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Policy instruments for public procurement of innovation: Choice, design and assessment[☆]

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ABSTRACT

Public procurement is increasingly seen as an important potential instrument of innovation policy. However, policy design has been underpinned largely by anecdotal evidence and without a clear theoretical or empirical basis for understanding how supplying to the public sector actually influences a firm's innovation capabilities and performance and in what ways desirable behaviour and outcomes can be promoted. This paper seeks to address the basis of innovation procurement policy. It establishes a broad taxonomy of procurement policies and instruments that have emerged in OECD countries in response to perceived deficiencies and then compares these with the perceptions of firms using an analysis of a dedicated survey of 800 public sector suppliers in the UK.

It is observed that policy measures include the creation of framework conditions, establishing organisational frameworks and developing capabilities, identifying, specifying and signalling needs, and incentivising innovative solutions. The survey findings confirm that the barriers encountered by firms correspond to the deficiencies addressed by policies but do not address them sufficiently. This arises from lack of coverage, lack of ownership by purchasers, failure to address the whole cycle of acquisition and to address risk aversion. The scope of policy measures needs to be extended in time, breadth of reach and depth.

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1. Introduction

Public procurement accounts for a significant proportion of overall demand for goods and services and is increasingly seen as an attractive and feasible instrument for furthering the goals of innovation policy [1]. While the interest in the use of procurement as an industrial and technology policy instrument or tool is not new [see [2,3]] there has been a renewed focus on this underexploited 'demand side' approach

in recent years [4,5]. Policy aspirations in relation to the use of public procurement in support of innovation have been backed by the recommendations of a number of inquiries, reports and policy documents, both at EU [e.g. [6–8]] and at national levels [e.g. [9]], most notably in the UK [e.g. [10,11]]. Some of those exclusively targeted public procurement to push innovation [6,8,9], while others had a broader remit and situated public procurement within the overall policy toolbox, often as cornerstone of Lead Market Strategies [12–14]. However, despite this policy interest, there is little empirical evidence on the implementation of such policy aspirations and on whether policy measures reflect the principal difficulties faced by firms seeking to innovate in the context of the procurement process.

Moreover, the use of public procurement as an instrument of innovation policy has posed fresh challenges to policymakers. Most had their experiences founded in a universe of supply-side policies which typically sought to address deficiencies in the

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resources or capabilities available to potential innovating firms. Resource issues remain the dominant mode, focussed heavily on the upstream part of the innovation process and in particular upon the supply of knowledge. More traditional policies then give grants, soft loans or fiscal incentives to firms to develop new technologies underpinned by Arrow/Nelson market failure arguments about social returns exceeding private returns. Grants at least may also address information failures and issues of uncertainty by encouraging firms to pursue longer term R&D or specific new technologies that they might be averse to exploring with their own resources. On top of this, the same instruments can be used to promote behavioural changes by incentivising collaboration with knowledge producing organisations or with other firms. For smaller firms, where capability gaps may be greater, perceived behavioural deficiencies are also addressed by measures designed to improve their capabilities in management of innovation. With the advent of open innovation policies to improve the supply of knowledge by making intellectual property or public data more available are becoming increasingly common. Taking this whole package together, what can be said is that almost the whole edifice of innovation policy has been built upon enhancing the supply of knowledge to the firm in one way or another. Not surprisingly, this has meant that innovation policy is often treated as a branch of technology policy and in governance terms generally rests with ministries and agencies responsible for R&D policy. As we shall discuss later, this may have influenced the selection and prioritisation of policies.

While today it is widely understood that innovation is an interactive rather than a linear process and that both technology (or knowledge) push and market pull have a role, the predominance or traditional market failure rationales rooted in neoclassical economics have dissuaded governments from intervening in so-called near-market stages where customers interact with suppliers. There are of course attractive arguments for this position – in a static situation customers should be best aware of their needs and competition to satisfy those needs should drive towards the best solution. System failure rationales have been less inhibited in relation to which parts of the innovation process they act upon but at their essence is an emphasis upon linkages and institutions and hence a focus on policies to improve networking and information flows. Both sets of rationales can be marshalled in support of the use of procurement for innovation [see [4]] but in their current articulations they do not offer explicit guidance for the design and selection of demand-side policies and in particular procurement-related interventions. As we will see remedying gaps in resources and capabilities remain an important part of the picture. But the crux of demand side interventions is, first, to increase the *incentives* for firms to innovate, that is to make the return to the innovating organisation sufficiently large or more certain such that it is motivated to supply the innovation; and second, to make buyers more willing and able to demand and absorb innovation. To deconstruct demand-side policies we first need to understand what is going on in public procurement. While this area has increased in profile in policy debates for good reasons and is the most prominent of demand-side measures [5,15], the impression is that policy measures at present lack a systematic basis for their design. It is therefore important at this stage to make sense of the variety of approaches already adopted and to relate them to a framework

that goes beyond the merely simplistic. In so doing we will also argue that success in innovation procurement requires a shared vision of the future between purchasers and suppliers and that systematic ways of identifying and characterising those possible futures are an important means to achieve this.

This article investigates the range of policy interventions to support the use of procurement for innovation and assesses the degree to which they correspond to corrections of identified deficiencies in the process. We do this from two directions. In the first part of the paper we review the policy framework logic for current policy (Section 2.1) and the current policy measures as well as the deficiencies they are intended to remedy (Section 2.2). By doing so we develop a taxonomy of innovation procurement policy. In the second part we test the current assumptions about these deficiencies by analysing relevant aspects of 800 responses to a survey of firms supplying the UK government (Section 3). In the third part, we then compare the two to draw conclusions on whether the design and balance of measures is appropriate to support the development of this approach as integral part of a modern innovation policy (Section 4).

2. Remedying deficiencies – a policy taxonomy for innovation procurement

2.1. The policy framework logic

The use of public procurement as innovation policy tool must accommodate the *raison d'être* of procurement, which is that a public organisation purchases goods or services that it needs to perform its function. Such purchases occur in a wide range of sectors but construction, health and transport are all domains where public buying is prominent (in addition of course to the special case of defence and security¹). The fundamental innovation-related activity comes when a public purchaser, in making its choice of what to buy, either seeks to *trigger* innovation by demanding goods or services that do yet exist, or *responds* to it by favouring goods or services which have innovative characteristics. No matter what policy goals are formulated, to design public procurement as an innovation policy tool still means that it is necessary to improve the cost–benefit of a public organisation performing its function.

We build our analysis of public procurement of innovation around a functional approach to procurement, which can track the sequence of events involved (often called the procurement cycle) but is not identical to it. We plot the various policy instruments designed for public procurement of innovation against the various functions they seek to support and the deficiencies they seek to remedy.

We take as the starting point what might be described as the *framework conditions* for procurement, including the legislative background, and the broader governance that determines, for example, the degree of centralisation, autonomy or devolution that applies in public bodies for particular types or sizes of purchase. The framework conditions thus determine the

¹ We exclude defence procurement from our analysis as it is operated under a different regulatory framework.

degrees of freedom public bodies have to design and implement procurement activities. This includes the way in which public bodies engage with the market, and can pursue additional goals such as, for example, improving access for small and medium-sized enterprises (SMEs) which can broaden the range of competition for contracts. SME access is generally thought to be inhibited by a lack of transparency and/or simplicity in access conditions [16].

Moving towards the specifics, but still in framing mode, we encounter a *package of specific procurement policies, personnel and practices* that could exist in a public organisation. For example is there an explicit procurement plan or set of guidelines that favours innovation? Is there a specialised function? What forms of strategic intelligence exist to keep the organisation up to date with the latest technological or service developments and their possibilities?

The next level then concerns instruments and practices around *individual purchasing decisions*. On that level we can organise the discussion around the procurement cycle. We first consider the case of a procurement that triggers an innovation that is needed to fulfil a certain need. The process starts with an *identification of a concrete need*. This is often referred to as the commissioning phase and will be in the hands of the users and budget holders in the organisation rather than procurement officials though the latter may provide advice. Sometimes the identification of need is constrained by lack of knowledge of the potential of innovation. In these circumstances pre-commercial procurement, that is the procurement of an R&D project to develop and demonstrate the innovation, can assist the definition of need and the design of a solution. This may then be followed by ‘regular’ procurement of goods and services.

In any event the more formal (and regulated) procurement activity begins with pre-qualification of potential contractors, articulation of requirements into a formal tender, design of selection procedures and criteria and in due course their application in an evaluation and selection process. During these phases under current legislation, several practices are considered to favour innovation. These include undertaking foresight activities to make purchasers and suppliers aware of options beyond their current market relationships and perceptions, technical dialogue between purchasers and suppliers, writing specifications in functional terms (i.e. setting a performance requirement rather than specifying the route by which it should be achieved), allowing variants to the specification to be considered, and evaluating on the basis of whole-life costs rather than the cheapest bid.

The cycle continues with the issuance and monitoring of the contract and eventual evaluation during all of which awareness of the innovation dimension can be enhanced. The procurement cycle approach may also obscure the fact that innovations can take place through combinations of contracts. In the case of a combination it may be that the innovative ‘architectural’ step is being taken by the user who is creating a new configuration of the purchased elements with or without the explicit involvement of the suppliers. For example a new web-based service may be established by the user but could rely on the purchase of higher-performing IT systems. In many cases public service innovations move in incremental steps. Where such a sequence is operating innovation may involve keeping contractors engaged from one phase to another but

where it is necessary to bring in new contractors there may be a need to transfer the relevant knowledge acquired during earlier stages to the newcomers.

The cycle may also extend in a different way. While the above steps are focussed on *triggering* innovation, public procurement can also incentivise innovation by being *responsive* to innovation through purchase of recent but recognised innovations that are new to the organisation. Since most products and services are not stable but go through a cycle of post-innovation improvements there are important interactions with users at the diffusion stage [17]. These in turn can inform the next cycle.

By walking through these levels and stages it is possible now to consider where failures that hinder innovation to be triggered or diffused properly may occur, or where good practice could be extended. By this means we can build a taxonomy of possible policy interventions. As noted above, we take the issue of deficiencies in two steps – first by making explicit those that are being addressed by present policies and instruments across a range of countries and second through consideration of deficiencies identified by suppliers to the UK government, drawing upon the results of a large-scale survey.

2.2. Foundations of current policies for innovation public procurement

Following the stylised cycle we have described above, we can group policy interventions under four main headings, summarised in [Table 1](#) along with the principal deficiencies they address.

2.3. Adjusting framework conditions: allowing for innovation friendly procurement practice

The first area of potential policy action comes in making framework conditions more conducive to innovation. The legal framework itself is ultimately restricted by the World Trade Organisation Government Procurement Agreement which in Europe is embodied in the European Commission’s Directives on Procurement. The tension in such regulation is between stimulating competition through innovation on the one hand and using innovation as a cover for preferential treatment for ‘national champions’ or other means of suppressing competition to favour local suppliers and hence departing from the basic principles of transparency, non-discrimination and equal treatment on the other hand. This tension recently came to a head in China’s decision to suspend certain procurement measures after protests on behalf of foreign suppliers [18]. In 2005 the European directives were modified with one aim being to make them more conducive to innovation by allowing explicitly, for example, functional specifications, technical dialogue and transfer of intellectual property to suppliers. New proposals for modernising the directives published at the end of 2011 by the EC for the first time make fostering innovation an explicit objective and introduce:

“... the innovation partnership, a new special procedure for the development and subsequent purchase of new, innovative products, works and services, provided they can be delivered to agreed performance levels and costs. In

Table 1
Policy measures in support of innovation public procurement.

Policy category	Deficiencies addressed	Instrument types	Examples
Framework conditions	<ul style="list-style-type: none"> i) Procurement regulations driven by competition logic at the expense of innovation logic. ii) Requirements for public tenders unfavourable to SMEs 	<ul style="list-style-type: none"> i) Introduction of innovation-friendly regulations ii) Simplification & easier access for tender procedures 	<ul style="list-style-type: none"> i) 2005 change in EU Directives including functional specifications, negotiated procedure etc. ii) 2011 proposal in EU to introduce innovation partnerships iii) Paperless procedures, electronic portals, targets for SME share
Organisation & capabilities	<ul style="list-style-type: none"> i) Lack of awareness of innovation potential or innovation strategy in organisation ii) Procurers lack skills in innovation-friendly procedures 	<ul style="list-style-type: none"> i) High level strategies to embed innovation procurement ii) Training schemes, guidelines, good practice networks iii) Subsidy for additional costs of innovation procurement 	<ul style="list-style-type: none"> i) UK ministries Innovation Procurement Plans 2009–10 ii) Netherlands PIANOo support network, EC Lead Market Initiative networks of contracting authorities iii) Finnish agency TEKES meeting 75% of costs in planning stage
Identification, specification & signalling of needs	<ul style="list-style-type: none"> i) Lack of communication between end users, commissioning & procurement function ii) Lack of knowledge & organised discourse about wider possibilities of supplier's innovation potential 	<ul style="list-style-type: none"> i) Pre-commercial procurement of R&D to develop & demonstrate solutions ii) Innovation platforms to bring suppliers & users together; Foresight & market study processes; Use of standards & certification of innovations 	<ul style="list-style-type: none"> i) SBIR (USA, NL & Australia), SBRI (UK), PCP EC & Flanders ii) Innovation Partnerships & Lead Market Initiative (EC), Innovation Platforms (UK, Flanders); Equipment catalogues (China to 2011)
Incentivising innovative solutions	<ul style="list-style-type: none"> i) Risk of lack of take up of suppliers innovations ii) Risk aversion by procurers 	<ul style="list-style-type: none"> i) Calls for tender requiring innovation; Guaranteed purchase or certification of innovation; Guaranteed price/tariff or price premium for innovation ii) Insurance guarantees 	<ul style="list-style-type: none"> i) German law enabling innovation demands in tenders; UK Forward Commitment Procurement; China innovation catalogues (to 2011); Renewable energy premium tariffs (DE and DK) Immunity & certification scheme (Korea)

addition, the proposal improves and simplifies the competitive dialogue procedure and facilitates cross-border joint procurement which is an important instrument for innovative purchasing.”

[[[19], p. 10 and Art. 29]]

The long term partnership which the new procedure is intended to foster addresses a recognised deficiency in the previous regime whereby all benefits from innovation effectively had to be realisable in the context of a single purchase decision when in reality most innovation takes place through a series of incremental improvements. In this case the partnership is intended to be structured in a sequence of steps from R&D to supply but allowing exit by the contracting authority at any stage if so desired.

Despite the existence of directives, even within the EC there is substantial variation in the framework conditions for procurement as they affect innovation. For example, under Belgian Law (Art.78) those who work on the prototype for a public purchaser are excluded from bidding to supply that purchaser with the resulting innovative products. In this case a pro-innovation policy measure would be the removal of this article from the Law – a course which has been recommended by two international reviews [[20], also see [21]]. The application of the procedures introduced in the directives also varies widely across different EU countries. A case in point is the uneven use of Competitive Dialogue, with 80% of the total procurements using competitive dialogue in Europe taking place in the UK and France [22,23].

A different tension in framework conditions concerns access of SMEs to public procurement. The general political view is that SMEs get insufficient access to public contracts and there have been specific lobbies in respect of high tech

SMEs.² While this is a wider issue than innovation policy, there are some important overlaps in that an increase in the number of potential bidders can drive up competition [24] and in particular the variety, arguably increasing the potential for innovation. Some specific policy measures are described below but at framework level the principal issue is whether there should be a quota for SMEs. In the United States, a programme of affirmative action for SME Procurement has been in place since 1978, when the Public Law 95–507 amended the 1958 Small Business Act so as to make government procurement more accessible to small businesses in the US, with a “fair proportion” of government procurement spending to be placed with small (and other disadvantaged) businesses. For Europe at least the conclusion thus far has been that operation of a quota would be in violation of European Treaty principles or the rules that govern fair procurement across the EU [16]. More specific measures aimed at SMEs are discussed below.

2.4. Organisational frameworks and capabilities: supporting the innovation dimension for the procurement function

In the area of organisational frameworks, two deficiencies are regularly identified, the first being the broad awareness and commitment of a public organisation to innovation procurement and the second the capability of its employees to execute an innovation procurement strategy. The first of these was recognised in the UK's previous government's White Paper Innovation Nation [11] which introduced a requirement for ministries to have an Innovation Procurement Plan setting

² See <http://www.comite-richelieu.org/>.

out in detail how they will drive innovation through procurement. The aim was to give ministries “an opportunity to fundamentally think about their procurement practices and to consider how these might be improved or used to drive innovation” [25, p. 3]. A cycle of these plans was produced but the Government subsequently described them as varying in quality from strong to ineffective.³ There was no evaluation of their impact on procurement behaviour but the subsequent Coalition government decided to discontinue the requirement for IPPs as part of the wider programme of reform of government procurement [26]. However, other countries, such as Austria, have copied and implemented the idea of regular forward looking plans of departments that outline the need for and intent to procuring innovation [27].

2.5. Building capacities

The issue of capability is generally agreed to be a key barrier. Indeed, in the majority of existing public procurement cases that have been analysed the role of enabling procurers and those who commission procurement has been the single most important enabler – or barrier – for innovation procurement⁴ [[6,28], also see [29]]. Building in the requirements of innovation alters both the practice and the mindset of procurers and those they work with.⁵ This includes several of the activities discussed in the following section and the use of novel approaches such as functional specifications (see below) or of more complex negotiated procedures. Particularly for countries new to the area the challenge is considerable – ministries in small European countries identified lack of sufficient procurement expertise for complex purchases involving innovation as a key barrier for them, especially in the absence of formal training for the profession [28]. There have been various guidelines produced to address this issue [30–32]. Other approaches include the best practice groups, training and the use of learning pilots and demonstrators aiming to spread best practice. For example, the Dutch PIANO activity has been organising meetings, producing publications and working with groups chaired by experts since 2005.⁶ The EU's Lead Market Initiative, an integrated approach to demand-side innovation policy supported networks of contracting authorities [12]. More direct cooperation can also be seen as a means of spreading expertise, for example the use of common documentation in calls. Centralisation is also a response to capacity issues, where a concentration of expertise and budgets is used to compensate for sub-critical expertise and high learning costs across departments. Caution needs to be exercised here as economies of scale and scope can be offset by creating a distance between the procurement function and the users in the distributed parts of the public sector and hence the possibility of interaction with suppliers to foster innovation.

³ This is based on interviews of the authors with officials in various UK departments.

⁴ For an overview of those studies see: <http://ec.europa.eu/environment/gpp/pdf/compilation%20case%20studies.pdf>.

⁵ We focus here on the capabilities during the procurement process, not the capabilities more broadly that are needed to actually implement an innovation once bought. Those capabilities are not on the radar of public procurement interventions.

⁶ See http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/files/case-2_en.pdf.

Lack of experience in handling procurement of innovation could also be manifested in higher costs. Policy initiatives are seeking to address this by offering financial support to buyers in order to reduce the overheads of learning to use innovation-friendly procedures. In one example Tekes, the Finnish national innovation agency meets the cost of up to 75% of project expenses in the planning stage [9, p. 7–8]. The European Commission has an experimental scheme under which financial support of up to 30% of the procurement cost (with a ceiling) is available for purchasing authorities that share experience through the specification and publication of a (joint or coordinated) call for tender involving innovation.⁷

2.6. Identifying, specifying and signalling needs

At the core of innovation procurement policy that seeks to support the triggering of innovation is the communication of needs for innovation from buyers to suppliers. This step requires that the needs have been identified and articulated in a way that can form the subject of a procurement process. As noted in the previous section user requirements can be encapsulated in a functional specification which allows the need to be described and communicated without prescribing the solution and hence creating scope for innovation.

Several types of policy initiatives have sought to reinforce this step. The failure such measures address is an inadequate identification and translation of needs into specification, resulting frequently into a specification too narrowly defined and in terms of characteristics that can be easily measured and monitored and reduced to price rather than innovative features. The articulation of future needs can be at multiple levels, for example both for the public agency (internal use) and for the citizens.⁸ In some terminologies a distinction is made between “commissioning” – the process by which the user identifies and expresses the need and “procurement” in which normally a professional agent carries out the formal process of drawing up a specification and awarding a contract to the chosen supplier. There is as much a need for good communication in these internal channels as there is between purchaser and supplier.

One means of longer term oriented articulation which has become part of the content of the capability agenda discussed above as a key element of good practice is the use of foresight and other long term approaches to get future intelligence about demand and supply. Technology roadmaps give a greater sense of security to those committing resources to an innovative approach and at the same time indicate wider options to buyers [33]. While this is a feature of good practice rather than a policy initiative as such, foresight and road-mapping are sometimes embedded in initiatives that aim to bridge supply and demand such as technology or innovation platforms [for example, 21]. Another kind of platform exists within lead market approaches [12]. Forward-looking approaches may be labelled as market consultation. For example, in a project within the lead market initiative using the UK government Forward Commitment approaches (see below), a health

⁷ See http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/pp-conf2_en.htm.

⁸ An example of the engagement of citizens is the Danish Mind-lab (TC 2011,22).

authority was seeking solutions to provide low carbon ward lighting. The unmet need was put into a procurement call, without prescribing any solution, at least two years before the lighting was needed. A market sounding process was used to engage the supply chain and to stimulate cross-sector cooperation. According to the authority, “The market consultation process was enthusiastically received and culminated in a consultation workshop and a refined outcome based specification” [34].

The largest scale initiatives at this stage of the cycle are in the domain of pre-commercial procurement (PCP). Initiatives in this domain support the development of prototypes by financing the underlying R&D as a starting point for general procurement. The archetypal initiative in this category is the US Small Business Innovation Research Program which reserves a proportion of the extramural research budgets of Federal Agencies for contracts and grants to small businesses [35]. Versions of the scheme exist in the UK, the Netherlands, Australia and Belgium (Flanders) [8]. PCP is also used and promoted by the European Commission which was responsible for coining the term [36]. PCP in general does not come under procurement law as it concerns R&D support and is regulated principally under State Aid provisions. All are concerned with triggering demand and facilitate a definition of a requirement for a solution that is not there in the market. They tackle a range of deficiencies including information asymmetries, lack of interaction between buyer and potential suppliers, perceived exclusion of small companies (e.g. design companies) from access to government contracts, and risk aversion on both the public and private sides.

Possibly the most formalised system for signalling demand was operated by the Chinese government (as part of its Indigenous Innovation Policy) from 2006 until 2011, when it was suspended in response to concerns about the use of the approach to discriminate against foreign firms. Under this system ‘catalogues’ were used to accredit the supply and demand of technologically oriented products. Two major types of catalogues existed, ‘catalogues of indigenous innovation products’ (innovation catalogues) and ‘guiding catalogues of key technology equipment for indigenous innovation’ (equipment catalogues). Technologies listed in the equipment catalogues represented the needs of ministries and had priority for research and development assistance and other support (triggering innovation). The innovation catalogue (which was eventually only used at provincial level) was by contrast a collection of products “accredited” as being innovative and indigenous (in terms of IP ownership) [18] and hence used for procurement responding to innovation.

2.7. Incentivising innovative solutions

A commonly identified deficiency is the risk involved in adopting innovative solutions. There is substantial comment about public sector buyers being more risk averse than the private sector because benefits take longer to be realised than the typical political cycle. National audit bodies are also considered far more likely to criticise what they see as excessive risk-taking than any insufficiency. We explore whether there is in reality evidence to support this view in the next section but nonetheless several policies exist which

have been designed either to incentivise innovation or to offset risks of various kinds.

From the supplier perspective the biggest risk is that the purchaser will not respond to their offering of an innovative solution. The most straightforward signal is a clear requirement for innovation within the tender document. The German government has legislated to enable commissioning bodies to impose additional demands upon suppliers, including asking for innovative solutions [37, p. 16]. A much more targeted approach is the UK’s Forward Commitment Procurement initiative which makes the market aware of needs and requirements and commits to buy solutions that meet these needs at a price commensurate with their benefits [38].

A range of approaches has been proposed for the management of risk in public procurement of innovation [39]. One approach used in practice is through providing a financial cushion. For example, financial incentives have been targeted at reducing the perceived risk of procuring from innovative SMEs. The French government enacted legislation which offered a price premium by means of which buyers could give preferential treatment to innovative SMEs when purchasing high tech goods, R&D or studies [40, p. 14]. Another approach to the mitigation of risk is the provision of insurance guarantees, this time aimed at reducing risk to buyers, the South Korean government’s New Technology Purchasing Assurance Scheme. This grants immunity to buyers for losses incurred due to the procurement of products covered by performance insurance. SMEs are able to get the performance of their products certified and can then benefit from the government providing price and purchasing assurance [5, p. 154].

Finally, the use of standards and certificates (such as quality labels) to reduce uncertainty is part of some procurement supporting schemes. One example here is the NHS in England that uses intermediary organisations to establish demonstration procurement procedures (National Technology Adoption Centre, NTAC) or quality certificates and business cases (National Institute for Health and Clinical Excellence, NICE) in order to reduce transaction costs and risks for the NHS trusts and hospitals [41].

3. Deficiencies from the supplier perspective

Above we have discussed the policy instruments against the deficiencies they seek to overcome. Those policies are based on perceptions of policy makers as to what they think the deficiencies are. Moreover, most of the evidence that has underpinned the policy debate in recent years and that has shaped the perceptions of policy makers has been based on case studies. The bulk of those studies have focussed on the demand side itself, on the public organisation that procures and the interaction during the procurement cycle [see [6,28]].

However, to assess how the policy portfolio fits the needs of all stakeholders involved, it is indispensable to understand which obstacles suppliers find most problematic when it comes to selling innovations to public organisations. To understand the suppliers, we have conducted a survey of suppliers to public sector organisations in the UK.

The focus of the survey was to understand the elements that act as barriers and drivers to stimulating innovation in the procurement process. The survey asked for information on a wide range of issues related to the innovation activities

Table 2
The responding sample.

	Categories	Frequency	Percent
Size (no. of employees)	Less than 10	82	10.3
	Between 10 and 49	297	37.1
	Between 50 and 250	226	28.2
	More than 250	190	23.8
Main categories of goods and services supplied	Facilities & management services	91	11.4
	Healthcare equipment, supplies and services (inc. dental & optical)	116	14.5
	Office equipment & stationery, computers & telecoms	61	7.6
	Professional services	159	19.9
	Social community care, supplies & services	133	16.6
	Works	145	18.1
Main client	Local government	191	23.9
	NHS	421	52.6
	Central government	137	17.1
Type of organisation	Private	649	81
	Social enterprise	139	17

of supplier organisations, the types of procurement they are engaged in, as well as general perception on the main practices and competences of procuring organisations, including perceived barriers to innovation.

In order to identify a sampling frame of organisations supplying to the UK government, we used information on public sector contracting during 2010 for the National Health Service, Central Government and Local Government in England.⁹ Overall we identified 8130 public sector suppliers.¹⁰

The survey was conducted using CATI (Computer Aided Telephone Interviewing) by Harris Interactive, a UK survey company and took place between May and July, 2011. By July 2011 800 full interviews had been conducted, which represent approximately 10% of the total sample. Our respondents were either general managers or heads of public sector contracts. Table 2 gives details of the respondents. It is important to note that the vast majority of organisations in the sample is innovative, 94% indicating that they have had an innovation (new or improved product, service and/or process) within the last 3 years. More specifically 54% have introduced a product innovation, 75% a service innovation and 67% a process innovation. Given the composition of suppliers in the sample in terms of the mix of goods and services and the areas of government that they serve, it is not surprising that most of the innovation among government suppliers is related to services.

As innovative suppliers to public bodies the sample is therefore highly relevant to comment on obstacles and deficiencies.

The starting point for our considerations is a broad finding that the lack of demand from the market is the single most important obstacle for innovation, as most recently demonstrated with a Gallup survey for Eurobarometer 2011 [[42,

p. 31,43]]. Our survey zooms into the public share of demand. First, it shows that public procurement does indeed lead to innovation. Out of the 94% innovative organisations in the responding sample, 67% indicate that bidding for or delivering contracts to public sector clients has had some impact on their innovation activity: 25% of the innovating organisations claim that all of their innovations have been the result of public procurement. Furthermore, 56% of the sample reported that they won a public sector contract in the last three years because of innovation.

In addition, 51.4% of suppliers in the sample that carried out R&D¹¹ in the last three years admitted having increased their R&D expenses as a result of delivering or bidding for public sector contracts. Crucially, public buyers are the second most important source for innovation in our survey (right after changes in the market, but more important than internal R&D or private buyers), which again is consistent with the Eurobarometer data for all Europe [42, p. 43]. As well as becoming more innovative, organisations experienced further positive knock on effects: more than three-quarters of organisations who innovated in the context of bidding or delivering goods or services to public bodies in England in the last three years report that the innovation has helped them to win other public sector contracts, more than half increased sales in the private sector and a smaller share of 29% report increased or enabled overseas sales.

Given this potential, it is even more important to understand what obstacles suppliers see and how the policy instruments designed and implemented fit to overcome them. One major obstacle is the general lack to signal the readiness and willingness to buy an innovation. A strong indication is delivered by the comparison to private costumers. Suppliers that responded to the survey and who sell to public and private customers roughly in equal measure – and thus can best compare – assess *public buyers to be less innovation friendly than private customers*, i.e. to be less open to new ideas, less well placed to buy an innovation, and less likely to demand innovation in the first place (Fig. 1).

⁹ Entries for local government suppliers correspond to 93 Local authorities in England. This is around a third of local authorities in England. Data for central government covers 97 department entities belonging to 25 central government departments. Data for NHS trusts covers spend for the 5 (South east, East of England, East Midlands, North West, Yorks and Humber) of the 9 English NHS regions.

¹⁰ Public procurement (particularly in local government) is characterised by a concentration of a high proportion of spend by relatively few firms, while there is a fairly long “tail” in the distribution of businesses that have quite small contracts by value Peck and Cabras [44]. In order to deal with this, we only targeted ‘core’ suppliers, namely organisations whose aggregated annual contracting with the public sector was above a certain threshold (of £50,000) in the 2010 financial year.

¹¹ In our survey, R&D refers to any activities undertaken to increase knowledge for innovation. Examples include making prototypes, testing of a new design, developing new software or IT tools, conducting market research.

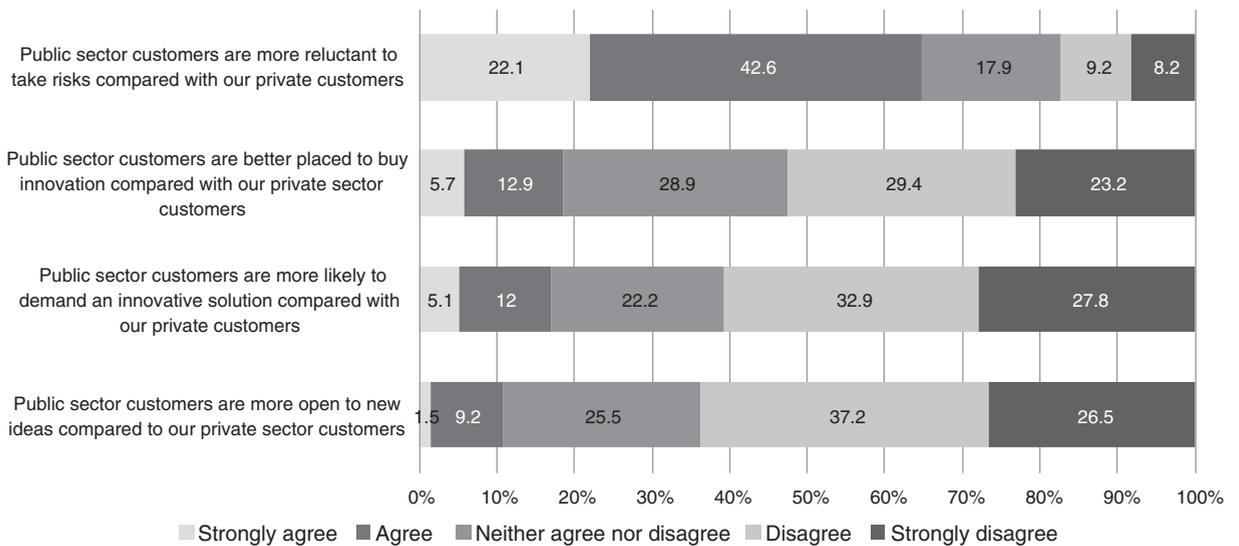


Fig. 1. Assessment of public vs. private customers.

Source: Underpinn survey.

Note: Responses are only applicable to those firms and organisations that supply both to the public and private sector therefore excludes those who largely or solely serve the public sector market (N varies between 194 and 200).

A first bundle of reasons for this are to be found in the attitudes and knowledge of procurers as perceived by suppliers. A large proportion of respondents (strongly) dispute that public suppliers are willing to take risk (indicating the prohibitive incentive structures for procurers to do so), while half of the responding sample question the technical and market knowledge of procurers (Fig. 2).

Secondly, barriers lie in the way public procurement is organised and the principles with which it is conducted (Fig. 3). Overwhelmingly, it is the emphasis on price rather than quality that firms complain most about; 60% of those answering the question see this as a very significant barrier to innovation. A related bundle of barriers has to do with restraining variety: the disallowance of variants and too prescriptive specifications hinder innovation, as does the lack of openness to unsolicited ideas which a majority of respondents report as well. Further, suppliers see a lack of interaction with the procuring body as a key hurdle to innovation. This is true despite the fact that our sample is characterised by often very long lasting relationships. This indicates that long lasting buyer–supplier relationships in

themselves do not support innovation activity, but rather that it is fostered by accompanying interaction and communication of needs. It is in this interaction space that the common vision of the future plays a role. Finally, the procurement process is also assessed to be overly complex and lacking useful feedback, both potential hindrances for innovative companies. These latter barriers are felt particularly strongly by small and particularly microenterprises.

Thirdly, this is mirrored in the actual procurement practices that suppliers value most. The respondents were asked to indicate how often they experience ‘innovation friendly’ procurement practices such as early engagement, interaction with procurers, innovation requirements in tenders and IPR management, and which of those practices has contributed to innovation in the past. The result is striking: those public procurement practices that appear to be most strongly associated with innovation (innovation requirements in tenders, early interaction with procurers, outcome based specifications, advanced communication of needs) are also some of the least frequently encountered (see Fig. 4). Indeed, whereas the practices

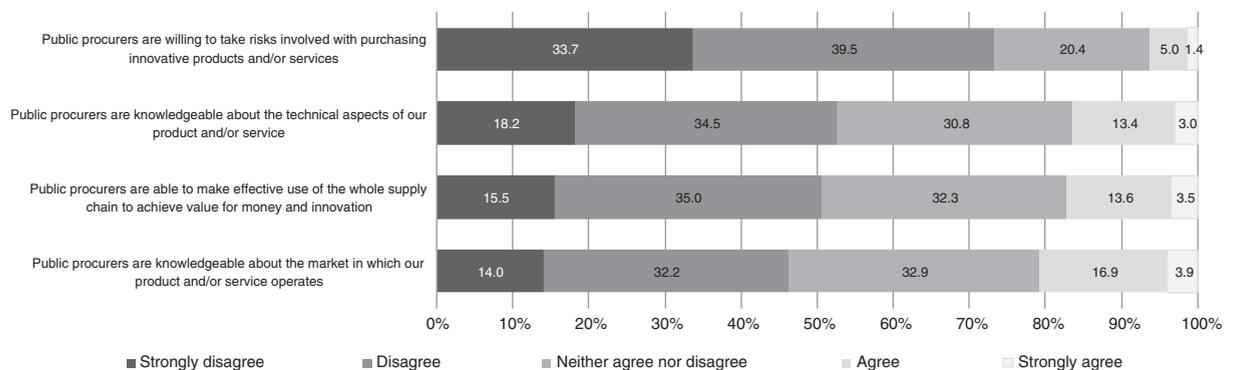


Fig. 2. Assessment of procurer characteristics.

Source: Underpinn survey (N varies between 762 and 791)

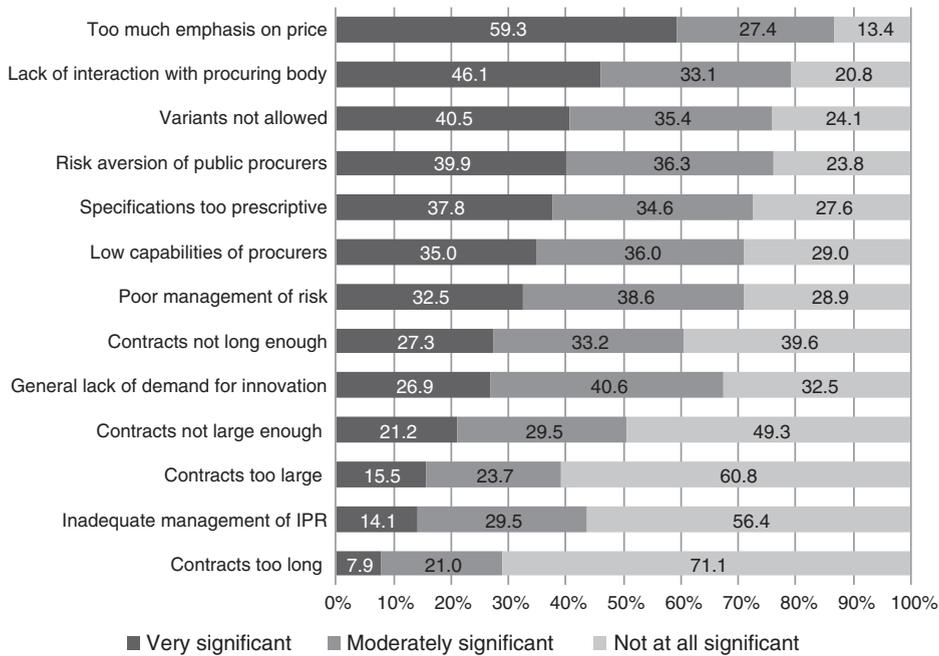


Fig. 3. Significance of barriers.
Source: Underpinn survey (N varies between 610 and 764)

indicated above were found to be a positive influence in their innovation activities in around two thirds of respondents, these practices were only frequently experienced by a third or fewer of respondents.

At a generic level there is a good correspondence between the barriers perceived by suppliers and the main categories of the deficiencies identified as needing to be addressed in the four-part policy taxonomy developed in Section 2.2:

- The perception by suppliers that the procurement process is unduly complicated and lacks useful feedback is evidenced in Fig. 3, which indicates lack of interaction as being

second only to price as a barrier (79.2% of respondents seeing as significant). This is an issue with respect to *framework conditions*;

- Finding public buyers less innovation friendly than private customers and less likely to demand innovation is a strong result from the organisations with only 17.1% agreeing that public customers are more likely to demand an innovation than private ones (Fig. 1) and 71.0% perceiving low capabilities for innovation among procurers (Fig. 3). This clearly maps to policies dealing with *organisation and capabilities*;
- The strong association of innovation with advance communication of needs, early interaction with procurers

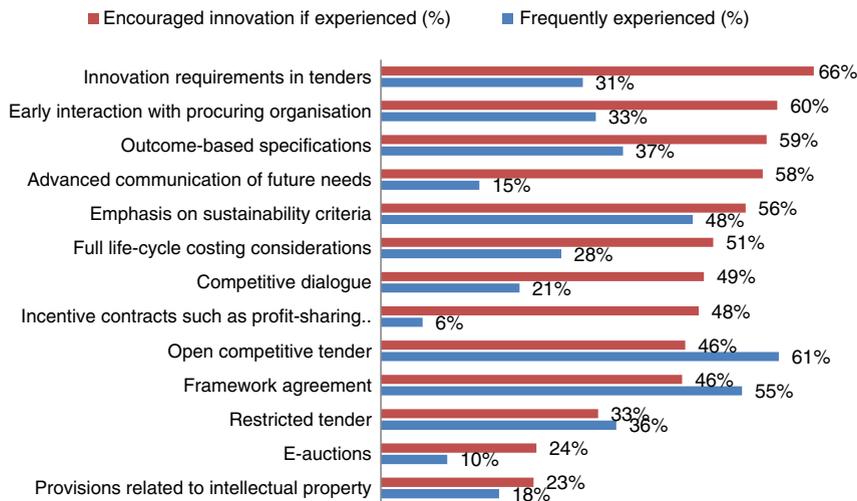


Fig. 4. Assessment of the innovation impact of procurement practices and percentage of all respondents experiencing that practice frequently.
Source: Underpinn survey.

and putting innovation requirements into specifications is highlighted in Fig. 4 which puts these clearly at the top for the firms (also agreeing with the result on lack of interaction noted above from Fig. 3). This links clearly to the group of policies concerned with *identification, specification and signalling of needs*; and

- The attribution of risk aversion to prohibitive incentive structures is explicitly supported by the response shown in Fig. 1 where 64.7% of respondents in a position to compare with private customers see public buyers as being more risk averse and Fig. 2 in which 72.7% of the respondents disagree with the proposition that public buyers are willing to take risks in purchasing innovative products or services. This corresponds to the group of policies that *incentivise innovative solutions*.

Thus we may conclude that, at a first level, there is a good consistency between the deficiencies identified by policymakers as a basis for the design of policy measures and the barriers and success factors indicated by the supplier organisations.

4. Conclusions: limitations of the current portfolio of policies

While public procurement is increasingly seen as an important potential instrument of innovation policy, evidence of its effectiveness is largely anecdotal. This paper first provided a taxonomy of procurement policies and instruments. It then reviewed a range of policy instruments according to the failures they address and compared these with the actual perceptions of suppliers to the public sector. The latter drew upon a dedicated survey of 800 suppliers (private and third sector) to the UK public sector.

As noted above policy instruments appear to be targeted towards the main deficiencies experienced by firms. The question which then follows is why in the face of these policy interventions, firms appear still to encounter the difficulties that the interventions aim to address? To conclude the paper we offer a series of propositions and observations that may explain the persistence of the deficiencies:

- i. The presence of policies does not mean that they are consistently available. Examples are scattered in different countries, and many remain, if not at the proposal stage, experiments or pilots with limited coverage, roll out or budgets;
- ii. Policies are not always well rooted in governance terms. They are often owned by ministries or agencies responsible for innovation policy while successful implementation depends on budget holders in health, transport etc. and often may be at sub-national level. These actors do not necessarily have the same commitment or understanding of innovation, which creates a much bigger challenge to secure the diffusion of the policy.
- iii. A further concern is that, despite the benefits that success would yield, austerity budgets and cutbacks in government have halted some measures (for example innovation procurement plans in the UK). There is also discussion in some quarters of turning back the clock to favour national suppliers over innovative ones;
- iv. Policy instruments mainly address the act of procurement itself and do not engage with the whole cycle from identification of need to adoption and diffusion of the

innovation, even though many barriers exist at those stage and generally involve a wider set of actors and stakeholders;

- v. Although some measures exist to mitigate risk, none address it as a broader cultural problem within the public sector or seek to change wider governance such as audit frameworks to achieve a shift in the risk/reward ratios.

To harness the huge power of procurement budgets in the direction of innovation thus requires a systemic approach to policy and its implementation. Three key dimensions need to be addressed, cutting across the policy taxonomy. These extend the scope of policy to be longer, wider and deeper:

- Extension of the timeframe so that the whole cycle of need and its satisfaction is addressed, also ensuring that a future vision is built-in;
- Extension of the breadth of reach of policy to include all stakeholders and to overcome deficiencies in the understanding of innovation among purchasing ministries and agencies on the one hand and the understanding of procurement and its relation to innovation in those normally dealing with supply-side innovation policies on the other hand;
- Deepening the measures to address the underlying cultural practices of the public sector, particularly in relation to risk management.

A first step in extending the timeframe is to enhance communication between all actors in the wider lifecycle of purchasing and enhancing in the context of a forward-looking vision which brings together anticipated needs and a wide range of potential solutions. As remarked earlier this is the natural territory of foresight approaches, including road-mapping. However, those foresight approaches will need to adapt to the procurement environment and be designed to avoid capture by the advocates of particular solutions. They will also need to engage end users beyond the initial purchasers to ensure that the innovators are given robust feedback at the earliest possible stage. The payoff will be to improve the diffusion environment as well as that for innovation, a critical factor in the public sector where decisions are not wholly market driven.

To make purchasing ministries take ownership of innovation procurement measures may require not only education but also a fundamental change in their mission so that promotion of innovation becomes an additional objective for all of them across government [45].

The problem of risk aversion and culture is probably the least tractable as the remedy is unlikely to reside only within the domain of procurement or even of innovation. To avoid labelling such issues with a mystique that leaves them in the domain of the insoluble it is important to unpack them and to address directly the factors which drive them. Solutions may include specialised intermediaries who support buying organisations in complex procurement activities and by doing so build up capacity and risk management practices across the public sector. Ultimately support and training would have to be underpinned by changes in individual incentives and rewards and a programme of rigorous evaluation designed to test (and hopefully prove) the proposition that the present practice of

highlighting only failures when risks are taken fails to capture the whole picture in which productivity and service gains through innovation in the public sector increase societal welfare.

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