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**Routines and Communities of Practice in Public
Environmental Procurement Processes**

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ABSTRACT

Environmental procurement has received increasing attention as a policy tool promoting change towards sustainable consumption and production. The successful implementation of public environmental procurement policy requires the establishment of new routines for user-producer-supplier relationships that enable the integration of environmental aspects. The aim of the study is to analyse the roles of different communities of practice and learning patterns in environmental procurement processes. Building on experiences from the procurement of ecological food and sustainable construction in Stockholm, the paper identifies learning patterns and codes of practice when environmental criteria are introduced into existing routines for economic and technical specifications in public procurement processes.

JEL codes: D83, Q28, Q55,

Keywords: Public environmental procurement, routines and codes of practice, procedural and declarative knowledge, vertical and horizontal learning, City of Stockholm

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1. Introduction

This study builds on experiences from environmental procurement in the public administration of the City of Stockholm in two different areas: ecological food and sustainable construction. By comparing experiences from the two areas, the paper explores learning patterns when a new, environmental component is introduced into the routine-based procurement process along with prevailing economic and technical specifications. The aim of the study is to analyse the roles of different communities of practices and learning patterns in environmental procurement processes. The argument put forward in the paper is that there is a need to develop greater knowledge about communities of practices, routines and codes of practice in advancing environmental policy analysis and planning.

The paper analyses public environmentally motivated procurement in Stockholm. Different types of knowledge are discussed using theoretical concepts applied to learning processes, but also different communities of practices involved in the environmental procurement process. The paper pays particular attention to learning processes associated with changes in procurement routines to include environmental criteria in order to explore what characterises these learning processes. The second theory contribution, concerned with the concept of 'community', is applied to outline different communities involved in the process of environmental procurement. The concepts of knowledge/learning and communities are further described and discussed. The paper employs the concept of community of practices, which focuses on the objective of creating new skills in a given practice (Cohendet et al., 2000).

The concept of a community of practice, together with the concepts of functional group and epistemic community, is used to describe different functions held by communities. These three communities are then used as a specification of the more inclusive concept of policy community. To examine and apply these concepts in the context of public environmental procurement in Stockholm, a combined approach of analysis of policy documents, environmental programmes was complemented with results from earlier studies and interviews with central actors and procurement administrators involved in the procurement process. These documents and sources of information are also referred to in the sections introducing the two procurement processes analysed and in the following section outlining some features of public environmental procurement in Stockholm.

The paper is organised in five parts. Following the introduction, the second part provides a background to the policy and practices of public environmental procurement in Stockholm. The third part outlines the theoretical approach of the paper. Particular attention is paid to concepts of procedural and declarative knowledge, learning processes, communities of practice and routines in creating new standards, adapting basic documents and defining codes of practice for environmental procurement. Experiences from public environmental procurement are presented in the fourth part with examples from ecological food and sustainable construction in Stockholm. Finally, results and conclusions are discussed and further research outlined.

2. Environmental procurement in Stockholm

The municipalities in Sweden have a high level of autonomy in policy making and the management of resources. Responsibilities of the municipality fall under the categories of providing education, schools, childcare and care for the elderly. In addition to these objectives of welfare, local and regional goals also increasingly address sustainability, encompassing economic, social and environmental concerns. Introduction of environmental procurement is one such environmental concern that has received increased attention in the municipality of Stockholm. The goals related to environmental procurement are formulated both at the level of the municipality of Stockholm and in the eighteen City districts that are the functional units for the objectives mentioned above.

Stockholm's environmental programme has set out goals addressing environmental procurement related to environmentally compatible chemicals and foodstuffs. The environmental objective for chemicals simply states that the City of Stockholm's administrative units and companies shall account for plans for environmental regulation of chemicals, also including purchasing policies. The objective for ecological food is quantitative and states that the City's activities shall increase the percentage of organically produced foodstuffs purchased to at least 15% (Stockholm City, 2003, p. 15). Environmental criteria are also applied to the procurement processes of product groups, such as vehicles, by the Sports Administration and the Streets and Real Estate Administration. This paper builds on experiences from environmental procurement in public administration in Stockholm in the procurement of ecological food and sustainable construction. Objectives for ecological food are mainly set in the provision of foodstuffs to schools and senior housing by the local City district administrations. For the area of sustainable construction, the Street and Real Estate Administration in Stockholm plays an important role, and there are initiatives in the City districts. The City has a general programme for sustainable construction to be applied in all new developments. In this paper, however, we focus on environmental procurement in Stockholm's prestigious urban development Hammarby Sjöstad, which has a set of project-specific environmental objectives. Although these goals are formulated in a separate environmental programme (for Hammarby Sjöstad), there is an ambition that both "knowledge and technology generated in the process should be disseminated to contribute to sustainable development elsewhere" (Stockholm City, 1997, pp. 5-6).

The environmental procurement process is surrounded by legal, scientific and economic considerations and restrictions shaping the conditions for the formulation of procurement criteria. The current regulation states that only procurement criteria for a service or product can be applied (NOU, 1998). This means that, legally, the environmental requirements for products and services must relate to the good or service that is the object of purchase. Ancillary criteria may not be applied. For example, the service provider cannot be required to have a policy of use for ecological products, for example ecological coffee, internally in their organisation. The question of what can be considered good or acceptable from an ecological point of view is also a matter of scientific understanding of the environmental impact of goods or services purchased. Besides the legal and scientifically related issues to be addressed for successful implementation of the procedures for environmental procurement, from the viewpoint of the City administration, there are also economic considerations that the administrative units have to take into account. For example, the objective above of a desired increase in organic (or ecological) food will also result in a cost increase for the food purchased.

The successful implementation of procurement policy and criteria also involves coordination between several of the City's working areas (construction and housing, environmental planning etc.) as well as between geographically bounded City districts. However, the procurement process also involves interaction between public customers and private suppliers. The environmental procurement process is, in fact, local level 'governance' carried out by the municipality. Governance activities (in contrast to government activities) involve both public and private actors. These activities not only focus on the management of resources but also on the mobilisation of resources. This is evident in the description of governance as "the mobilisation and management of collective action with respect to qualities of services, opportunities and places in cities..." (Cars et al., 2002, p. 11, emphasis added).

The quality of a certain service that is subject to public procurement can be described as 'economically advantageous' by fulfilling all (or some) of the numerous, often conflicting criteria. These criteria may relate to cost, quality, aesthetic values, performance, technical features, service, technical support, environmental impact etc. according to the Act on Public Procurement (SFS, 1992). These goals, and possible conflicts between goals arising from them, require procurement routines to incorporate ways to cope with tradeoffs between costs and environmental impact, but also an assessment of what possible consequences the environmental procurement practices may have on the opportunities for smaller firms to take part in the process and compete for supplier contracts.

It is argued that a policy-driven approach to governance requires that policy objectives and strategies are articulated (Healey, 1997, p. 215). The articulation of goals in written documents is important in the policy process of implementing environmental criteria in the public procurement process for both the external and internal transfer of knowledge. External interaction involves public procurement agencies in their interaction with private contractors or suppliers while internal interaction targets the sharing of experiences within the public administration. From the above, it can be seen that, although the present study acknowledges the importance of these policy-making and agenda-setting processes preceding the implementation phase, the focus of this paper is not on examining the power relations that lead to the formulation of these particular goals as studied in other planning processes (Foucault, 1980; Flyvbjerg, 1998). Rather, the focus is on implementation. This can nonetheless give increased understanding of the roles and importance of communities of practice providing new knowledge about policy-making processes in formulating and revising environmental objectives. Studies of research- and technology-intensive sectors, such as the electronics industry, provide examples of public procurement processes which successfully influenced the innovation process (Rothwell and Zegveld, 1981). One important mechanism stressed there is the public procurement process as a mechanism to create a market for new innovations and new technology. For the procurement processes of ecological food and sustainable construction, market creation is also relevant.

Another role for the public agency and public policy making, suggested in earlier studies of the interrelationship between technological change and the environment, is to provide an infrastructure for environment-related innovation (Freeman, 1994; Freeman and Soete 1997; OECD, 2002). Governmental environmental procurement is one of several tools for implementing public policy through the adoption of codes of practice to promote environmentally

attuned alternatives. Theoretical contributions on how these alternatives for better environmental performance can find their way to the market stress that technology is socially embedded. Approaches used for exploring this are, for example, the role of technological regimes (Berkhout, 2001), the greening of technology as an evolutionary process (Kemp and Soete 1992; Raven and Verbong 2004) and strategic niche management (Kemp et al., 1998; Smith, 2004).

At the European policy level, Integrated Product Policy (IPP) proposes a strategy to “strengthen and refocus product-related environmental policies to promote the development of a market for greener products” (EC, 2001, p. 3). One mechanism suggested in IPP is the use of public procurement for market creation. The Green Paper on IPP emphasises the purchasing power of public organisations, stating that public procurement represents 12 % of the EU’s GDP (EC, 2001, p. 15). This implies that there are expectations for (public) environmental procurement as a tool for creating a market for ecological products and services. Another challenge, alongside market creation for existing products and services, is developing procurement criteria that provide both enough flexibility and sufficient stringency to promote innovations (i.e. new or substantially improved products and services) also with regards to environmental performance.

3. Knowledge, learning, communities of practice and routines

3.1 Learning and codified knowledge

The idea that information exchange and knowledge transfer between actors provide opportunities for innovation and learning is central in the literature of innovation systems. This body of literature stresses the importance of interactive learning applied to a local, regional, and national level (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist, 1997), as well as to sectoral systems (Malerba, 2002) and technical systems (Carlsson and Stankiewicz, 1991). Learning processes in the economy have been conceptually described as involving four types of knowledge (Lundvall and Johnson, 1994):

Know-what: knowledge about facts (knowledge close to information)

Know-why: scientific knowledge about principles and laws (specialised knowledge)

Know-how: capability to do things at a practical level (skills)

Know-who: who knows what and can do what (specific and selective social relations)

Know-where is a fifth category added (Cohendet and Meyer-Krahmer, 2001) that becomes increasingly important when the knowledge is codified, while know-who is extremely important when we seek (to understand) knowledge that is tacit.

A remark is in order here in outlining the different types of knowledge in the five categories above represent. The difference between the nature of procedural knowledge (know-how) and declarative propositions (know-what and know-why) deserves further attention (Cowan et al., 2000) but so do their complementarities. For example, in the development of codes of practice for environmental procurement, both declarative propositions and procedural knowledge are used. As a result, declarative knowledge, such as environmental standards and critical loads of emissions, but also procedural knowledge, based on experiences from earlier public procurement processes (technical and economic specifications), are relevant and influence the public environmental

procurement process. In studies of organizational change and stability, this cultural-cognitive aspect of routines and practices is recognised (Scott, 2001). In the case of public procurement, the knowledge for enabling institutional change (towards higher levels of green procurement) resides to some extent within the public organisation, but also among other actors. These includes suppliers of good and services that are purchased, but also customers such as schools that are affected by the local governments' purchase policy.

In describing different types of learning processes, particular attention is paid to the character (vertical/horizontal) of the codification process and how it is related to the community in which the process of codification is undertaken as well as the community (or communities) that is the target of the codification process (Cohendet and Meyer-Krahmer, 2001). In a vertical codification process, a community tries to codify a body of knowledge, which is tacitly held by another community, in order to take control over it. The horizontal process of codification, on the other hand, is characterised by codification efforts (aimed at reaching "the world") where the codebook produced has a universal ambition.

The notion of vertical learning processes in the planning literature has been used to discuss knowledge transfer by translating national governmental environmental policy into regional and local environmental policy (Vigar et al., 2000), while studies of vertical learning in the literature on innovation management are primarily concerned with knowledge accumulation in buyer-supplier relationships. These co-development activities between downstream buyers and upstream suppliers take place to "introduce new products or improve the quality of existing products" (Appleyard, 2003, p. 358). In this paper, the two perspectives intersect, as the translation of environmental policy practices to the City district levels also involves processes of establishing procurement routines between public buyers and private suppliers. Figure 1 outlines these processes of vertical policy learning.

In this paper, the concepts of vertical and horizontal codification processes are used to illustrate different types of knowledge transfer in environmental procurement processes. A vertical aspect of the codification process, for example, is when public authorities codify their suppliers' knowledge about the environmental properties of their products and services, such as ecological food and sustainable construction. In the context of this paper, a horizontal aspect of the codification process lies in the diffusion of procurement criteria and codes of practice from one City district to another. The role of the public agency is discussed in promoting values and codes of practice, where "a public agency is expected to play a key role in the articulation of values and to internalise this and work in the public interest of its own volition" (Nelson and Winter 1982, p. 268). The values and codes of practice articulated in public environmental procurement processes come from the articulation of environmental objectives, but also from daily work establishing routines for implementing these goals. Both activities can be described as processes of knowledge codification.

The characteristics of the processes of knowledge codification have been studied (Hicks 1995; Senker, 1995; Cowan et al., 2000), with features of corporate or private knowledge often being analysed. This study, however, is concerned with the processes of the exchange and management of knowledge about the environmental performance of services and products in the public-private interface. Given the growing understanding of the environmental properties of products and services, it is also relevant to gain a better understanding of how these properties are

communicated in environmental procurement processes. A novelty of this paper lies in the application of concepts of 'codified knowledge' to the area of environmental policy and routines. Codification of knowledge in connection with the implementation processes of quality standardisation, ISO 9000, has been analysed in earlier work (Bénézech et al., 2001). The codification of knowledge relating to environmental policy and planning, on the other hand, is little studied.

Theoretical work on codified knowledge and unarticulated (tacit) knowledge suggests that tacit knowledge can be divided into knowledge that is unarticulated because no codebook exists or because the codebook is displaced (Cowan et al., 2000). The aforementioned paper on quality standardisation refers to the ISO 9000 standard as an existing codebook. In the case of codification of knowledge related to the environment, one might ask whether the existing standards are to be seen as existing codebooks for two reasons – firstly, because of the great variety of ways (environmental indicators, green labelling, life cycle analysis) of communicating environmental performance, and secondly, because of the difference in the visibility of the environmental performance of product groups and services (Pedersen, 2000).

This paper draws on contributions from the literature on tacit and codified knowledge as well as from the environmental policy literature on sustainable production and consumption, thus building on current theory about the nature of knowledge and at the same time acknowledging particular features of processes involving innovation processes and learning related to the environment. These features are associated with the perception of environmental risk (Cohen, 1997; Stirling, 1998) and uncertainty (Wynne, 1992) and the relation between science and technological change and the environment (Rip et al., 1995; Freeman and Soete, 1997; Gregory and Slovic, 1997).

One important aspect discussed in the literature on tacit and codified knowledge, also influenced by the features mentioned above, is the reward structures for codification. The costs and the benefits of codification of (old or new) knowledge are crucial for whether the knowledge becomes codified, and reward structures impinge on different (social) contexts of codification (Cowan et al., 2000). The codification of knowledge about preventive environmental management must be distinguished from codification of knowledge in end-of-pipe technology. The reasoning behind this statement has to do with the reward structures for codification.

This paper focuses primarily on the codification of knowledge of a preventive character about the environmental properties of products and services subject to environmental procurement. Studies that analyse knowledge codification of end-of-pipe technology (Olson Lanjouw and Mody, 1996) have given considerable focus to the codification of knowledge in patents.

Here, in contrast, reward structures for knowledge codification are linked to the communication of knowledge since participation in the procurement process is conditioned by the provision of information about environmental performance. Hence, there are widely different reward structures for codifying preventive environmental knowledge (dissemination and conditioned participation) compared to codifying knowledge of end-of-pipe technology in patents (appropriation of knowledge).

The municipality of Stockholm encourages tenderers to include environmental information about their products in their tenders for contracts in environmental procurement. This is done through the Act on Public Procurement, which provides the opportunity to include an environmental impact in the assessment of tenders. This is done by stating that “in assessing which tender is the most economically advantageous, the entity is to make the overall assessment including considerations such as cost, quality, aesthetic values, performance, technical features, service, technical support, environmental impact etc.” (SFS, 1992, Evaluation of tenders §22). Hence, the public policy objectives targeting an increased level of environmental procurement can (supported by legislative framework) implement environmental criteria in their procurement processes and thereby promote increased communication of environment-related knowledge by private contractors and suppliers. The ‘messages’ applied for communicating the environmental performance of products (and services) are eco-labels, and the processes of communication are between public purchasing agents and private contractors or suppliers.

To conclude, at the local level, public policy goals are developed for the implementation of environmental criteria as applied to procurement processes. Quantified objectives are formulated for certain product groups, such as the environmental objective of procuring 15% ecological food in Stockholm. This and other product- (or service-) specific criteria serve as an incentive to private contractors and suppliers to undertake codification of environment-related knowledge about their environmental performance. However, there is a great deal to learn about the process of codification of environment-related knowledge in the actual implementation of these criteria and procedures. This study explores what types of knowledge are applied in the learning process for developing codes of practice for environmental procurement in a public administration of Stockholm. Seen as a process of knowledge codification, these codes of practice are bound by legal and economic constraints, and also by uncertainty about the environmental impacts and by the multidimensional character of environment-related knowledge.

3.2 Communities of practice and routines

Studies of policy processes and planning have recognised the daily routines, discourses and practices of governance (Healey, 2003, p. 109) as important components of the planning process. One branch of these studies is concerned with the roles of policy communities and networks (Vigar et al., 2000; Rhodes, 1997) and the way relations are formed and sustained over time (Cars et al., 2002, p. 24). One example in the environmental policy area is the analysis of industry-government relations for policy stability and change in environmental policy making in the UK (Smith, 2000). Another branch of studies focuses on the roles of different types of communities, such as communities of practice, epistemic communities, and functional units that accumulate and share both tacit and codified knowledge (Cowan et al., 2000; Cohendet et al., 2000).

The second branch of literature, mentioned above, contributes a differentiated description of the function of different types of communities in the procurement process. This combined approach enables an analysis of the learning processes and roles of different communities of practice and routines in environmental procurement processes. The paper also recognises that these communities can exist for a limited period of time, after which they dissolve, but can also re-emerge. The environmental procurement processes studied involve public agencies and are

regulation-driven. This means that new regulations and policy formulated can also influence the composition and persistence of the community involved.

Environmental procurement at a municipal level involves the integration of environmental aspects in other established policy areas and administrations. Existing routines, such as routines for economic and technical criteria in procurement, are juxtaposed with new routines for also achieving environmental objectives of the procurement process. What is a routine then? A routine is described as “an executable capability for repeated performance in some context that has been learned by an organization in response to selective pressures” (Cohen et al., 1996, p. 683). Studies of change in organizational routines claim that routines reside in the procedural memory and that “methods of making actors more conscious of their current practices may facilitate change” (Cohen and Bacdayan, 1994, p. 165). Further more, Cohen and Bacdayan outline three basic characteristics of organizational routines. Firstly, routines are multi-actor phenomena; secondly, they have an emergent character where behavioural patterns evolve; and thirdly, the underlying knowledge about the part of the routines held by individual actors is often partially unarticulated.

The above means that some of the knowledge remains tacit even to the actors themselves, limiting their possibility to articulate what they do and why. That may be one explanation, of several, for why “policy communities tend to be closed off to new ideas and become entrenched in particular ways of thinking” (Vigar and Healey, 2002, p. 525). Thus, this study can provide insight into processes of change in the community of practice when new ways of thinking and acting are imposed on established routines by processes of integrating environmental criteria in public procurement practices. Two central concepts linked to the arguments above are policy community and community of practices, and it is therefore justified to start with what we mean by these concepts by referring to earlier literature of relevance.

Rhodes (1997, pp. 38-42) describes a policy community as a tightly integrated network and stresses the functional basis of a policy community serving an area of responsibility (such as education) but insulated from other networks. Others, on the other hand, describe how “policy communities are typically surrounded by other parties who have some kind of relation to them” (Vigar et al., 2000, p. 249). The process of environmental procurement is an interactive one between public customers and private suppliers and cannot be considered to take place in an insulated community. To achieve the environmental procurement objectives, different types of procedural knowledge about the practices of the procurement process are applied, in addition to declarative knowledge about environmental properties of products and services. Hence, the function of the community studied here is not only to provide the services of ecological food and the sustainable construction of residential areas, but also to develop knowledge relevant for the implementation of environmental criteria and apply it in order to achieve the goals of the procurement process. This requires learning processes that also build on knowledge that resides outside the policy community, including the knowledge of individual actors in the user-producer-suppliers networks as well as knowledge that has been codified in guidelines, routines and codes of practice. Hence, it is understood that the description of the policy community stressing relations to other actors as outlined by Vigar et al. (2000) is useful for this paper.

Having said that, this paper employs the concept of community of practices, which focuses on the objective of creating new skills in a given practice (Cohendet et al., 2000), together with the

concepts of functional group and epistemic community to describe different functions held by different communities of stakeholders. For the environmental procurement process, the transfer of knowledge between stakeholders is crucial. The transfer of knowledge between stakeholders depends on the nature of the knowledge itself, but also on the type of relations between the actors that are engaged in the exchange of knowledge. This is a main concern in studies of ‘communities of practice’ and ‘epistemic communities’. An epistemic community is described as comprising “knowledge-creating agents who are engaged in a mutually recognized subset of questions” (Cowan et al., 2000, p. 234). The epistemic community is distinguished from ‘functional groups’ and ‘community of practices’ in its objectives, character of agents, cognitive activity, recruitment rule, dominant learning mode, and what holds the community together; see Table 1.

The functional group and the community of practices both consists of a homogenous set of actors performing a given function or developing skills in a certain practice, and these types of communities are held together by the definition of their task or by the practices performed (see Table 1). The set of actors in the epistemic community is described as being heterogeneous, but there are certain things that keep the community together. Agents in an epistemic community are bound together by their commitment to enhance a particular collection of knowledge, and the recruitment rule is thus defined with regard to the contribution an agent makes to fulfil the goal (Creplet et al., 2001).

In addition to this, the epistemic proximity between actors may arise from shared work or study experiences, or previous co-operation that required face-to face contacts (Breschi and Lissioni, 2001), and reciprocity in the exchange of knowledge can be of importance (David et al. 1999). Hence, although codification processes in the context of epistemic communities enables circulation of codified knowledge, the processes are still characterised by ‘sticky knowledge’, where face-to-face contacts and routines established from previous collaboration are important. The actors and routines involved in the public procurement of ecological food and sustainable construction are outlined in the next part of the paper, which applies a schematic account (Cohen and Bacdayan, 1994) of central actors and routines.

4. Procurement of ecological food and sustainable construction

4.1 Ecological food

Stockholm’s environmental programme (Stockholm City, 2003) sets a goal for the procurement of organic food. The objective for organic (or ecological) food is that the City’s activities shall increase the percentage of organically produced foodstuffs purchased to at least 15% (Stockholm City, 2003, p. 15). The management of schools and nursing homes are two important activities of the City districts for achieving the goal for ecological food formulated in Stockholm’s environmental programme.

The framework supplier agreement for the City’s schools and nursing homes is renewed every four to five years. The most recent tendering procedure, which took place in 2004, was divided in two parts, distinguishing between the purchase and distribution of foodstuffs to schools and nursing homes on the one hand, and the more “consumer adjusted” purchase and delivery to smaller units on the other (Kommentus, 2004, p. 3). In the call for tenders, the framework supplier agreement is estimated to include food for more than 100 000 children and about 24 000

elderly people in schools and nursing homes in Stockholm, and covers a total turnover of around SEK 170-175 million using the preceding two years as estimates (ibid).

The codification of knowledge, in the case of ecological food, takes place in two phases. Firstly, when the environmental procurement criteria are implemented in the tendering process, but also in a second step, evaluating how well the City managed to attain its goals for organic food.

In the first step, the specified goods are divided in two groups, one general group and one ecological product group. This means that the suppliers that compete for contracts will compete in two different categories to ensure that ecological food tenders will only compete with other tenders for ecological food. Thus, the codification of knowledge is strictly vertical in the first step, with interaction between customers (i.e. the City of Stockholm) and the suppliers and wholesale dealers in the food sector.

In the second step of the policy process, i.e. the evaluation phase for improving the practices of the procurement process, there is both horizontal and vertical codification of knowledge and activities promoting learning. This policy process includes the codification of procedural knowledge (experiences of good practices, existing networks for ecological food procurement), but also of factual knowledge (why ecological food is important in relation to national environmental objectives). There is an ambition to coordinate and stimulate learning within the City administration. This is done by collecting information about how the different City districts are working with the procurement of ecological food. In addition to these initiatives of horizontal learning, there are also meetings and networks with suppliers and wholesale dealers in the food sector to achieve a long-term process of change (Lipkin, 2004), representing vertical learning. For both steps of the policy process phases, the knowledge of the private suppliers is considered to be important for establishing procurement criteria that are reasonable for the product specified¹. It can be knowledge about the assortment of certain ecological product groups or the availability of the products during different seasons. Figure 2 provides an overview of the actors and routines involved in the procurement process of ecological food in Stockholm.

The functional group identified in the procurement process for ecological food consists of the individual City district administrations and the Environmental and Health Protection Administration in Stockholm. They are responsible for implementing the environmental procurement objectives formulated in the City's environmental programme. The epistemic community is recognised by a joint effort to construct codes of practice and routines that will facilitate communication and avoid misunderstandings between the City administrations and the private suppliers that compete for contracts. Thus, the epistemic community also includes the private actors in addition to the actors in the functional group.

Communities of practice, in the case of the procurement of ecological food, change over time since the contracts are renewed every four or five years. This type of community of practice includes the consultants managing this new round of contracts. A parallel process of day-to-day practices takes place that includes the interaction between public actors (schools and nursing homes) and suppliers. Both processes contribute to achieving a higher share of ecological food,

¹ Interview with Alexandra Anastasiou, Kommentus, coordinator of renewal of framework agreements for foodstuffs for the City of Stockholm, 28 February 2005.

but involve different stakeholders and communities of practice. Therefore, it is relevant, from a policy analysis perspective as well, to make a distinction between the day-to-day purchase activity (by schools and nursing homes) and the tendering processes renewed every four to five years. The different communities, associated learning processes (horizontal-vertical) and types of knowledge (declarative-procedural) involved in the process of environmental procurement are further outlined in Table 2.

There is a difference in the percentage of ecological food purchased for the different City districts, according to a work report from the Environmental and Health Protection Agency in Stockholm (Lipkin, 2004). Two of the City districts that achieved the highest share of ecological food are about halfway to achieving the targeted 15%. These districts had several years' experience working actively with ecological food issues and have acted as pilot districts.

Experience from these pilot districts shows that existing accounting routines make it difficult to establish new routines for setting up accounts solely for ecological food (Lipkin, 2004). One question identified is how to ensure long-term progress if no economic compensation is given to the administrative units for purchasing (more expensive) ecological food. In the pilot districts of Stockholm, efforts to increase the level of ecological food have focused on providing education to personnel in combination with a clear communication of objectives for the level of ecological food for the individual City district (ibid).

What other factors can be identified as explaining the success or failure of environmental procurement? What does the experience from schools reveal about levels of ecological food and the day-to-day practices of environmental purchasing?

A study of factors that influenced the percentage of ecological food based on interviews in eight schools in Stockholm revealed a difference in the level of ecological food (Rohdén, 2003). The study identified five groups of factors influencing the schools' use of ecological foodstuffs. These related to the school's finances (school budget, the greater expense of ecological food, no economic compensation), knowledge (education of staff and coordination within the City), the municipality and suppliers (availability and quality of products, limited possibility of suppliers meeting environmental requirements, a lack of coordination in City administrations), commitment (interest among staff in ecological food and existing routines limiting the introduction of new ways of doing things), and other factors such as children's dislike of certain ecological food.

The conclusion from the examination of public environmental procurement in Stockholm with ecological food is that there is a two-stage codification process. This includes codification of environmental criteria in the tendering process (every four to five years) but also codification of experiences and best practices in evaluating the procurement processes where there is a deliberate effort to disseminate experiences between city districts within Stockholm. The design of the criteria (with the two separate categories of ecological and non-ecological food) limits the need to balance between economic goals and ecological goals. However, in discussing how to ensure a long-term positive change, with an increasing share of ecological food, the question of economic incentives for City district administrations is raised. Finally, the case of procuring ecological food shows examples of both vertical and horizontal processes of learning including networks or the exchange of best practices. This includes both learning between City districts as well as in buyer-

supplier networks to ensure the involvement of private actors with special knowledge about the food sector. The clear articulation of goals for ecological food in individual City districts and in the City as a whole is vital for achieving goals but also for exchanging knowledge in the implementation and evaluation phases of the environmental procurement process.

4.2 Sustainable construction

This example of municipal environmental procurement concerns construction jobs in a large-scale development project, Hammarby Sjöstad, in Stockholm. The “objects” procured consist of labour as well as materials, together comprising, for example, streets and green areas, or extensions of the municipal infrastructure for water, sewage and heating. Thus, the product is large and expensive, lasts for decades or a century, and though its parts are standardised, the whole is unique and adapted to its site. Procurement is a process of codifying project-specific functional knowledge – a description of the technical properties of the streets, green areas and other physical elements, to be developed. Codification is to a large extent vertical – from the City’s general Environmental Construction Programme, through the Environmental Programme of the whole development area, down to “what” and “where” knowledge that is specific for each procurement process. Parts of the process itself are uncoded, but for the main stages there are standardised documents – for example, templates for programmes and contracts. The codification process can be described as resolving a set of potential goal conflicts, and is undertaken by a temporary epistemic community, or at least a community that is in part specific to each procurement process.

The construction of Hammarby Sjöstad is a large brownfield development of an old harbour and industrial area. The development is guided by well-defined environmental objectives, passed by the City of Stockholm (Stockholm City, 1997). The basic idea is “twice as good” as other contemporary housing. The bulk of the City’s estimated procurement (SEK 2 billion or EUR 220 million) is directed via a Project Team, which is a unit within the Streets and Real Estate Administration. The City’s brief for the Team is that they should influence all stakeholders, public as well as private, to realise the environmental objectives of the project. It can do this through formalised management tools, e.g. development contracts, detail plans or environmental procurement, but also through informal means, for example, handbooks of good practice or seminars. The first few years of the Project Team’s efforts were evaluated in one research project (Johansson and Svane, 2002). The focus of the study was on the process of environmental management (SIS, 1996; Svane, 1999): To what extent did the Project Team identify and use its formal and informal means of influence to realise the project’s environmental objectives? Thus, the study by Johansson and Svane (2002) examined environmental procurement as one of several management tools in the process. Figure 3 outlines the actors and routines of the public procurement process of sustainable construction.

The environmental programme of Hammarby Sjöstad has six main headings. Of these, municipal procurement addresses three: oil contamination, transport, and construction materials. The objectives under these headings are the project-specific codified knowledge. They relate to the aforementioned general Environmental Construction Programme, but are more precise and to some extent quantitative. On the other hand, they are also “directives” rather than strict requirements.

The City's first procurement contract was the decontamination of the soil in the first area of development, Sickla Udde. Until year 2003, this was followed by another 25-30 contracts, this time for streets, green areas and infrastructure. The procurement process proper starts with designing and programming the desired end product and outlining the prerequisites for the production process. This is done by a team of consultants, co-coordinated by officials from the City's Streets and Real Estate Administration. The team produces new knowledge that is specific to each procurement and can be considered an epistemic community. The next phase is the tenderers' assessment of the documents, resulting in tenders from a number of construction companies – the contractors. In this process, each contractor functions as a member of a community of practices, producing new knowledge within a homogeneous group (ibid.). The third step is the Streets and Real Estate Administration's "putting on a par" of tenders, ending with the selection of one. Once more, this happens within a homogeneous community of practices. The signing of a contract ends negotiations. Construction comes next. It involves supervision and inspections agreed upon in the contract and executed by officers of the City. This phase ends with a takeover inspection, which is also the beginning of the guarantee period, normally two years. Often for contracts involving green areas, this leaves the responsibility for cultivation, management etc. to the contractor. The temporary combinations of stakeholders in the construction phase and the guarantee period can all be seen as epistemic communities. This period ends with another inspection, after which the City's Administrations take full responsibility for the management and operation of what has been procured.

In Sweden, the procurement of construction jobs is based on standardised documents, texts from what is known as the AMA series. The construction contract is also based on this kind of document. Combining the requirements of the Environmental Programme of Hammarby Sjöstad with these texts is an example of vertical knowledge codification. While the Environmental Programme addresses environmental aspects only, the AMA series do not directly support environmental procurement. In compiling the procurement programme, the environmental objectives have to be coordinated and included in the document, resulting in a need to resolve a set of potential conflicts of goals. Doing so is part of the normal practice of any construction project, but it becomes more complex and the members of the epistemic community have less experience in handling the environmental objectives. In the study by Johansson and Svane (2002), the stakeholders in the Hammarby Sjöstad project were reported to be unanimous in their assessment of this process of codification. The standardised documents give no support, nor are they in themselves obstacles. Rather, the problems are described as a lack of knowledge of what products are available and of how to assess their environmental properties.

Swedish law regulates public procurement. Normally, this is achieved by using the phrase "...or the equivalent", when a brand name instead of a neutral product/material description is given in the programme. However, in environmental procurement there is sometimes no "equivalent". This is another example of vertical codification of knowledge with a potential for goal conflicts. The problem was identified by developers in the project of Hammerby Sjöstad, but not seen as large by the head of the project team or by the Roads and Real Estate office in the study by Johansson and Svane (2002).

Based on the above, some conclusions can be made. The Environmental Programme of Hammarby Sjöstad is a very specific, new code of knowledge, only in part intended for use outside the project. When combined with standardised codes of knowledge, there are conflicts

between goals that have to be resolved through changes in the practice – the tacit routines of the City’s procurement administrators – and in their negotiations with the other members of the temporary epistemic community. The standardised documents of procurement offer no support; nor are they obstacles in environmental procurement. Thus, there is a need for the development and codification of research-based knowledge to supplement these documents.

Within the group of procurement administrators involved in the Hammarby Sjöstad project, a process of learning took place, especially from the first phase to the later phases. However, despite this being a main objective of the environmental programme, there has been very little dissemination of knowledge about environmental procurement outside this specific community of practice according to the study by Johansson and Svane (2002). In other words, the horizontal aspect of knowledge codification is as yet absent in the procurements of the Project Team of Hammarby Sjöstad.

5. Results and discussion

There are to some inherent differences between the procurement processes for ecological food and sustainable construction has to do with procurement processes of everyday essentials versus large and unique projects. However, there are some distinct differences that go beyond this. While an actively targeted action is taken to coordinate the City districts’ work with the procurement of ecological food, interviews with actors involved in the procurement of sustainable construction in Hammarby Sjöstad show that there has been very little or no horizontal learning and dissemination to the City as a whole, not even to parallel major development projects. In the case of the procurement of ecological food, there have been several initiatives in horizontal learning between City districts, while some obstacles to vertical learning in supplier networks have been identified relating to the availability of products and lack of coordination. These obstacles, together with existing routines, slow down the process of achieving the City’s goal of 15 % ecological food.

The experiences from Stockholm show differences in patterns of learning for different procurement areas but also similarities. Drivers for procedural knowledge and learning were triggered by the communication of knowledge enforced by legislation and public environmental policy documents. For both procurement processes, there are public policy documents outlining the environmental objectives and criteria, but in addition to this, learning processes involving procedural knowledge were undertaken in functional groups, epistemic communities and communities of practice. Other comparative aspects relating to stakeholders and communities and learning are outlined in Table 2.

These results also outline the different types of learning processes (vertical/horizontal) and the different types of knowledge (procedural /declarative) involved in procurement processes. This includes different aspects of where to get the information in tenders from contractors/suppliers, how the procurement process is implemented, who the contractors and suppliers are (procedural knowledge), as well as what to procure to achieve environmental goals and criteria and why the stated goals and criteria are appropriate based on sustainability criteria and environmental objectives (declarative knowledge).

The two cases of environmental procurement, ecological food and sustainable construction, differ with regard to the level at which the environmental objectives are formulated, but both cases selected show that environmental policy objectives are supported by a regulatory framework that provides opportunities to include environmental criteria in the procurement processes. This in its turn provides an incentive for the codification and communication of environment-related knowledge between public-private communities of practice and epistemic communities involved in the procurement process. The procurement of ecological food does not specifically target technology change and innovation (among suppliers) but it provides possibilities for the market creation of environmentally attuned technology and products. However, this process is driven by factors such as public consumption and values – which are influenced by many factors not easily affected by public policy measures. It is important to consider this when comparing other areas of public procurement (such as transport infrastructure and military technology) often mentioned as examples of areas where public environmental procurement triggered innovation processes and technology development.

Since the application of public environmental procurement is a rather new tool targeting sustainability, there is scope for further studies. Here, two areas are suggested following the results of this study. Firstly, there is a need for more analysis of possible conflicts between goals arising in ranking the order of importance attributed to different criteria, for instance relating to costs versus environmental impact. Secondly, analysis of the use of environmental management tools, such as life cycle assessment, in environmental procurement is warranted. These tools are designed to improve declarative knowledge, providing information about what type of products to select and why these are better alternatives. Particular attention should then be paid to stakeholders' perception of the non-articulated (or tacit) knowledge and codes of practice not defined in routines and manuals for the procurement process.

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FIGURES AND TABLES

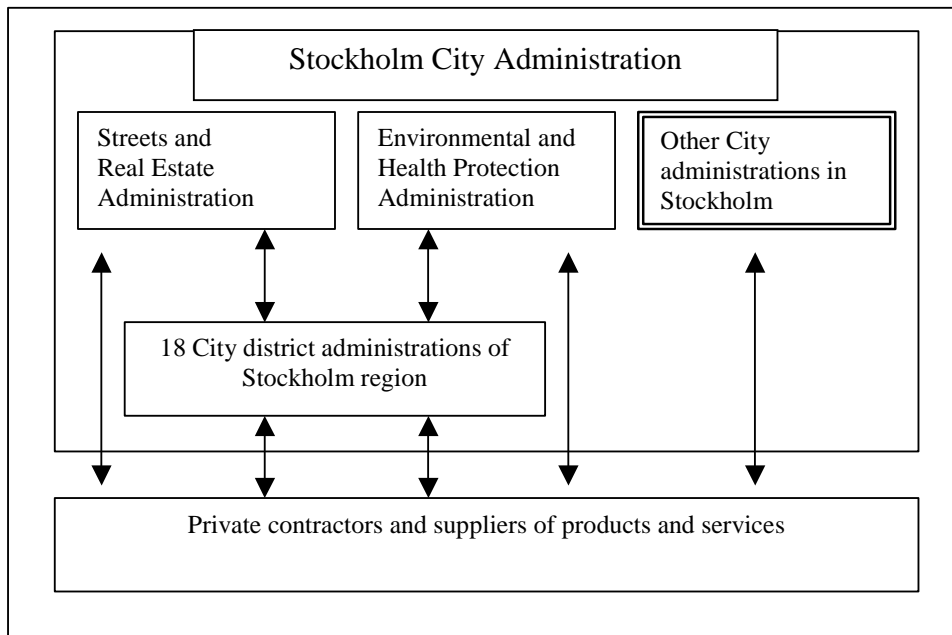


Figure 1. Environmental procurement in Stockholm: public administration and private contractors and suppliers. Note that the Environmental and Health Protection Administration also plays a policy-making role in formulating the Environmental Programme of Stockholm, which outlines objectives for the City administration's environmental procurement.

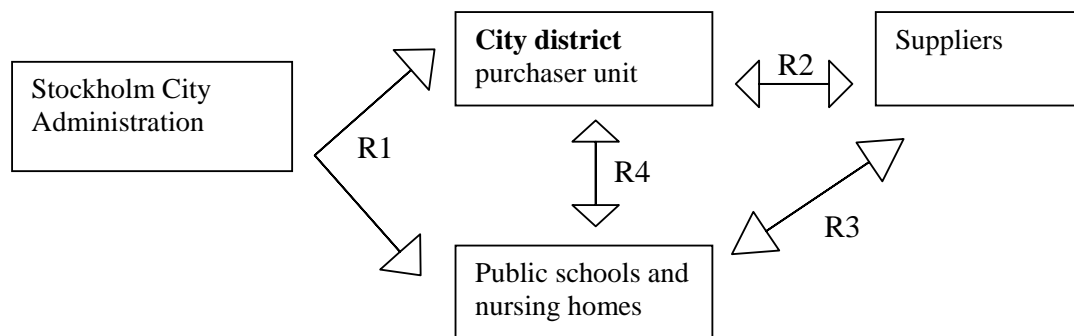


Figure 2. Actors and routines (R1-R4) in the public procurement of ecological food. R1: Goal formulated in Stockholm’s Environmental Programme of 15 % ecological food, R2: Framework supplier agreement renewed every 4-5 years, R3: Routines for coordinating menus in schools to provide greater opportunity for the introduction of ecological food, R4: Shared information and routines between user and purchaser (information about the renewal of framework supplier agreements etc.). Criteria used for the procurement of ecological food are based on environmental labelling.

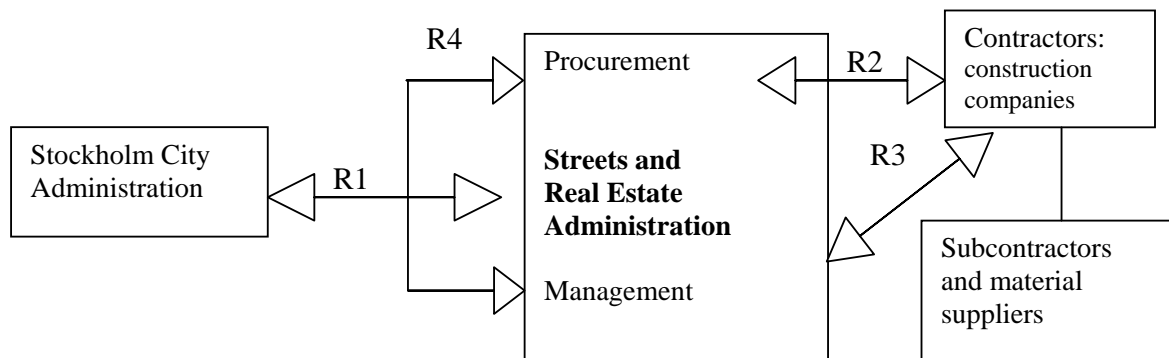


Figure 3. Actors and routines (R1-R4) in the public procurement of environmentally sustainable construction. R1: The City’s general Ecological Construction Programme; the project-specific Environmental Programme of Hammarby Sjöstad. R2: From the procurement programme for tenders to contracts; environmental rounds and inspections during construction. R3: Joint management responsibility during the guarantee years. R4: Informal, non-codified information exchange and feedback within the Streets and Real Estate Administration.

Table 1. Characteristics of functional groups, community of practices and epistemic communities based on a community typology, adopted from Cohendet et al. (2000).

	Objective	Agents	Cognitive activity	Recruitment rule	Knowledge production & dominant learning	What holds community together
Functional group	Ensure a given function	Homogenous	Disciplinary specialisation	Hierarchical	Unintended Learning by doing	Education Task definition
Community of practices	Increase the skills in a given practice	Homogeneous	Accumulate knowledge about a given practice Circulation of best practices	Members who select themselves	Unintended Learning in working	Common passion for the practice
Epistemic community	Produce knowledge	Heterogeneous	Construction of knowledge or language or messages Circulation of codified knowledge	By peers	Intended Searching	Respect of a procedural authority

Table 2. Communities, codes of practice and learning processes in the public environmental procurement of ecological food and sustainable construction in Stockholm.

	Ecological food	Sustainable construction
Functional group	City district administrations and Environmental and Health Protection Administration	Streets and Real Estate Administration
Epistemic community	Network activities targeting efficiency and goal fulfilment involving City district administrations, Environmental and Health Protection Administration, operational purchaser at schools and nursing homes and external actors	1) Streets and Real Estate Administration and consultant responsible for development of procurement criteria 2) Stakeholders during guarantee period of construction
Community of practice	1) Consultants' managing contracts renewed every 4-5 years 2) Shared routines between public schools and suppliers	1) Contractor of construction 2) Developer (City administration)
Existing codebook	Yes – Stockholm Environmental Programme and other guidelines	Yes – several codebooks (not all with environmental aspects)
Horizontal / Vertical knowledge and learning	Both horizontal learning (through interaction among City districts) and vertical codification of knowledge (objectives in Stockholm Environmental Programme translated to routines at the City district level)	Mainly vertical codification of knowledge from Environmental Construction Programme – Environmental Programme in Hammarby Sjöstad guiding routines on what to purchase and where to get the information
Declarative and procedural knowledge	<u>Procedural knowledge</u> Where to get the information in tenders from contractors/suppliers How the procurement process is implemented Who the contractors and suppliers are <u>Declarative knowledge</u> What to procure to achieve environmental goals and criteria Why the stated goals and criteria are appropriate (based on sustainability criteria and environmental objectives)	