



**Aalborg Universitet**

**AALBORG UNIVERSITY**  
DENMARK

## **Strategizing sustainable procurement in a political environment**

Vogelius, Peter; Haugbølle, Kim; Olsen, Ib Steen

*Published in:*  
CIB Proceedings

*Publication date:*  
2011

*Document Version*  
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Vogelius, P., Haugbølle, K., & Olsen, I. S. (2011). Strategizing sustainable procurement in a political environment. *CIB Proceedings*, 234-243. <http://www.sb11.org>

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

### **Take down policy**

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

# Strategizing sustainable procurement in a political environment

Peter Vogelius  
Senior Researcher

Kim Haugbølle  
Senior Researcher

Ib Steen Olsen  
Consultant

Danish Building  
Research Institute,  
Aalborg University  
Denmark

Danish Building  
Research Institute,  
Aalborg University  
Denmark

Danish Building  
Research Institute,  
Aalborg University  
Denmark

e-mail pev@sbi.dk

e-mail khh@sbi.dk

e-mail iso@sbi.dk

## Summary

The paper presents a case study with focus on how the municipality of Copenhagen, as a public client, implements an ambitious strategy for sustainability with special regard to energy consumption. The paper deals with the general question **how** public clients can in practice make a difference as sustainable change agents. The study is based on qualitative interviews, two field cases (sustainable renovation) and with desk-top studies on the policy regarding sustainability and renovation in the municipality. It is concluded that the municipality is pursuing sustainable renovation in a strategic way and it acts actively with network initiatives to enforce the effect of its politics. Further it is noted that when deciding to invest in sustainable renovation, calculations with payback time is used, this gives rise to difficulties and do not always fit into the municipality's budget system. Finally, as a more tentative conclusion, it seems as the original, more ideological agenda about climate initiatives etc. was supplemented by translation to the economical dimension which was enabling a broader political support for sustainability in renovation.

**Keywords:** client, users, innovation, sustainability, renovation, change agent, public policy, construction

## 1. Introduction

This paper describes the results of a case study undertaken as part of the Nordic project "SURE: Sustainable Refurbishment – lifecycle procurement and management by public clients". The SURE project team covers four Nordic countries, with participation from both research institutes and practitioners, namely SBI/AAU (Denmark), VTT (Finland), Multiconsult (Norway) and Innovation Centre Iceland (Iceland).

The purpose of the case study is to analyse how municipal policy, understood as strategies for change, shape the financing and practices of sustainable renovation strategies in a municipality. The actual municipality studied is the city of Copenhagen and its recent policy with respect to sustainability and construction. In continuation of this question, we will draw on some tentative analyses and overall conclusions on how Copenhagen as a public client is acting and shaping strategies [1] for sustainability, in the field of construction.

### 1.1 Analytical approach and disposition for the paper

The study operates on two levels; the systemic policy level and the level of the specific building project. The analyses at the systemic level are juxtaposed with two specific studies of recent renovation projects in the municipality.

At the systemic policy level, we look at the conditions for operating with a sustainable approach to renovation/refurbishment. Our focus is directed towards that part of the policy which deals with the built environment as a subdivision of the target areas for sustainability in the policy for the municipality. We endeavour to understand the web of regulations that a big public client have to operate inside. For example, conditions for long-term loans and the problem of defining and operating with a (new) long-term horizon of investment are explored.

At the level of the specific building project, we look into two more recent building / renovation projects. It is the ambition, to see how these concrete projects have taken colour from the (ambitious) general policy for sustainability. At the same time it is observed how they, as more or less, ordinary renovation projects, have been streamlined like most other projects.

The paper falls in five main sections. The next section gives an overview of the central concepts for understanding the client as a change agent. We break down the different part of the concepts to reveal what kind of mechanisms are at stage; as a consequence we also take a further look into the concepts of innovation and the concept of Strategy. In section 3 we describe the case – the work with sustainable renovation in the municipality of Copenhagen. In section 4 we give an insight into the analyses of case. We have focus on which kind of problems the municipality is facing and which can act as barriers. Finally we conclude in section 5.

## 2. Clients, change (-agents) and strategy

A look at the central concepts represented in the problem, we deal with, show four concepts that seem to be important.

**The keyword 'client'** may translate into the field of 'construction procurement' dealing with issues related to e.g. theoretical foundations; development and privatisation; the role of culture: trust and institutions; procurement systems: classification and choice; contractual arrangements and forms of contract; procurement: culture and conflict; environmental sustainability and procurement (see e.g. [2], [3], [4], [5] and [6]). **The keyword 'change'** may be associated with the field of 'innovation' dealing with issues related to the nature of innovations, drivers of innovation, innovation process and innovation systems (see [7], [8], [9], [10], [11]). **The keyword 'agent'** may translate into the field of 'agency' dealing with the dualism of actors and structures in relation to the role as users, clients and stakeholders (see [12], [13], [14], [15], [16]).

These three fields point at a combination of innovation theories. The theories have to deal with the role of users, most notably the concept of lead users, various constructivist approaches on the co-construction of users and technologies, and the role of clients in changing the construction industry (as dealt with by the CIB Task Group 58 and the literature on construction procurement).

**The concept of strategy** becomes relevant when we try to understand the overall policy and the different initiatives connected with sustainable renovation in the municipality, our understanding is based on [1].

### 2.1 Construction procurement: the role of the client

There are different inputs which can inspire an understanding of this area. Both "The International Council for Research and Innovation in Building and Construction (CIB)" and [17] have engaged intensely in developing projects and programmes to gain experience with the client as a change agent; below a model from the latter.

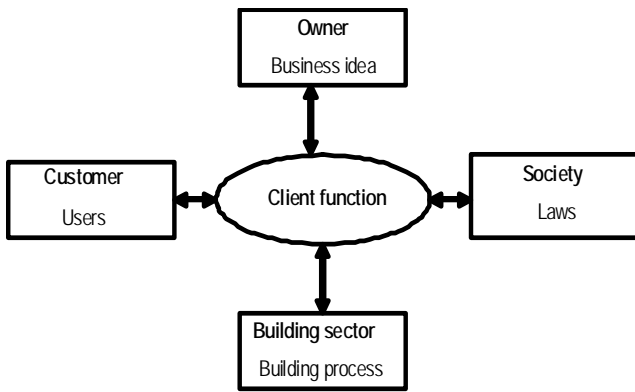


Figure 1. The client's relations to the stakeholders

(Source: The Swedish Association of Construction Clients)

The construction client (and construction in general) operates in a context of project-based services. As noted by [18], a major impediment for innovation in project-based service firms is the gap between the project-based processes and the business processes of the firm. The project-based nature of construction implies that the interdependencies are primarily linked to the fluid, changing and ad-hoc patterns of cooperation with a rather large number of external firms.

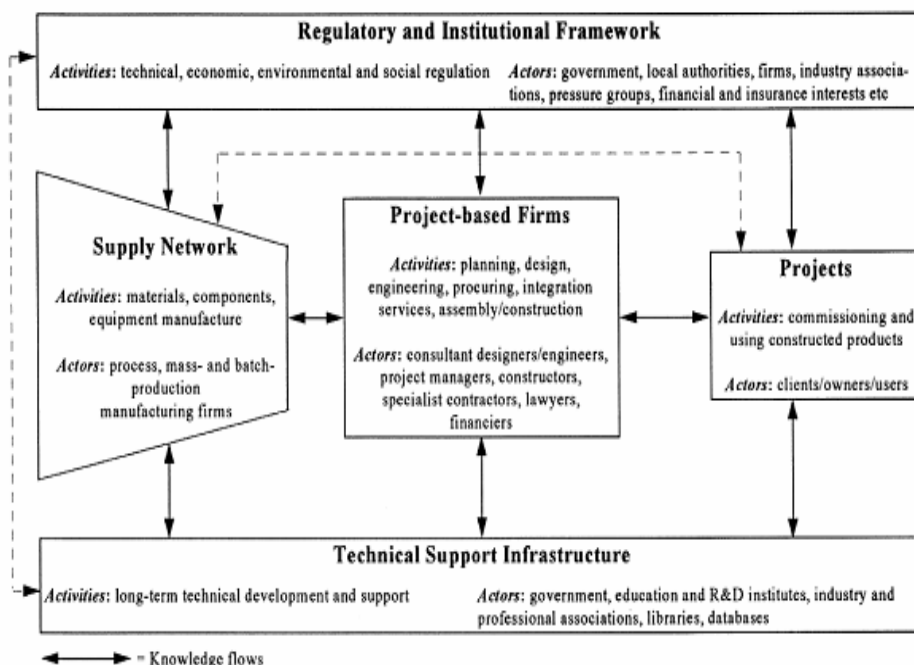


Figure 2. Knowledge, information flows and actors in project-based processes Source: Gann & Salter 2000

Further they offer a framework that explicitly addresses the linking of business processes of the firm with project-based processes (see Figure 2).

Although the work of [18] provides a stronger analytical perspective on the context of managing innovation in construction, it does not in any substantial way provide practical guidelines for creating change in the construction industry.

## 2.2 Change and agents - or the client's role as a user in the innovation process

Since the 1980s, it has been argued within science and technology studies (STS) that technology is socially shaped and designed. The point of departure in STS is that technical objects and social relations are bound together and that actors and technology are co-constructed. A distinction

between the social and the technical is not given beforehand, but is the result of a mutual shaping process [13], [14]).

According to [7] the literature on innovation management deals with four questions. **First**, researchers have analysed the nature of innovation activities by asking questions on whether innovations are radical/incremental, continuous/interrupted, changes over life cycles, are modular/architectural (systemic), result in dominant designs, or are sustaining/disruptive. **Second**, other approaches consider the sources of innovation, which can broadly be grouped in the push model, the demand-pull model, and the coupling model. **Third**, approaches related to analysis of the innovation process include the chain-linked model, the innovation journey, and various innovation management approaches focusing on organisational integration, technology strategies and knowledge management. **Fourth**, approaches concerned with innovation systems focus on systems of innovation on a national, regional, sector and technological level, analyses of networks to which firms belong, and the integration of complex product systems.

Behind the strategy of the client as a change agent, it is believed that the client, through the choice of procurement methods, targeted goal setting, acting as a lead user etc. can have a decisive impact on the products and services of the building industry on behalf of the owner/end-user. However, the client as a change agent requires a closer definition of the role of the client. It is clear that construction projects – whether procured through traditional systems or through long-term 'service contracts' – have to meet the needs of stakeholders and in particular the needs of users and clients as expressed by the representatives of users and owners.

### 2.3 The concept of “strategy”

What do we mean by the concept of strategy?. We can identify [1] four important dimensions that are necessary for the investigation of whether or not an organisation has a strategy (in fact the authors operated with a fifth one, namely “How will we win?”, however this dimension is primarily directed against studies of more commercial organisations and it will not be included here):

- Where will we be active?
- How will we get there?
- What will be our speed and sequence of moves?
- How will we obtain our return?

In the analyses of the municipality of Copenhagen, we had these dimensions in mind, and tried to relate them to the different levels of policy conducted by the municipality.

## 3. The case

Since the 1990s, Copenhagen has been engaged in local policies focusing on energy saving and renewable energy. Several generations of plans for the use of energy and the introduction of sustainability have been prepared, some of them as a part of national and international cooperation with other cities working on the same agenda.

Former initiatives can be mentioned, for example "Agenda 21" for intensified local environmental efforts regarding energy saving, separation and reuse of waste - an initiative that was a continuation of the UN Brundtland report from 1987 [19]. Also the UN stipulation in 2005 of the 2015 goals can be seen in same light. All in all, over the years the initiatives can be perceived as drifting in a direction which is getting both increasingly ambitious and specific.

Today the municipality is also active in various network activities in the field of sustainability. Among others, they participate in a broader development initiative - Gate21 [20] involving Copenhagen and the surrounding municipalities. The primary goal is to be a pivot for new climate and energy solutions, and the initiative therefore hosts major projects for low-energy solutions and renovation with a very broad participation from different public as well as private actors.

It is obvious that a large dominating client like Copenhagen has the option to set out its own requirements, while minor municipalities have to wait for national regulation covering the whole of Denmark. Minor actors have, to a higher degree, to rely on cross-cutting initiatives like "Green Building Council Denmark" (GBC, a broad representation of all actors with reference to construction, building and urban-planning practice; GBC is currently (2010) very active in Denmark - the primary goal being to establish norms and sustainability standards for the Danish construction industry including consultants.

Several web-based sources from the City of Copenhagen present plans and programmes related to energy savings, and more broadly, to sustainability. Below is presented an (by September 2010) extract stating the municipalities' policy on energy consumption:

*Copenhagen is focused on the climate. The city is energy efficient with our district heating system, while nearly 40 % of our citizens cycle to work or their educational institution every day and the electricity-generating windmills, located in the sea outside the city, save 76,000 tons of CO2 emissions annually. Our vision is for Copenhagen to be the climate capital of the world, with a 20% reduction in CO2 emissions by 2015 compared to 2005. We even want to become completely CO2-neutral by 2025 as the first capital in the world. We are looking for joint initiatives from municipalities, the business world and the citizens as well as close cooperation across international borders.*

*More than 30% of CO2 emissions in Copenhagen come from residential and other buildings. It is our goal that in the future all urban development projects will contribute to reducing Copenhagen's total CO2 emissions, and that selected urban areas will become completely CO2-neutral.*

Source: [21]

### **3.1 Copenhagen City Properties – the case organisation**

Our overall research in the case study of the City of Copenhagen originates in "Copenhagen City Properties" (Danish abbreviation KeJD). This is the organisation which takes care of all the traditional tasks of the client. For Copenhagen, several actors used to have relation to renovation and service of buildings. Some years ago it was decided to make a major organisational reform for the handling of buildings used by the City, and City Properties was established as the central organisation in this respect.

According to [22] (The Danish Association of Construction Clients), a municipality, as a public client, can basically choose to arrange its organisation in accordance with different principles. It is possible to illustrate the principles, by thinking of the local facility management organisation as layout in four different ways along an axis with the administration for each unit/building (schools etc.) at one end of the spectrum, and at the other end the entire portfolio for service, new building and renting, centralised in a separate organisation for the whole municipality. City Properties is an example of the latter form which is typically highly professionalised and is applying economic models for calculating rent, investment and depreciation.

The organisation, which administrates one of Denmark's biggest portfolios of properties, describes itself in this way: "a cross-sector unit in Copenhagen under the Culture and Leisure Administration. Copenhagen City Properties handles ownership, operation, development and administration of the City of Copenhagen's properties and tenancies. The property portfolio comprises some 750 properties and 570 tenancies and consists of administrative buildings, schools, leisure institutions, child day-care centres, cultural buildings, fire stations, etc." source: [23] )

### **3.2 The City of Copenhagen – a policy for implementing sustainably**

In the fields of new construction and renovation, the national regulation does not offer much to lean on. In the current Danish Building Regulations (2010) [24] there are no defined standards for sustainability, although you can find detailed provisions for energy consumption and indoor climate. However the principle of sustainability is incorporated in several town plans, but in urban planning sustainability is primarily a declaration of intent, rather than a specific standard for buildings, design or construction. A declaration of intent does not give much leverage to sustainability demands

in renovation projects. Finally some of the regulations regarding sustainability is in-cooperated in the environmental legislation, among others this count for construction waste from demolished buildings

For the municipality, the work with sustainability can, roughly speaking, be divided into three different levels:

The programme level – Political announcements

↓

The level of practical politics (prioritising the economy)

↓

The level of implementation

**At the programme level** the principal political decisions are taken regarding transforming the municipality in a sustainable direction. Political compromises and negotiations are placed at this level. Often the input for policy creation is introductions from the civil servants. The political handling of sustainability and renovation has been greatly influenced by economic calculations regarding possible gains due to reduction of energy cost. Political back-up from a broad spectrum of political parties to sustainability programmes has also been highly dependent on the ability to express gains in energy savings in absolute terms or as good investment compared with the general level of interest rates.

**At the level of practical politics**, we place the comprehensive reports describing how the City of Copenhagen will reach the goal for sustainability, and more precisely the achievement of Copenhagen as a CO2 neutral city by 2025 (with a sub-goal for construction).

For some time, the municipality of Copenhagen has, been working with its own set of standards. In 2010 it announced a new set of regulations with the title of "Environment in building and construction" [25]. It has a binding status for companies that want to work for the City of Copenhagen, whether it is renovation, conversion or new building. Furthermore financial support for urban renewal or social housing can be conditional with regard to the regulation.

The regulation covers 9 different fields:

1. environmental design
2. energy and CO2
3. material and chemistry
4. water and sewers
5. design of valued environments (urban spaces – urban design)
6. waste
7. noise
8. indoor climate
9. building site

For each field the regulation demands that the project is described in three sections, namely an introduction, a demand section and a documentation section.

**At the level of implementing** we have all the practical efforts in the administration for ensuring that the rules and procedures for handling of sustainable renovation projects is followed. It covers all kind of initiatives from informative contact meetings with contractors and advisers to internal education in the new formalities and new templates for bidding in the procurement. At the level of implementing it is also possible to interpret the former mentioned, development initiative - Gate21 [20]

## 4. Analysis

By nature, initiatives in the field of renovations and changes at buildings are bound to be evaluated in a long-term perspective – the life time and rate of turnover for different improvements are long.

It is therefore a general schism how to implement specific goals in energy savings and sustainability, when running budgets are cut down and major policy areas take over in the public debate. Especially themes like (un-) employment, lack of economic growth, a deficit of kindergartens, schools that are run down and stagnation in local business are important themes with strong public attention.

#### **4.1 Backlog and Prioritising**

At present the backlog is DKK 2.5 billion for the City of Copenhagen as a unified whole (according to interview June 2010). With the existing grant of DKK 200 million per year (excluding certain minor special contributions) for renovations (covering all renovations – not only energy renovation), it can quickly be calculated that there has to be some cross-cutting strategies for sustainability, if not all funding is going to be monopolised by urgent, but traditional, renovation tasks.

Some general principles meant for supporting ordinary service has been defined for prioritising the DKK 200 million. In a short form they follow here:

1. Worst first
2. Housing or buildings where people work on a daily basis. For example, it could be indoor problems related to moisture and/or mould growth
3. Of the DKK 200 million/year, 10 million are reserved for individual well-defined sustainable energy renovation projects and additional 10 million are reserved for what could be called extra (marginal) cost of traditional renovation projects where specific extra cost can be traced to new high energy standards. This raises some related problems. In technical terms, it can be discussed what has to be included in the term "renovation", and further what is the "standard solution"? The latitude of marginal cost is central both for access to those special funds but more generally to guidance on when to implement different energy-saving solutions.

Obviously it can be a problem when limited budgets have to be distributed in the day to day practice. Currently there is work going on in the municipality with respect to this. To exemplify the problem, one can mention that plans for better coverage of institutions for children (especially kindergartens and day nursery) is a sensitive subject in the public debate, it has been discussed to stretch a point on energy demand for exactly those institutions – otherwise there was a concern whether the earmarked sum would be sufficient to fulfil the plan for new institutions. The city council is the only one to make this difficult decision!

Up till now the current practice regarding financing of renovation initiatives has often been similar to other investments of the municipalities. This means that funds have to be allocated from year to year. Besides, a rolling budget model covering three more years (constantly four years in all) is applied. A time horizon of 1 – 4 years is often insufficient to plan improvements or renovations at a list of schools, or similar. The problem becomes even more pressing when we talk about calculation pay-back times for different initiatives, in relation to sustainable construction. Especially when initiatives are not any longer among the tree's low-hanging fruits, in those situations payback time can be as long as 10 or even 20 years. The question is how to calculate such initiatives?

As opposed to the calculated, prioritising model, a rather new trend seems to gain footing. That is, simply to take a political decision, in principle regarding a construction principle or similar. As an example can be mentioned a recent decision, by the City Council prescribing how to use "green roofs" (on certain public and semi-public buildings) in Copenhagen. In those cases the ambition both to calculate the price on the initiative and compare the cost effectiveness with other initiatives has been abandoned. In other words: there seems to be embedded conflicts between specific goals regarding sustainability and major policy themes when implementing strategy at the municipality level.



## **4.2 Financing and horizons of investment**

The Danish government has, especially in the last couple of years operated with a very limited "frame of cost" for the municipalities, in relation to the theme in this text, it is important to note this kind of policy for public finances means that the municipalities constantly have to face serious dilemmas in their priorities. This applies to running costs as well as for investments in new buildings and renovation.

Regarding investment in solutions with an energy-saving potential, an exception exists for this principle ("Lånebekendtgørelsen", "the loan declaration"); in such cases municipalities are allowed to obtain loans for new projects without straining the overall frame for cost. This opportunity is frequently used by the City of Copenhagen to realize its policy in the field of sustainability and energy saving.

The municipality has asked itself whether cooperation with major private (or semi-private) investors could be an answer to the difficulties with financing renovation, and recently it has engaged in a tentative cooperation with the worldwide financial institution "Carbon War Room" [26]. In the municipality, this cooperation is regarded as important, and believed to represent a great potential, although there can be problems, due to different core competences in the two organisations as well as a different culture between the organisations when it comes to negotiations and agreements (architects and engineers are not trained in conducting economic negotiations concerning conditions and long-term regulation of loans at a multi-million Kroner scale). In spite of these difficulties, it is the plan to go further into investigations on the potential for long-term loan agreement. This kind of solution is quite new for the City of Copenhagen, and it may have the potential to prevent that the pragmatic "day to day" policy will over the years erode goals and strategies for sustainability.

Looking at the current political scene, solutions with long-term loans from investors with a special interest in CO2 reduction and (and to some extent sustainability in general) seems to be a way of financing energy renovation. In September 2010 Bo A. Kjeldgaard, mayor for the Technical and Environmental Administration [27], has commented on the 2012 political budget agreement, where he draws special attention to the new possibilities for such loans, as a part of the agreement.

But, as we have touched on in the former sections (and as our interview person from KejD have pointed out during an interview), there is obviously a challenge of balancing, at the one hand the public clients governing principle for economic planning and budgeting and on the other hand the need for long investment horizons.

## **4.3 Is the city of Copenhagen following a strategy for the initiatives on sustainable renovation?**

It is possible to interpret the municipalities' handling of the development of sustainable renovation in the scheme described by [1]. With the overall plan for Copenhagen as a CO2-neutral city by the year 2025 and a planning history in the field of sustainability going back to Agenda 21 initiatives at municipality level, the city has pinpointed the arena for where and how to do policy when it comes to sustainability. Or with the expression from [1] they "know where to be active"

The defining of nine focus areas for activities (where construction/renovation is one), where each area is the subject of an analyses, equals the strategic ambition of stating where and how to proceed.

Further the criterion on "speed and sequence of move" is covered by the time table for goals in the years of 2015 and 2025. Finally we saw that the city had a line of initiatives aiming at the procedures for cooperation with advisors and contractors. New mechanisms for procurement have to ensure change in calculations in the biddings. Finally standards have been introduced for how to

document that as a contractor you do in fact follow the initiatives prescribed in the procurement documents.

## 5. Conclusion

The city of Copenhagen has made a marked effort to ensure sustainability as a principle in renovation and construction, and the city is organising its efforts in a strategic way. The outset for the policy can be traced back to the Brundtland agenda, but today the work with sustainability is arranged in a “strategic way” [1]

A major problem for conducting sustainable renovation in practice in the municipality seems to be the calculation of payback periods (internal interest rate). At the same time the payback period is a central instrument in the political decision process when talking about sustainable renovation (which in this connection is mainly identical with “energy savings”). Further the standard economic planning horizon is far too short to host ambitious, expensive energy-saving projects. A cooperation with a private or semiprivate investor is a possible way to handle this problem and the city of Copenhagen is currently looking at this possibility.

As a change agent, the municipality acts on several levels. It acts directly with demands to constructors who want to bids on construction work; it acts as a very active network actor both with efforts for rising new regional projects and for promoting the ideas to the business, industry, public and the state.

Looking at the drift towards sustainability, you can say that inside the municipality, the original, more ideological agenda about climate initiatives etc. was supplemented by translation to the economical dimension which apparently was enabling a broader political support for sustainability.

## 6. References

- [1] Hambrick, Donald C. & Frederikson J.W. 2005: Are You sure you have a strategy? In *Academy of Management Executive*, Vol. 19, No. 4
- [2] Rowlinson, S. & McDermott, P. (eds. 1999). *Procurement systems. A guide to best practice in construction*. London/New York, USA: E & FN Spon/Routledge.
- [3] Edler, J. & Georghiou, L. (2007). Public procurement and innovation – Resurrecting the demand side. *Research Policy*, Vol. 36, 949-963.
- [4] Brown, K., Hampson, K. & Brandon, P., 2005, *Clients Driving Construction Innovation: Mapping the Terrain*, (Australia: Icon.Net Pty Ltd)
- [5] Brown, K., Hampson, K. & Brandon, P., 2006, *Clients Driving Construction Innovation: Moving Ideas Into Practice*, (Australia: Icon.Net Pty Ltd).
- [6] IVA – Kung. Ingenjörsvetenskapsakademien/Swedish Academy of Engineering Science (1997). *Kompetensutveckling inom samhällsbyggnad. Byggherren i fokus*. Stockholm: IVA
- [7] Dodgson, M., Gann, D. M. & Salter, A. J. (2002). The Intensification of Innovation. *International Journal of Innovation Management*, Vol. 6 (1), 53-83.
- [8] Gann, D. M., 2002, *Building Innovation: Complex Construct in a Changing World*, (London: Thomas Telford Services Ltd).
- [9] Manseau, A. & Seaden, G. (eds. 2001). *Innovation in Construction. An International Review of Public Policies*. London & New York: Spon Press
- [10] von Hippel, E. (1986). Lead Users: A Source of Novel Product Concepts. *Management Science*, 32 (7), 791-805
- [11] von Hippel, E. & Katz, R. (2002). Shifting innovating to users via toolkits. MIT Sloan School of Management. Working Paper No. 4232-02.
- [12] Pinch, T. J. & Bijker, W. E. (1984). The social construction of facts and artifacts. *Social Studies of Science* Vol. 14: 399-431.
- [13] Bijker, W. E., Hughes, T. & Pinch, T. (1987). *The Social Construction of Technological*

Systems. Cambridge, MA: MIT Press.

- [14] Bijker, W. E. & Law, J. (1992). *Shaping Technology/Building society – Studies in Sociotechnical Change*. Cambridge, MA & London, England: MIT Press.
- [15] Haugbølle, Kim & Forman, Marianne (2006). *The Co-Construction of Clients, Concepts and Companies*. I: Pietroforte, Roberto; De Angelis, Enrico & Polverino, Francesco (eds.). *Construction in the XXI Century: Local and global challenges*. Rome: CIB & ArTec. pp. 1-12. Full papers.
- [16] Olander, Stefan (2006). *External Stakeholder Analysis in Construction Project Management*. Lund, Sweden: Lund University, Construction Management 06/1023.
- [17] Swedish Construction Clients Forum 2006: *The Role and Mission of the Construction Client*. Byggherreforum. Stockholm
- [18] Gann, D. M. & Salter, A. J. (2000). Innovation in project-based service-enhanced firms: the construction of complex products and systems. *Research Policy*, Vol. 29, 955-972.
- [19] Brundtland (1987). *Report of the World Commission on Environment and Development: Our Common Future*. UN
- [20] Agenda 21. (2010) (<http://www.gate21.dk/> (in Danish only))
- [21] Municipality of Copenhagen (2010). <http://www.energymap.dk/Profiles/City-of-Copenhagen>
- [22] The Danish Association of Construction Clients ("Bygherreforeningen") 2009: *Udvikling af bygherrerollen 1999 – 2009*. Bygherreforeningen & Boligfonden Kuben. København
- [23] Municipality of Copenhagen (2010a). <http://www.kk.dk/sitecore/content/Subsites/CityOfCopenhagen/SubsiteFrontpage/ContactsAndFacts/DepartmentalStructure/CityAdministrations/CultureAndLeisureAdministration.aspx>
- [24] Danish Enterprise and Construction Authority (2010). <http://www.ebst.dk/bygningsreglementet.dk/br10/0/42>
- [25] Københavns kommune (Municipality of Copenhagen) (2010): *Miljø i byggeri og anlæg*
- [26] Carbon War Room (2010). <http://www.carbonwarroom.com/>
- [27] Kjeldgaard, A. B (2010). Interview to Licitationen (newspaper for Construction Industry)