be circumvented by using “functional procurement”. Hence, functional procurement is not only allowed by the EU procurement directives. It is strongly encouraged “*and should be used as widely as possible*” (see quote above).

As mentioned in section 1, such functional procurement has, however, been used to a very limited extent so far. We do not even know how much it has been used. It is a purpose of the research project mentioned in section 1 to find out how much, and how, functional procurement has been used to enhance innovations in the Swedish municipal sector.

To increase the propensity to use functional procurement, two things would be important:

1. A plan of action for the diffusion of the use of functional procurement should be developed. An important part of such a plan should focus upon how product procurement can be transformed into functional procurement. It must also include how human needs can be identified and how societal problems can be solved or mitigated by functional procurement. The transformation of these needs and problems must also be translated into functional specifications.⁷
2. Functional procurement should be developed into a full-scale procurement procedure in the EU Procurement Directives – in addition to the six procedures mentioned in section 2.

⁷ These issues are discussed in some detail in Edquist 2014 c: 36 – 38 and Edquist 2019: 46 – 55.

These are major tasks to develop, and this cannot be pursued here and now.

3.4. “Innovation partnerships” in the EU Directives

“*Innovation partnership*” is a fairly new procurement procedure. It was introduced in the EU Directives in 2014 as Article 31. It was included in the Swedish law in 2018. The description of this procedure is about two pages in the Directives. The Directives on public procurement as a whole are about 230 pages, i.e., the text on innovation partnerships is not very detailed. The quotes following are taken from Article 31.⁸

- “In the procurement documents, the contracting authority shall identify the need for an innovative product, service or works that cannot be met by purchasing products, services or works already available on the market.”
- “The information provided shall be sufficiently precise to enable economic operators to identify the nature and scope of the required solution and decide whether to request to participate in the procedure.”
- It is mentioned that the partners participating in innovation partnerships may be “conducting separate research and development activities,”
- “The contracts shall be awarded on the sole basis of the award criterion of the best price-quality ratio....”
- “The innovation partnership shall aim at the development of an innovative product, service or works and the subsequent purchase of the resulting supplies, services or works...”⁹
- ”In selecting candidates, contracting authorities shall in particular apply criteria concerning the candidates’ capacity in the field of research and development and of developing and implementing innovative solutions.”

⁸ Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, Article 31)

⁹ Apparently, the terms “product” and “supplies” are used in a different way as compared to the use of “good” in section 3.1.

- “Only those economic operators invited by the contracting authority following its assessment of the requested information may submit research and innovation projects aimed at meeting the needs identified by the contracting authority that cannot be met by existing solutions.”

Obviously, the new procedure (innovation partnership) requires that the contracting authority shall identify the *need* for an innovative product, service or works that is not yet on the market. This is new, and very similar to the proposal regarding functional procurement in section 3.2 above. It can also be related to the discussion of “innovation procurement” in section 3.2. However, functional procurement is not mentioned in the legal text on innovation partnerships in Article 31. Neither does the Directive indicate how the “needs” (etc.) shall be identified by the contracting authority.

Another new element in the 2014 EU directives is that the addition of the procedure of innovation partnerships includes the procurement of R&D results. Hence, public procurement in an innovation partnership context includes procuring R&D results *as well as* the purchase of resulting products, services or works.¹⁰

It should be noted that the Directive on innovation partnerships (Article 31) mentions “innovative products”, but there is no methodology proposed to describe these products. We have argued that innovative products cannot be described – if it means that an innovation (a non-existing – new – product) shall be described. However, the “*needs*” for innovative products can and should be identified. This is similar to describing the functions that shall be fulfilled by the new products when functional procurement is pursued – see section 3.2.

Hence, innovation partnerships make possible a long-term relation between the procuring organization and potential suppliers for development (research results) and (later) purchase of new products. It is intended to be a combination of procurement of research results and of new products (innovations).

This procurement procedure is new, and the (short) directive (Article 31) needs a much higher degree of specificity to become operative (just like functional

¹⁰ Including R&D results in public procurement, is like making procurement directives include Pre-Commercial Procurement (PCP), as analysed in (Edquist and Zabala 2015). Before the inclusion of “innovation partnerships” in the EU Directives, PCP was not counted or classified as public procurement. We should also remember that public procurement is many times larger than publicly funded R&D – see section 1. If public procurement leads to the development of innovations, this procurement can be a many times more powerful innovation policy instrument than publicly funded R&D.

procurement). This might be the reason why innovation partnerships have not yet been used in many procurements. This, in turn, makes it very difficult or impossible to evaluate public procurement pursued according to this procedure. A detailed plan of action related to innovation partnerships is as necessary for innovation partnerships as it is for functional procurement.

If functional specification and innovation partnerships is a possible combination, we could discuss how this marriage could be arranged. This could be done in the context of developing functional procurement into a full-scale procurement procedure – which we mentioned at the very end of section 3.3.

4. Concluding remarks

The most important instrument to attain innovations by means of public procurement is descriptions of problems to be solved and functions that shall be performed by means of new products that are developed and procured. The best way to avoid excluding innovations in public procurement is to avoid product specifications in the procurement documents.

By reformulating social, environmental or climate problems into functional specifications, public procurement can be a very powerful means to develop new technologies and other innovations that can contribute to the solution of societal and climate problems. They can influence not only the speed of the innovation processes, but also their directions – see also Section 3.3. This is governed by the *objectives* that it is decided that public procurement shall have, e.g., that, in this case, certain sustainability or climate objectives shall be reached.

Obviously, product procurement and functional procurement are ‘ideal’ types. The relation between the two may sometimes be complex and multifaceted. For example, the documents behind the same procurement initiative may contain both product specifications and functional ones. An important question is whether our dichotomy instead could be seen as a continuum from product, to mixed, to pure functional procurement?

Conceptualizing these two ideal types of public procurement is important, for us to be able to distinguish between the implications of each of these two categories. If only one of the two ideal types is present in the procurement documents, then the effects on innovation discussed in this paper will

materialize. If both are present in the documents, then it is reasonable to assume that they are inconsistent and that the product specifications become dominant—and this is then an obstacle to innovation. The conclusion will then be that it is not a good idea to add a functional specification without removing the product specifications.

However, this issue must be analysed further, preferably empirically. To our knowledge, no such study exists. Our preliminary conclusion on this point is that product and functional specifications should be dealt with separately - in the analysis as well as in the practical pursuit of public procurement.

The notion of “innovative procurement” is sometimes used and can mean different things:

1. That the result of the procurement process may be an innovation (a new product).
2. That the procurement process is pursued in a new and innovative way.

It is important to distinguish between the two. But they are also related to each other. For example, we have shown that “product procurement” cannot lead to innovations. For this to happen, the procurement must be transformed into functional procurement, i.e., the product specifications must be changed into functional specifications.

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