

Public Procurement of Innovation and Health in Denmark

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Abstract

This paper explores the possibilities of using public procurement as means to stimulate innovation and thereby create a more efficient health service in Denmark. The increasing interest for public procurement of innovation in the Danish health sector is justified for demographic reasons. Increasing number of elderly people should be taken care of by fewer numbers of staff. This can be done only if innovation is achieved. Region health authorities are also in the process of building new and refurbishing old hospitals. The paper summarises the theoretical rationale for using public procurement as a means to stimulate innovation, and explores the possibilities for using public procurement of innovation for a Danish context. Special attention will be made on pre-commercial procurement as a means to create innovation, - a recently developed approach that helps public agencies stimulate research and development of goods and services that has not yet reached the market.

1. Introduction

The role of public procurement as a means to stimulate innovation has increasingly been emphasised the last decade. At the European level, public agencies have been described as “big market players” which “have powerful means to stimulate private investment in research and innovation” (European Commission, 2005, p. 8). In the UK, initiatives are underway to make government “a smarter customer”, with stimulation of private sector innovation as a central theme (Department of Trade and Industry, 2004, p.11). Similar developments are also emerging elsewhere. Public procurement contributes to around 16 % of European GDP (National IST Research Directors Forum, 2006), and in some countries, e.g. the UK and in some market areas e.g. medical equipment, the share might be even bigger. Consequently, the public sector commands a strong purchasing power that, if managed accordingly, could promote innovation.

Denmark is a country that has not traditionally given much attention to public procurement of innovation. In the often cited Fraunhofer study on public procurement and innovation it was established that Danish policies on public procurement up to 2005 mainly concerned efficiency aspects while some other EU member states were already in progress towards developing policies and practices for public procurement of innovation (Edler et al, 2005). The traditionally relatively modest interaction between the public sector and firms in

Denmark, was also identified as a problem to be addressed in future innovation policies by Danish analysts (Innovationsrådet, 2004).

What was previously an only emerging policy interest in Denmark has since then evolved and manifested in several reports and initiatives. One example is the Danish health sector where the interest for public procurement of innovation is growing. Regional health authorities are planning substantial new hospitals and refurbishing of old hospitals, where public procurement will be a central issue (Voss, 2009). Recently, the Danish Enterprise and Construction Authority issued a report on public private partnerships (PPP). The starting point in this report is the understanding of PPP as a special case of collaboration between public agencies and suppliers. Instead of a traditional buyer-supplier relationships PPP offers creates partnerships where the participants jointly work towards innovative solutions (Ebst, 2009). The Danish Government has also allocated DKK 100 Million funding pool for PPP-projects (Innovationsrådet, 2009). Thus, it can be concluded that there is an increasing interest for public procurement as a means to stimulate innovation in Denmark and lots of activities are currently under way.

2. Public Procurement of Innovation for Better Health

There exists an array of definitions of public procurement of innovation in the research literature (Rolfstam, 2008). Also practitioner's views on how to best utilize public procurement as a lever for innovation varies in different countries and industry sectors. Here, public procurement of innovation is understood as the *purchasing activities carried out by a public agency that lead to innovation*. This relatively broad understanding means for example that activities carried out both before (what is sometimes called the pre-procurement phase) and after the formal tender process should also be taken into account. Example of activities in the pre-procurement phase would be scanning of markets and emerging technologies. Examples of activities after the formal tender process is concluded can for instance be evaluation of project outcomes and collection of lessons learned to improve procurement projects in the future. Public procurement of innovation may also render different results and take place in different modes. This is discussed in the following section.

2.1 The Hommen Matrix

One attempt to summarise different types of public procurement of innovation lead to the development of the Hommen matrix, named after the late innovation researcher. This typology relies on two dimensions in order to define public procurement of innovation activities, type of social need motivating the procurement process and its role in relation to the market (see Picture 1).

The reasons for a public agency to execute public procurement of innovation can be *intrinsic*, i.e. procurement takes place in order to satisfy own need. In the typology this is called direct procurement. Another situation occurs when the

public procurer is not the only potential user but seeks to promote market acceptance of the procured item by other potential users. In such a situation the procurement is based on needs that are shared or '*congeneric*'. This is referred to as collaborative procurement. The third element on the axis of social needs is *extrinsic* or catalytic procurement. This refers to a situation when the public procurer does not obtain something that immediately is of use to itself. Instead, the public procurer acts on the behalf of other end-users, for instance private consumers.

Role in Relation to Market	Initiation (Development)	Escalation (Adaptation)	Consolidation (Standardisation)
Type of Social Need			
Direct (Needs intrinsic to public agencies)			
Co-operative (Congeneric, or shared needs)			
Catalytic (Needs of end-users; extrinsic to public agencies)			

Picture 1. The Hommen matrix, a typology of public procurement of innovation.

The market dimension in this typology denotes the role of a procurement project in relation to the market, as follows. Sometimes public procurement project creates a new market. The role of the procurement would then be market *initiation*. In situations where a market already exists, the effects of public procurement of innovation may be characterised as 'boosting' or *escalating* an already existing market. A third type occurs when the role of a public procurement process leads to *consolidation of markets*. This refers to a situation when the market is fragmented by different products and solutions and where there is a perceived need for harmonization or standardization of all or some selected aspects of a product or solution.

A combination of these two dimensions would create a matrix consisting of nine possible types of outcomes for public procurement of innovation. This typology is outlined in Figure 2, populated with some examples discussed in the preceding text. Some additional examples are also included and discussed below. (For a

further discussion on the population of the matrix see Gavras et al, 2006. For an elaboration of the Hommen matrix, see Hommen and Rolfstam, 2009)

2.2 Rationale for Public Procurement of Innovation

The rationale for developing policies and practices for public procurement of innovation is explained by the connection between innovation and growth. Firms engaging in R&D leading to innovation will gain new knowledge and competencies, which in turn will increase competitive advantage over firms that do not engage in such activities. This means that, in the long run, on average, innovative firms will survive and grow to a larger extent than those firms that are not innovative. It can be argued that successful firms also create prosperity for the people employed in those firms, and also for the economy in general.

The research literature in general verifies policy-makers' claims that public procurement can be a useful instrument for stimulating innovation (Dalpé and DeBresson and Xiaoping, 1992;). In fact, it has been argued that it is more efficient than other supply-side policies (Edler and Georghiou, 2007; Geroski, 1990; Rothwell, 1981). It has also been argued, in the case of the European semiconductor industry, that public procurement initiatives - if they had ever been implemented - could have prevented European firms from lagging behind American companies that were supported domestically by large public contracts (Morris, 1990). While not always literally talking about innovation per se, the use of public procurement as a way to stimulate technical development has also been highlighted for the building sector (Westling, 1991); for creating environmental friendly technology (IEA, 2000; Erdmenger, 2003); and as a way to coordinate demand and faster bring new technology to the market (Phillips et al, 2007), in other words, market transformation (Neij, 2001).

Thinking in terms of innovation rather than according to mainstream economic principles creates possibilities for public agencies. If one understands 'growth' or value as created by capital and labour, the only way to increase value is to increase input. This means that 'more value' is achieved by either increasing capital and/or increasing labour. In other words, to achieve better services more machines need to be bought or more staff need to be hired. This is a situation that becomes problematic in a situation when resources are scarce. By introducing an innovation a public agency may be able to deliver a better service without increasing spending of resources. Alternatively, the same service can be delivered with less spending of resources. Especially in times of crisis, when resources indeed are scarce, it would thus make sense to consider the options given by public procurement of innovation as a way of improving service quality per resources spent ratio.

Although public procurement of innovation includes other modes than those rendering innovation that satisfies an intrinsic need within a specific public agency the outcomes of public procurement of innovation should always be some kind of gain. For intrinsic public procurement of innovation the outcome

would mean some kind of improvement for the public agency, either manifested in better public services or the same services delivered in a less costly way.

As was alluded to above, promoting public procurement as a means to stimulate innovation means at least implicitly a questioning of neo-liberal ideas of the free market as the universally best set-up for sustaining innovation. It has also been shown that public agencies can move and create incentives for innovation in situations where private firms would normally hesitate. These situations are typically called market failures or system failures. System failures occur for instance in technology shifts where emerging new technology is about to replace existing technology and thereby create uncertainty regarding what is adequate focus for firms R&D efforts. Such uncertainty existed for instance when digital technology was emerging in telecom. It was because of rather explicit demand from the national telecom agencies that both Nokia in Finland and Ericsson in Sweden dared to start development of digital switches (Palmberg, 2002).

3. Tools and Mindsets for Change towards Public Procurement of Innovation

In public procurement of innovation at least two types of actors collaborate, the public procurer and the supplier(s). Conceptually, public procurement of innovation consists of a public 'problem' whereas the solution is attained through the utilization of knowledge available among suppliers. Thus, for innovation to happen, knowledge about the problem needs to be communicated to suppliers and also, awareness of available solutions needs to be communicated to the procurer.

In order to understand innovation in general and also public procurement of innovations, as emphasised in the literature (Dosi et al, 1988; Lundvall, 1992; Hollingsworth, 2000) reviewed in Rolfstam (2009), institutions need to be taken into account. Institutions might be understood as "the rules of the game in a society... that shape interaction" (North, 1990, p. 3) or as "sets of habits, routines, rules, norms and laws, which regulate the relations between people and shape human interaction" (Johnson, 1992, p. 26). Institutions can also be regarded as "systems of established and prevalent social rules that structure social interactions" (Hodgson, 2006, p. 2). The formal institution that provides 'the rules' for public procurement within the EU are the EC Directives on Public Procurement. What follows from an institutional approach is the need to understand how compliancy with these directives may affect the possibilities for public agencies to procure innovation.

The undergoing policy development on public procurement as a means to stimulate innovation must take into consideration the institutional set-up as evolved under long-term influence of policies promoting aspects that may not have nurtured an innovative spirit. Historically procurers have not been encouraged to take risks, or consider value for money rather than the lowest price in their procurement decisions. There may also be an array of institutional barriers preventing innovation from diffusing into a hospital. For instance, silo budgeting, problems related to getting into supply chains, or decentralised

decision structure may prevent innovation (Rolfstam et al, 2009). There is also sometimes uncertainty regarding the legal limitations for action among for instance lawyers.

In order to implement public procurement as an innovation policy tool there is a need for institutional redesign. Rather than changing laws however, actors on different levels must develop understanding and practices that support the application of public procurement of innovation (Rolfstam, 2009). Actors on different levels need to become aware of the possibilities that actually exist to use public procurement as a means to render innovation. The following section discusses pre-commercial procurement (as described in Rolfstam et al, 2010), a model developed by EU policy makers that can be seen as a vehicle for achieving such change.

3.1 Pre-commercial Procurement

Pre-commercial procurement is essentially an “approach to procuring R&D services” (European Commission, 2007, p. 2). It should be noted that pre-commercial procurement is not a procedure written into the EC Directives of Public Procurement (like the “open procedure”, the “restricted procedure”, the “negotiated procedure”, the “design contest” (Directive 2004/17/EC), the “competitive dialogue” (Directive 2004/18/EC)). In essence, pre-commercial procurement can be seen as a “package” built on the exception in the procurement directives that allow direct procurement of R&D services, i.e. procurement which does not render commercial applications. At the same time, competition must be maintained in order to avoid transactions that constitute state aid. Pre-commercial procurement can be seen as the outcome of a balancing act defined by the two legal frameworks regulating public procurement and competition.

Pre-commercial procurement is described in detail elsewhere (e.g. European Commission, 2007; National IST Research Directors Forum, 2006). Very briefly, one could say that pre-commercial procurement allow three important aspects:

Risk-benefit sharing according to market conditions; Competitive development in phases; Separation of the R&D phase from deployment of commercial volumes of end-products (European Commission, 2007, p. 6-7.)

Pre-commercial procurement gives an opportunity to develop different ideas in parallel where one or a few of the initial ideas will eventually be selected for commercial public procurement in accordance with the Procurement Directives. In that sense pre-commercial procurement starts earlier in the innovation cycle of a product than does a more conventional procurement project. It is also a competitive process where solutions are step-wise selected or abandoned. The first phase in pre-commercial procurement may involve a pre-study or ‘solution exploration’ where several different solutions are explored. A second phase may include prototype development of the solutions that are judged most promising. This can be followed by the development of a small test-batch of some of the

remaining solutions. Eventually one or more of the remaining solutions are selected for commercial roll-out (Fig. 2).

Although pre-commercial procurement is an interesting attempt to highlight existing possibilities for public agencies to procure innovation within existing legal frameworks, one problem is that the approach is still relatively untried in practice. In order to change that situation, the European Commission is conducting different promotion activities encouraging pre-commercial procurement. One such undergoing project is the project called “Enhancing Innovation in Pre-commercial Public Purchasing Processes” (PreCo) which is a coordination action funded by the FP-7 program of the European Commission.

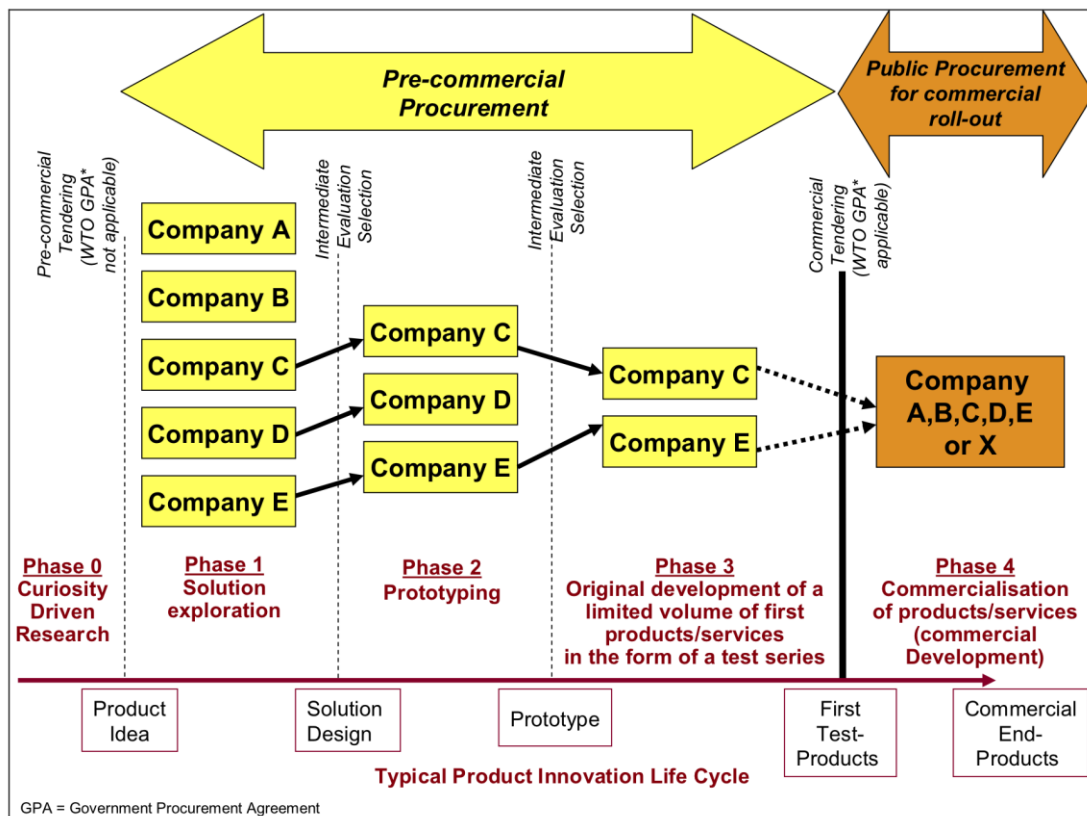


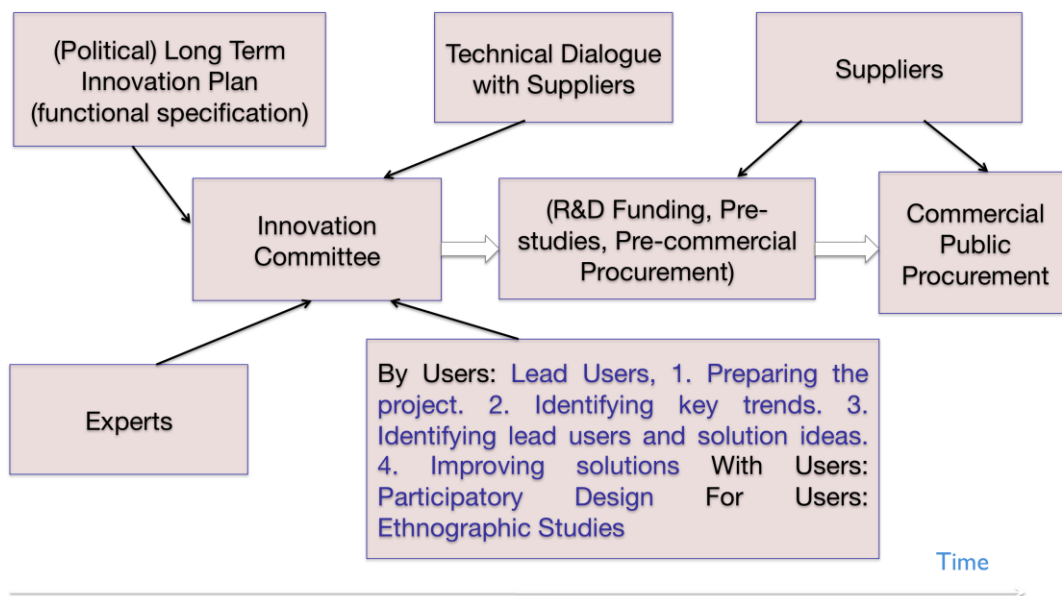
Figure 2. A phased pre-commercial procurement process (European Commission, 2007, p. 8)

3.2 Tentative Demand-system for Public Procurement of Innovation

This section tries to outline what could be a hospital or a group of hospitals understood as an organisation that identifies need and stimulates innovation. This is done by taking a systemic perspective on innovation emphasising that innovation rarely occur in isolation, but is typically a social process characterised by interactive learning (Lundvall, 1992). Following this perspective innovation perceived as a social process occurs in an institutional setting, i.e. affected by laws, norms, traditions etc. (North, 1990; Hodgson, 2006). Closely connected to a systemic view on innovation is the assumption that the innovation system can be controlled and managed. Thus,

public agencies on different levels can and may want to develop “knowledge policies” to promote e.g. scientific progress or development within a specific sector in order ultimately to stimulate innovation (Lundvall and Borrás, 2005). Such knowledge policy development has indeed occurred for public procurement of innovation the last years. What has driven the research reported here is also an ambition to inform such policy development for public procurement of innovation.

A public agency is typically designed and thought of as an entity that *delivers* a service. A hospital delivers health; a school provides with education; a library facilitates book loans and other information services, etc. In order to deliver public services different technologies may be used. A hospital, for instance, uses a variety of technologies to treat patients. In relation to innovation, however, public agencies are mostly seen as rather static or passive users. Very little emphasis is traditionally made on how to change aspects of how public services are delivered and the potential role public agencies may have to stimulate innovation. Picture 1 tries to summarize a model emerging from the idea of public agencies as potential creators of demand for innovation.



Picture 1. A Demand system for public procurement of innovation

Briefly, the model implements some essential success factors typically occurring in successful public procurement of innovation. It takes for instance into account that political support is needed. Politicians may formulate long term (master) plans where visions of future innovations are communicated. There should be an innovation committee reassuring that required expertise is allocated to projects. This may mean expertise on public procurement law, project management, and technology. One important aspect is to scan for emerging technological opportunities. Hence, a continuous interaction with industry is essential. This can take place as consulting events or simply by visiting fairs and conferences organized by industry.

As was discussed above, there exist an array of different possibilities to perform public procurement of innovation. A public procurer may choose different procedures or make certain different decisions on how to select suppliers. The way the procurement is organized may vary depending on different variables such as the maturity of technology to be procured, the number of potentially qualified suppliers, the level of innovation, etc. When the procured technology is relatively immature and unproven, procurers may want to use pre-commercial procurement. To make adequate choices on the organizational set-up allocation of experienced staff is essential.

The model captures some relevant interactions, for instance those with experts and suppliers. Another important and often neglected category in the context is users, i.e. staff working in the public sector. Especially in health sector, users of medical technology are important sources of innovation that should be taken into account (von Hippel, 1988).

4. Concluding Remarks

In general, the public health system is designed to *deliver* health services to citizens. Inspired by current policy development underscoring the role of public procurement as a means to stimulate innovation, the current paper attempts to highlight another perspective. Understood as competent procurers, health agencies may be able to demand innovation in health technology that in turn may enable an improved service level at the same cost, or maintained service level at reduced cost. In order to utilise public procurement of innovation, a complementary perspective needs to be developed. One model discussed in the paper, that is of interest in such a context is pre-commercial procurement. By applying pre-commercial procurement health authorities may help to stimulate innovation and get access to technology that would otherwise not be available. Discussed in the paper was also the possibility to think of for instance a hospital or a group of hospitals as forming a demand-system for public procurement of innovation.

One general problem with implementing innovation policies has to do with the principles on which specific policies are selected. Inspired by success stories elsewhere, policy makers often attempt to copy these successes into their own domains. This “naïve borrowing of ‘best-practices’” has been questioned in the context of policy making for Asian economies in transition (Lundvall, Intarakumnerd and Vang, 2006, p. 16). Similarly, authors writing about regional policies maintain that “successful borrowing or copying of a single institutional idea is quite difficult to achieve, since it is often the case that the imitated institution will not function in the same way in the context of another institutional set-up or configuration” (Eriksson, 2005, p. 53). In a similar manner, Tödting and Trippel (2005, p. 1204) argue that “[i]t would be misleading ... to conclude that innovation activities required to secure competitiveness are the same in all kinds of areas”. Thus the sensibility in taking into account contextual considerations concerning Danish conditions before implementation of these policies are made are obvious.

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