

Situations of Opportunity – Hammarby Sjöstad and Stockholm City’s Process of Environmental Management

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Hammarby Sjöstad is a large brownfield development in Stockholm guided by extensive environmental objectives. This case study focuses on the environmental management of the city’s project team. A main aim was methodology development related to the concept of situations of opportunity – how to study those periods when the team had great influence over the process. Goal conflicts on for example energy use and the lake view were identified. The team used policy instruments such as development contracts and design competitions. Some of the situations identified contributed little to the environmental management, for example the detailed planning. Others were more successful, for example the integration of infrastructural systems. Success situations were unique or created by the team, and had less formal power. Other situations had more power, but were burdened with a prehistory of routines and agreements. The methodology should also be applicable to other processes of environmental management. Copyright © 2007 John Wiley & Sons, Ltd and ERP Environment.

Received 6 September 2005; revised 27 October 2006; accepted 29 November 2006

Keywords: environmental management; environmental sustainability; Hammarby Sjöstad; Stockholm City; situations of opportunity

Introduction

HAMMARBY SJÖSTAD IS THE LARGEST URBAN DEVELOPMENT PROJECT THAT STOCKHOLM HAS SEEN for many years. When fully developed in 2012, it will have 9000 apartments and 30000 people are expected to live and work in the area. Its location as a natural continuation of Stockholm’s inner city shapes its infrastructure and the design of its buildings. Planning focuses on its waterside setting, also transforming an old industrial and harbour area into a modern urban

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environment. For further information on the project, see the Hammarby Sjöstad websites (2006). In its environmental programme from 1997, the project has detailed, in part quantitative, objectives on for example land use, transport and energy. They were summarized as 'twice as good' as ordinary developments of that time (Stockholms Stad, 1997).

Realizing the environmental objectives of the Hammarby Sjöstad project is a process of environmental management. This is but part of the large and complex process of developing the whole area. In this paper, we discuss what can be learned from this process. What have those who are directly involved learned so far? To what extent has the knowledge gained also been disseminated to others? A specific methodology was developed: We studied the process in terms of *situations of opportunity*. Through this, we explored those shorter periods of the process when the City's project team could tangibly influence the process and contribute to the realization of its environmental objectives. Thus, our description of the environmental management process has as a main purpose to introduce this methodology – how to identify and analyse *situations of opportunity* – and its related conceptual system.

The article is based on a research project in which the first phase of the development, Sickla Udde, was studied. Thus the focus was on the environmental management process from spring 1997 when the environmental objectives were passed in the City Parliament, until early 2003 when most residents had moved into the area.

The research project was a case study (Stake, 1995; Yin, 1994). Its data were collected through 30 interviews with officers of the city's project team and some other city administrators, as well as with developers and architects, and furthermore from documents produced during the process and from on-site observations during construction. Thus, results stem from a number of sources besides the ones explicitly given in the text. To a high extent the study was explorative. Taken together, these facts imply the need for a strict methodology. Therefore, we used computerized tools for qualitative analysis and were influenced by the coding process of grounded theory (Strauss, 1987). We did, however, have a draft conceptual framework to support interviews as well as analysis. The research strategy was elaborated in an earlier paper (Johansson and Svane, 2002).

Background – on Environmental Management and Other Brownfield Developments

Many research projects have studied corporate environmental management, especially since the international standards, the ISO 14000 series, were introduced (SIS, 1996). For an overview see for example the work of Ammenberg *et al.* (2002), Hoffman (1997) and Kolk and Mauser (2002). Researchers from different disciplines have also evaluated brownfield developments, for example the Western Harbour of Malmö in southern Sweden, which has clear parallels to Hammarby Sjöstad (Green, 2005; Larsson *et al.*, 2003). Hammarby Sjöstad has been studied in a small number of academic publications (Carlstedt and af Sandeberg, 2000; Forsberg, 2003; Green, 2005).

Also in other countries, city districts have been developed following environmental objectives, for example in Viikki, Helsinki (Helsinki, 1998) and GWL-terrain, Amsterdam (Femenias, 2000). For an overview of projects, see for example that by Beatley (2004).

However, we argue that our approach is different. We did not study Hammarby Sjöstad as a good example or evaluate it in terms of its goal achievement. Instead, we focused on the process itself, through identifying and analysing *goal conflicts* and *policy instruments*, and especially in integrating the findings as *situations of opportunity*. From this it follows that we see methodology development – the identification and analysis of *situations of opportunity* – as a main result, and as a more generally applicable one.

To realize the environmental objectives of Hammarby Sjöstad, all stakeholders of the whole development process must combine efforts: planners, developers, consultants and contractors all have their share. For objectives on for example transport, waste and energy use, the users and managers of the area must also contribute. The project team thus has direct control only over part of realization. Influencing the other stakeholders though indirect, informal means becomes a main task.

Not only are the other stakeholders numerous, but also many of them participate only for a shorter period; once the design phase is over, the architects are little involved according to Swedish practice, to give one example. Furthermore, stakeholders work together in teams, unique for each development contract. Thus, the project team's counterpart in each development is a unique, temporary organization consisting of a developer and his consultants or a contractor with his sub-contractors. In organization theory and business economics, this is the 'temporary' or 'project' form of organization (Dobers, 1999; Packendorff, 1995; Sahlin-Andersson and Söderholm, 2002).

The process of environmental management is one of 'management by objectives'. Often, this is seen as rather straightforward; compare for example the way such processes are described in the standardized documents on environmental management, the ISO 14000 series (SIS, 1996). There as well as often in management literature, it is assumed that once there are well defined goals it is feasible to identify the relevant measures and to realize the goals. This assumed and unarticulated 'goal rationality' might be valid in less complex organizations and when the objectives are well established, but it is definitely less so in a complex process such as that of the development of Hammarby Sjöstad. There, the environmental objectives are at the same time precise and out of the ordinary. Thus they add to an already complex process of decision-making and concretization; in developing Sickla Udde, new routines had to be found and new knowledge gained and disseminated, to counteract everyday 'muddling through'.

This line of reasoning leads to the overarching evaluation question of our project. We did not assess the outcome of the Sickla Udde environmental management process in terms of environmental impacts or goal fulfilment; others will have to do that. Instead we asked which were the periods of time when the project team could powerfully influence goal achievement, how its members acted during their *situations of opportunity* and to what extent they succeeded in utilizing the opportunities of the situation.

The Environmental Objectives from the Team's Perspective

As already mentioned, the overarching aim of the environmental objectives of the Hammarby Sjöstad development is 'Twice as good' as ordinary new housing (Stockholms Stad, 1997). The objectives have six main headings:

- land use,
- soil decontamination,
- technical supply: energy, waste and water sewage,
- transport,
- construction materials and
- noise.

There are also some social and economic objectives. They are, however, neither as concrete as the others, nor as comprehensive. From this it follows that the whole could hardly be called sustainability objectives.

To some extent, the project team can take measures that contribute to realizing all these objectives. However, the full potential of reducing environmental impacts is available only to stakeholders that

co-operate. From this it follows that the team must use formal as well as informal *policy instruments* and also utilize its *situations of opportunity* in order to influence the other stakeholders. In doing so, its members also have to resolve or otherwise handle a number of potential *goal conflicts*.

Theoretical Framework – the Process Studied as Goal Conflicts, Policy Instruments and Situations of Opportunity

Any large-scale development must fulfil many different kinds of objective, for example technical ones such as durability and energy efficiency, practical ones such as efficient use of space and also economic and aesthetic ones; programming, design and purchase abound with potential *goal conflicts*. When environmental objectives are added, the number of goals increases, and the number of possible conflicts, too. To realize the environmental objectives, the project team had at its disposal a set of tools, *policy instruments*, such as detailed plans and procurement programmes. Policy instruments are often used in a specific phase of a project: signing a procurement contract comes before construction begins but after the design. These shorter moments of the management process are the focal points or formative moments of its *situations of opportunity*. During such a *situation*, the process can be influenced so as to more or less comply with the environmental objectives.

In the following, we discuss the environmental management process of Sickla Udde in terms of *goal conflicts* and *policy instruments* and as *situations of opportunity*. The first two concepts are well known and used for example in political science. The third one has clear relations to well established concepts of political science and business economy. It is, however, wider in scope as well as more extended in time and thus, we argue, better adapted to the analysis of processes of ‘management by objectives’ in sustainable urban development.

Results – the Project Team’s Main Goal Conflicts

During the Sickla Udde process of environmental management, the project team encountered a number of goal conflicts. Theory from political science helped us identify three conflict categories: *internal*, *external* and *procedural* (Wandén, 1997).

Internal goal conflicts occur when two environmental objectives cannot be realized at the same time. The intense debate initiated by the developers concerning the level of energy use has some of the characteristics of such a conflict. The environmental objectives for energy use are given as 60 kWh/m² per year for heating, hot water and electricity (Stockholms Stad, 1997). The developers of Sickla Udde joined forces in arguing that this was technically impossible; it could only be realized at the cost of reduced comfort (Kellner *et al.*, 1997). In arguing thus, they made the conflict also an external one, between environmental objectives and comfort ones. Although there are examples of this level of energy use in Sweden and from other countries, the resulting debate led to cautious wordings in the development contracts and later on to a less strict definition of the objectives. Calculations and preliminary measured data indicate that measured real use is around double at 120 kWh/m² and year (Stockholms Stad, 2003).

One obvious and frequent *external* goal conflict occurs between economy and environmental objectives. According to some of the interviewees, environmentally friendly materials are more expensive; the residents are not willing to pay the extra cost etc. Another dimension of the same kind of conflict is the investment cost versus management/maintenance cost; if it costs more to build an energy-efficient house, that investment should result in lower costs in the usage phase. This conflict was often identified by the developers and extensively discussed in a consultant’s report ordered by the team (EAL, 1998).

However, the project team mainly procures green areas, roads, infrastructure etc. for the city's long-term management, and here the conflict is not manifest.

Already in the comprehensive plan for the Sjöstad project, the residents' view of Hammarby Lake was identified as a main quality. Since the lake is to the north of the development area, this means windows facing north. Furthermore, in a design programme, the city planning office requested large window areas (Stockholms Stadsbyggnadskontor, 1999). Although modern windows have much better energy performance than old ones, a wall is perhaps five times better. Thus, there is an external goal conflict with the energy objectives. In practice, the lake view and large windows were the higher priority (Figure 2) contributing to the level of energy use presented above. Incidentally, this conflict was internal in another sense of the word: both sides of the conflict were represented within the project team through the planning and environmental offices, respectively.

A *procedural* goal conflict occurs when the means of realizing an environmental objective are in conflict with practices of decision-making, democratic principles etc. One such conflict with the transport objectives was identified in the environmental management process of Sickla Udde. As part of the planning process, the local opinion and the residents-to-be should have their say. However, they were in favour of increasing the number of parking places and the new, non-socialist political majority supported their view. This revealed a procedural conflict with the environmental objective of supporting public transport, walking, cycling etc. The outcome was that in the later phases of the Sjöstad project the number of parking places was increased, from 0.55 per flat to 0.7 (Stockholms Stad, 2003).

Results – the Project Team's Recurrent Policy Instruments

Political science gives concepts to categorize and analyse also the policy instruments: the *whip*, the *carrot* and the *sermon* (Vedung, 1997). The first concept describes instruments of power, for example the detailed plan, the development of which according to Swedish law is a municipal monopoly and a powerful regulatory instrument. The planning process of Sickla Udde was well under way when the environmental objectives were passed in 1997, so the objectives left little imprint in the plan. Another example occurred much later. One of the contractors caused extensive mould problems. The project team could use documentation and publicity as 'whips' to influence the offender and the other contractors towards better on-site management.



Figure 2. Sickla Udde, pedestrian bridge; the central parts of the city in the background (left); Sickla Avenue bridge (right). Photographs: Ö. Svane.

Often, the *carrot* is a monetary policy instrument, one example being conditional subsidies. Interviews and documents indicate that early in the process the city's politicians promised SEK 200 million (22 million Euro) to finance the extra costs of environmental measures. In the end, they were not available to the developers, but instead used for the integrated infrastructure system for waste, sewage and heating, the Hammarby model. Somewhat later, the national government offered subsidies for investments in environmentally adapted technology, the so-called LIP (Local Investment Programme) money. Of these, Stockholm got SEK 300 million, half of which was intended for Hammarby Sjöstad's developers. However, the subsidies were 30 per cent of total costs, and according to our interviews some of the developers considered this too low to motivate the extra investment.

Historically, Stockholm City purchased land as part of its development strategy, often decades in advance. Thus, there is a tradition of using land ownership as a policy instrument in development. When the city sells land as part of a development agreement, the price is part of negotiations. This can be used as *whip* and *carrot* in combination. In principle, the project team's officers from the roads and real estate office could set conditions concerning for example environmental objectives and use land price as a policy instrument: the developer gets the land at a lower price if he promises to realize a set of environmental objectives. In practice, this was little used on Sickla Udde, one reason being that the city did not originally own the land.

When the project team has little formal power, or as a supplement to other policy instruments, information can be used. This is the *sermon*, which was used widely and with certain ingenuity by the project team's officers. Early in the environmental management process, the future contractors and their architects were for example invited to seminars, officers from the city's environmental office wrote an environmental design guide and the contractors were asked to prepare a corresponding document (Hult and Corner, 1998; Kellner *et al.*, 1997). Later, the environmental objectives were rewritten as 'success criteria' by the head of the team, architects from the planning office produced visions of plans etc.

For the follow-up of the environmental objectives, the team commissioned the 'Environmental Load Profile', a computerized tool integrating elements of life cycle assessment (Forsberg, 2003). In the contracts with the Sickla Udde developers, the latter agreed to supply input data for calculations during design as well as from operation. The tool was also used to evaluate entries for a competition between the developers, arranged by the project team (Stockholms Stad, 2000). It has been assumed that its use will be more integrated in the management process of the later phases of the Hammarby Sjöstad development.

Methodological Results – the Project Team's Situations of Opportunity

As one major finding of this research project, we introduce the concept of *situations of opportunity*. Through it, we propose a methodology and a conceptual system for identifying and analysing those periods of the environmental management process when organizations such as the project team have a wide influence over its outcome. Negotiations leading up to the signing of a contract are one example, the developers' competition on the most environmentally innovative building another. We identified a series of such opportunities for 'management by objectives' through our analysis of interviews and documents. When coding, they were categorized as *situations of opportunity*, and we found that the concept was very useful as a unit for further analysis. We also argue that it is applicable in many similar kinds of process.

Political science and business economics have similar but narrower concepts such as 'windows of opportunity', 'policy windows' and 'formative moments' (Kingdon, 1995; Rothstein, 1996). However, while these concepts are used to analyse historical processes of policy-making and implementation, the

situations' concept is a methodology for the early identification and analysis of opportunities in processes of environmental management. Thus, unlike the other concepts it defines what is an opportunity in relation to a pre-defined set of objectives. A more elaborated comparison between the concepts can be found in the work of Brikell *et al.* (2004).

We argue that in environmental management *situations of opportunity* are the exceptions to a normal improvement by incremental steps – the process of 'muddling through' already mentioned. (The concept stems from political economist Charles Lindblom (1959).) Based on the contrast between everyday 'muddling through' and the wider freedom of action of a *situation*, we conclude that the latter is applicable not only as a methodology for retrospective analysis of processes such as that of Sickla Udde. It should also be useful for identifying and utilizing the opportunities of ongoing and planned processes of sustainable urban development.

As we define them, *situations of opportunity* are not only those short moments of great freedom of action identified by the concepts of 'windows of opportunity' etc. Instead, they can have a considerable extension in time; they are sub-processes within the main process of environmental management. Thus, *situations* begin with a prehistory, for example the programming and negotiations leading up to a detailed plan. They furthermore have as their focal point a 'formative moment', which is that point in time when the key decisions are taken. The prehistory guides and restricts the field of possible options that are considered in the formative moment. From the Sickla Udde findings we could for example conclude that the early introduction of environmental objectives into the prehistory of a *situation* reduced the element of 'muddling through', as elaborated in the following. In urban planning, the formative moment is then followed by the realization of the plan – the design and construction of buildings. Once construction is over and the buildings are in use, the outcome of the *situation* can be assessed, for example in terms of environmental impacts or goal achievement. Since the *situations'* concept identifies periods of larger than average freedom of action, and that once the moment is gone, this freedom is again more restricted, we also find it relevant to characterize the outcome in terms of 'chances taken – chances lost'. In an ongoing research project, we have found wider use of the concept – when identifying and analysing synergetic moments of the processes of urbanization and sustainable development in cities such as Curitiba, Dar-es Salaam and Stockholm (Brikell *et al.*, 2004; Weingaertner and Svane, 2005).

Development Contracts and Detailed Plans – Situations of Opportunity with Inertia

If we take a wider perspective on the development contracts previously discussed, they are policy instruments within a set of *situations of opportunity*. The prehistory of each *situation* includes political negotiations and decisions on who should be the developers. This in its turn is influenced by land ownership. To the prehistory belongs also the well established routines and standardized template documents of the roads and real estate office.

Ten development contracts were signed on Sickla Udde. As already mentioned, the city did not originally own the land. This gives the officers a weaker position in negotiations. In the standard contract, certain parts were adapted to include the environmental objectives. Most wordings were, however, of the 'aim at . . .' type rather than compulsory. The directly binding parts were little stricter than the 'ordinary' development equivalent.

A main reason for this was inertia of the 'muddling through' kind. In other words, it followed from officers' adhering to well established routines and template documents. Furthermore, development of Sickla Udde was already under way when the environmental objectives were passed in 1997; the developers were already preliminarily designated, expectations created etc. Thus not only the city's officers but also their counterparts were 'locked up' in the prehistory of the *situation*. The opportunity to guide

development more powerfully towards the environmental objectives was to a large extent lost. In later phases of the development of Hammarby Sjöstad, revisions of the standard contract have been made and it can be assumed that the inertia of previous decisions and expectations is smaller.

Also the planning process can be analysed as a *situation of opportunity*. The first detailed plans were to a large extent 'locked up' by their prehistory, beginning several years before the environmental objectives were passed, and guided by strict routines. For example, a comprehensive plan had already been passed, and that plan was in its turn based on the outcome of an architects' competition.

There is, however, one exception. The main part of the development area was of the brownfield kind, but there is also an area with ancient oak trees. In the original plans, this area was to be reduced, oaks to be replaced by buildings. Referring to the environmental objectives on land use, and following an intense debate, the plan was changed to preserve the oaks. Incidentally, this is an example of an internal goal conflict within a *situation of opportunity*: on the one hand, the environmental objectives on land use state that Sickla Udde, being so near the city centre, should have high density; on the other hand the objectives say that valuable nature should be preserved as recreation areas and to support bio-diversity. It was furthermore a conflict where the stakeholders represented differing opinions: politicians and environmental office versus planning office.

The roads and real estate office was one of the major investors in Sickla Udde. Infrastructure such as roads, water and sewage systems, district heating and also green areas were procured. In general, procurement is to a high extent based on routines and standardized documents – a direct parallel to the development contracts. As a *situation of opportunity* in the development of Sickla Udde it had, however, less inertia. Unconventional systems for storm water treatment, waste handling etc. were procured (Stockholms Stad, 2003). In our interviews, the officers involved commented that the documents in themselves neither supported nor obstructed environmental procurement; their main difficulty lay rather in the lack of empirical or research based, solid knowledge among stakeholders.

Situations of Opportunity with Less Inertia – Competitions, One-Off Events

Above, we observed that the environmental management of Sickla Udde had a number of *situations of opportunity* that were to some extent 'chances lost'. In other words, the project team in principle had great influence, but inertia of the 'muddling through' kind limited goal achievement. On the other hand, there were also a number of 'chances taken'. What made inertia less in these *situations*? What features of theirs made it possible for the project team officers to utilize them to a higher extent?

One *situation* of the 'chances taken' kind was the integration of the technical infrastructure for water, sewage, waste and energy, the so-called Hammarby model (Hammarby Sjöstad, no year). It relies heavily on conventional systems for district heating, sewage treatment etc. but adds an experimental biogas plant that handles part of the sewage of the area and produces fuel for buses and cars. Furthermore, storm water is treated locally instead of becoming part of the sewage. On some buildings there are solar panels, on others photovoltaic cells, and the collection and treatment of household waste includes separate treatment of the organic fraction.

In the development of the Hammarby model, the city authorities co-operated, and the whole was coordinated by an officer of the project team. Unlike the *situations* previously discussed, the prehistory of this one began with the development of the environmental objectives. Furthermore, the authorities involved influence environmental impacts more directly than their planning or roads and real estate colleagues. They were also more involved in the debate on the merits and shortcomings of conventional systems, which was very lively at the time. Thus we can assume that their officers' inertia against change was lower, and that the knowledge of alternatives was more readily available to them. Together, these

observations indicate why the Hammarby model was more of a 'chance taken' than the *situations* of the previous section. However, unlike the 'chances lost' at Sickla Udde, this *situation* is unique, at least in the development of Hammarby Sjöstad; the same kind of chance will hardly reappear, and there is no scope for learning from previous mistakes within the project.

Another set of 'chances taken' is the *situations* created as the team arranged competitions. One such event involved the developers of Sickla Udde and its theme was 'best new building' from an environmental point of view. This *situation* was created by the team officers and concretized in a competition programme (Stockholms Stad, 2000). The winner was selected from an evaluation of the designs of the developers, their architects and other consultants. As already mentioned, the 'environmental load profile' was used as an evaluation tool.

The purpose of the competition was to make developers more aware of alternatives to conventional design. In other words, it was a means for indicating the wide *field of options* that was in fact available. Although it is hard to assess the long-term effects, it seems clear that it influenced the developers and provided good examples for other developments.

Another competition initiated by the team concerned the 'car pool' system. In order to contribute to the environmental objective of 'reducing the use of private cars', the team wanted to make cars readily available to the residents without the need for owning one (at the same time avoiding the everyday trouble of finding a parking place). Invited participants to the competition were car rental firms and petrol companies. The winner was the company that had the most innovative and flexible system of car sharing to offer. The price was the right to establish Hammarby Sjöstad's petrol station on a well situated site. The system has become a success; interviews indicate that between five and ten percent of the Hammarby Sjöstad households are members.

Remiss On-Site Management Utilized as a Unique Situation of Opportunity

The 'chances taken' *situations* discussed above were all initiated by the project team – thus they were chances 'created' rather than 'taken'. There is, however also an example where the team literally 'took' a chance – in which its members used problems at one construction site to influence not only the developers and contractors of Sickla Udde but also many others. Our analysis here is based on interviews, a research report, documents and articles in newspapers and journals (Samuelsson and Wånggren, 2002).

In April 2000, it became clear that one of the contractors had problems with on-site management; construction materials were stored without rain protection, the concrete framework was not allowed to dry properly etc. Officers of the project team documented these neglects and repeatedly commented on them to the site manager and his superiors, but to no avail.

In January 2001, residents were moving into the buildings and the moisture problems, now clearly visible as mould, became public. Stockholm's largest newspapers wrote about the 'Moisture and mould scandal', the specialist press followed. Since the project team had documented the *situation's* prehistory, its members could fully utilize the formative moment. They called a crisis meeting where all developers and main contractors were represented by their principals. A crisis group was formed, experts were summoned, the contractor had the erring site manager expelled, the damaged buildings were dismantled to their concrete frame and reconstructed at great cost etc. All Sickla Udde developers and contractors unanimously declared that what happened was a 'one-off'.

Two results remain after public interest has waned. The Hammarby Sjöstad contractors have developed methods for construction under covering and improved the on-site storage of materials. Furthermore, the project team and the contractors agreed that the team should make regular inspections and rounds, take minutes and discuss problems with the contractors' site managers. This voluntary

agreement remains in force, and in their environmental reports the team shows that it has considerably influenced on-site management and construction routines (Stockholms Stad, 2003). Following the debate in the specialist press, the 'mould scandal' has influenced contractors nationwide.

Conclusions – Situations of Opportunity, Goal Conflicts and Policy Instruments

The environmental management process of Sickla Udde lasted for 4–5 years. It was the first phase of a development that will continue until 2012. In studying the process, we produced two main categories of results: the empirical findings, and a methodology for analysing environmental management processes. Both, we argue, can be applied beyond the case studied: The first permits so-called naturalistic generalization – a process of generating knowledge through comparison of individual cases, taking place in the reader's mind (Myers, 2000; Stake, 1995; Svane, 2005). The second is more generally applicable in itself.

From our perspective as researchers, it was rewarding to identify themes of interest through the application of the political science concepts of *goal conflicts* and *policy instruments* (and their subordinate concepts). To an even higher extent, the development of the concept of *situations of opportunity* in relation to already established concepts such as 'windows of opportunity', 'policy windows' and 'formative moments' produced interesting results and a novel methodology. In this and other projects it has shown itself to be a powerful instrument for understanding what supports or restricts change in a process of change guided by environmental objectives (Svane, 2002; Brikell *et al.*, 2004; Weingaertner and Svane, 2005). We also argue that it facilitates research with the purpose of contributing to environmental sustainability without being openly normative.

Analysis of the empirical data was guided by two questions: what have those who were directly involved learnt so far and to what extent has the knowledge gained also been disseminated to others? It seems clear that the project team quickly decided to 'create' their own *situations of opportunity*: they arranged seminars and competitions, produced a design guide and the success criteria and co-ordinated the development of the Hammarby model. In all these *situations*, the formal power of the team was limited. Instead, informal persuasion, negotiations and knowledge dissemination were used as policy instruments. Although there are guidelines and standardized documents for competitions, these *situations* on the whole were little burdened by a prehistory of routines or previous agreements.

The team was also successful in taking a given chance – utilizing the mould scandal as a *situation of opportunity*. This was a unique event originating from a contractor's neglects. The team had a position of power based on its documentation of the on-site problems, and used persuasion and negotiations skilfully during the formative moment created by the extensive publicity. The influence of this *situation* goes far beyond the offender, and to a large extent still remains. The main lesson of this *situation* is that there was little inertia in utilizing the unexpected and unique since the team was well prepared.

On the other hand, the team was on the whole less successful in utilizing the *situations* related to development contracts and detailed plans. In all likelihood, these *situations'* policy instruments are more powerful than the aforementioned ones. However, on Sickla Udde these *situations* had a prehistory beginning well before the environmental objectives. Together with well established routines this created a 'muddling-through' kind of inertia that only in part has been overcome even in the later phases of the Hammarby Sjöstad development.

To what extent has knowledge and experience gained through the environmental management process of Sickla Udde been applied in other large-scale developments in Stockholm? Here, results are unambiguous: there was little of learning or spin-off effects. The routines of the roads and real estate office were hardly influenced, and the same applies to detailed planning. This result is not exceptional; on the

contrary: demonstration projects all too often remain 'one-offs' (Femenias, 2002; van Hal, 2000). Thus we arrive at three overarching conclusions concerning the environmental management of Sickla Udde.

- The 'chances lost' were *situations* within an ordinary, routinized development process, with formal power; but they were also burdened by a prehistory of tacit understandings, open agreements and routines.
- The 'chances taken' were *situations* outside the ordinary, one-offs or created by the team, but they had less formal power.
- With the exception of the mould scandal, there was little of learning outside those directly involved.

Finally, on the issue of generalization: for professionals involved in similar processes of environmental management, the findings from Sickla Udde are but one example in a set of related cases. From this example, they have the possibility of naturalistic generalization. Furthermore, in reporting on the example we indirectly introduce the second kind of result, the methodology for analysis of *situations of opportunity*, and also define its related concepts. Environmental managers as well as researchers could apply this methodology to the identification and analysis of other processes of environmental management. Through presenting it here, we also invite further development in future research.

References

- Ammenberg J, Hjelm O, Quotes P. 2002. The connection between environmental management systems and continual environmental performance improvements. *Corporate Environmental Strategy* 9: 193–202.
- Beatley T. 2004. Planning for sustainability in European cities: a review of practices in leading cities. In *The Sustainable Urban Development Reader*, Wheeler SM, Beatley T (eds). Routledge: Abingdon; 249–258.
- Brikell B, Weingaertner C, Svane Ö. 2004. *Daladala Buses Deregulated – Assessing Methods for Analysing Sustainable Development's Situations of Opportunity through a Tanzanian Example*, paper presented at the 2004 ENHR Conference, Cambridge.
- Carlstedt C, af Sandeberg H. 2000. *Konkurrentanalys av Örestad och Hammarby Sjöstad*. KTH: Stockholm.
- Dobers P. 1999. Organizing environmental control in temporary local organizations. *Business Strategy and the Environment* 8: 143–150.
- EAL. 1998. *Miljöekonomisk Bedömning av Etapp 1 Projektet Hammarby Sjöstad*. Stencil, EAL: Stockholm.
- Femenias P. 2000. *Learning from Buildings – a Strategy for Environmental Design: Discussions from a Case Study of the Sustainable Building Project GWL-Terrain in Amsterdam*. Chalmers: Göteborg.
- Femenias P. 2002. Demonstration projects as support for sustainable development. In *MISTRA – Sustainable Building Experiences from a Cross-Disciplinary Research Programme*, Edén M, Jönsson Å (eds). Chalmers: Göteborg; 51–56.
- Forsberg A. 2003. *Environmental Assment of the Urban Environment – Development and First Application of the Environmental Load Profile for Hammarby Sjöstad*. KTH: Stockholm.
- Green A. 2005. *Hållbar Energianvändning i Svensk Stadsplanering Från Visioner till Uppföljning av Hammarby Sjöstad och Västra Hamnen*. Linköpings Universitet: Linköping.
- Hammarby Sjöstad. No year. *Hammarby Sjöstad En Presentation av Kretsloppsbolagens Gemensamma Koncept*. Stockholm Vatten, Skafab, Stockholm Energi: Stockholm.
- Hammarby Sjöstad. 2006. www.hammarbysjostad.se [10 October 2006]; www.hammarbysjostad.stockholm.se [10 October 2006].
- Helsinki. 1998. *Ecological Planning Criteria for Viikki*, Helsinki City Planning Department 1998:6, Helsinki.
- Hoffman A. 1997. *From Heresy to Dogma. An Institutional History of Corporate Environmentalism*. New Lexington: San Francisco, CA.
- Hult M, Corner R. 1998. *Vägledning för Miljöanpassade Material och Konstruktioner i Hammarby Sjöstad, Etapp 1*. Stencil, Stockholms Miljöförvaltning: Stockholm.
- Johansson R, Svane Ö. 2002. Environmental management in large-scale building projects – learning from Hammarby Sjöstad. *Corporate Social Responsibility and Environmental Management* 9: 206–214.
- Kellner J et al. 1997. *Sickla Udde Hammarby Sjöstad, Redovisning av Energi- och Miljötekniska Åtgärder*. Byggherregruppens Arbetsrapport: Stockholm.
- Kingdon JW. 1995. *Agendas, Alternatives and the Public Policies*. Harper Collins: New York.

- Kolk A, Mauser A. 2002. The evolution of environmental management: from stage models to performance evaluation. *Business Strategy and the Environment* 11: 14–31.
- Larsson B, Elmroth A, Sandstedt E (eds). 2003. *Västra Hamnen 2001-Framtidsstaden En Utvärdering*. Chalmers: Göteborg.
- Lindblom C. 1959. The science of muddling through. *Public Administration Review* 19: 79–88.
- Myers M. 2000. Qualitative research and the generalizability question: standing firm with Proteus. *The Qualitative Report* 4(3/4). www.nova.edu/ssss/QR/QR4-3/myers.html [10 October 2006]
- Packendorff J. 1995. Inquiring into the temporary organization. New directions for project management research. *Scandinavian Journal of Management* 11: 319–333.
- Rothstein B. 1996. Political institutions: an overview. In *A New Handbook of Political Science*, Goodin RE, Klingemann H-D (eds). Oxford University Press: Oxford; 133–166.
- Sahlin-Andersson K, Söderholm A (eds). 2002. *Beyond Project Management New Perspectives on the Temporary–Permanent Dilemma*. Liber: Malmö.
- Samuelsson I, Wänggren B. 2002. *Fukt och Mögelskador Hammarby Sjöstad*, SP Rapport 2002:15. Sveriges Provnings- och Forskningsinstitut: Borås.
- SIS. 1996. *Environmental Management Systems – Specification with Guidance for Use*. SIS: Stockholm.
- Stake R. 1995. *The Art of Case Study Research*. Sage: Thousand Oaks, CA.
- Stockholms Stad. 1997. *Miljöprogram för Hammarby Sjöstad*. SBK, Miljöförvaltningen, GFK: Stockholm.
- Stockholms Stad. 2000. *Premiering av Goda Nybyggnader inom Stadsdelarna Hammarby Sjöstad, Skärholmen och Östbergahöjden*. LIP-Kansliet, Stockholms Stad: Stockholm.
- Stockholms Stad. 2003. *Miljöredovisning för Hammarby Sjöstad 2002/2003*. Stockholms Stad: Stockholm.
- Stockholms Stadsbyggnadskontor. 1999. *Kvalitesprogram för Gestaltning Sickla Udde Uthyggnadsetapp 1 DP 96099*. Stockholms Stadsbyggnadskontor: Stockholm.
- Strauss A. 1987. *Qualitative Analysis for Social Scientists*. Cambridge University Press: Cambridge.
- Svane Ö. 2002. *Nordic Households and Sustainable Housing – Mapping Situations of Opportunity*, TemaNord 2002: 523. Nordic Council of Ministers: Copenhagen.
- Svane Ö. 2005. Useful concepts or eternal truths? Reflections on generalisation based on experience from a case study. In *Methodologies in Housing Research*, Vestbro DU, Hürol Y, Wilkinsson N (eds). Urban International: Gateshead; 329–339.
- van Hal A. 2000. *Beyond the Demonstration Project The Diffusion of Environmental Innovations in Housing*. Aeneas: Best.
- Vedung E. 1997. *Public Policy and Program Evaluation*. Transaction: New Brunswick, NJ.
- Wandén S. 1997. *Målkonflikter och Styrmedel – Ett Centralt Miljöstrategiskt Problem*, Rapport 4800. Naturvårdsverket: Stockholm.
- Svane Ö, Weingaertner C. 2006. MAMMUT – managing the metabolism of urbanization: Testing theory through a pilot study in Stockholm underground. *Sustainable Development* 14: 312–326.
- Yin R. 1994. *Case Study Research: Design and Methods*, 2nd edn. Sage: Thousand Oaks, CA.