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## **Barriers to the adoption of sustainability assessment tools in strategic decision making**

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The ubiquitous drive towards a more sustainable future has resulted in major changes in the planning and design of urban environments. Government strategies on sustainable development, published in 1999 and 2005, are thought to be driving the development of new legislations that are aimed at delivering a sustainable future for the UK. As a result, conventional stand-alone approaches to decision making in strategic planning are being replaced by more participatory and evidence-based approaches. These focus on achieving sustainability by taking into account the dynamic interactions between social, economic and environmental aspects of urban environments. The sheer volume of complex urban issues, the multiplicity of stakeholders and their varying values and diversity of viewpoints - all contribute towards making urban sustainability and its assessment an intellectually challenging task. Many tools have been developed to aid the decision making process by assessing the impacts of urban projects throughout their lifecycle. Sustainability assessment (SA) tools range from the assessment of a single indicator within a given context to the integrated assessment of a wide range of indicators covering many facets of sustainable development. However, the adoption of SA tools in decision making for strategic planning remains low.

This paper reports on the findings of the research aimed at the identification and classification of the factors that had the potential to hinder or encourage the adoption of SA tools during the preparation of a local strategic plan. Based on the findings of a review of relevant literature, a questionnaire survey, follow-up interviews and a case study, the application context of SA tools was identified. To better understand the barriers to the adoption of SA tools, concepts from information sciences were taken into account. The findings reveal that in the complex platform of decision making, the adoption of tools is often constrained by the chain effects of interconnected barriers relating to technology, people and resources. The lack of appropriate tools to serve the demands of the sustainability assessment process and the lack of relevant expertise are the major barriers to the adoption of SA tools. Emerging policy context calls for robust and integrated tools that will perform efficiently to guide the decision making process. Joined-up efforts are required from academia and industry to develop the SA tools and to enhance professionals' skills in the application of SA tools to meet the challenges of sustainability decision making in an emerging policy context.

**Keywords:** barriers, strategic planning, sustainability assessment, tools, urban development

# 1 Introduction

The ubiquitous drive towards a more sustainable future has resulted in major changes in the planning and design of urban environments over the past couple of years. Government policies on sustainable development (DETR 1999; HMSO 2005) are thought to be driving the introduction of new legislations such as Planning and Compulsory Purchase Act (OPSI 2004), aimed at delivering sustainable urban developments at local and regional levels. Under the new approach, strategic planning at a local level has received renewed interest as a vehicle to achieve overall sustainability by setting out the framework for future developments of the area. Another major development is the departure from stand-alone and ad-hoc approaches (Zellner et al. 2008) in decision-making towards more participatory and evidence-based approaches. The local planning authorities (LPA) are now obliged to conduct sustainability assessments as part of the strategic plan preparation process. Sustainability assessment is applied as a means to generate the required evidence base that informs and structures the decision-making process to ensure the robustness of the proposed strategies with reference to sustainable development. The assessment process involves assessing the significant social, economic and environmental effects of the proposed strategies considering the observed local trends of the urban system. The dynamic nature of urban development, often influenced by the inherent uncertainties and complexities of population growth, economic activities, resource usage and assimilative capacity of the natural environment, complicates the matter further. The sheer volume of urban issues, the multiplicity of stakeholders and their varying values and diversity of viewpoints - all contribute towards making urban sustainability and its assessment an intellectually challenging task (Moobela et al. 2007).

A number of tools have been developed to assess sustainability at various lifecycle stages of urban development strategies and projects. Sustainability assessment (SA) tools range from the assessment of a single indicator within a given context to the integrated assessment of a wide range of indicators covering many facets of sustainable development. However, the adoption of SA tools in decision-making for strategic planning remains low. Rotmans (2006) reported that more than 90% of currently available sustainability assessment tools have never been used by clients or users. Therefore, it is important to understand the factors that inhibit the adoption and use of SA tools for strategic decision-making in an emerging policy context.

Previous research focused mostly on the barriers to sustainability in general, with little reference to SA and adoption of tools. A few studies attempted to identify the barriers that had limited the uptake of SA at a project level (e.g. Wilkinson and

Reed 2007). However, it has been argued that there exist differences between the barriers to sustainability assessment and the adoption of sustainability assessment tools (Moobela et al. 2006); mainly in the context of behavioural, institutional, economic and technological aspects. Against this background and considering the significance of strategic decision-making in sustainable urban development, this research aims to investigate and identify the barriers to adoption of sustainability assessment tools over the lifecycle of a strategic plan.

The rest of the paper is structured as follows. The next section describes the methodologies adopted in this research. The subsequent sections discuss the application context of SA and the barriers to the adoption of SA tools in practice. Finally, the paper concludes with a discussion on the implications of this research as well as future directions.

## **2 Methodology**

This study focussed on exploring the barriers to the adoption of sustainability assessment tools in emerging evidence-based and participatory decision-making in strategic planning. The research methodology was based on a systematic approach involving a combination of literature review, a questionnaire survey, follow-up interviews with practitioners and a case study with a UK local authority. To contextualise the research and findings in the emerging policy context, national and local policy documents were reviewed to gain insights into the lifecycle stages of a strategic plan of a Local Development Framework (LDF). This resulted in a general protocol, which was later validated by industry stakeholders through follow-up interviews. The protocol also provided a basis for subsequent investigations in this research.

The questionnaire survey was designed to fill in the information gaps of the literature review. The survey was conducted among the strategic sustainability assessment practitioners from both private and public sectors across the UK. The aim was to collect their views on sustainability assessment tools and the factors that had hindered the adoption of such tools in practice. Local authorities for the survey were selected based on their geographical locations to ensure a representative sample. Out of the 100 questionnaires sent, 34 were returned. Follow-up interviews have been conducted to complement the findings of the questionnaire survey.

As sustainability assessment is aimed at generating an evidence-base for informed decision-making, the case study investigated the key tasks associated with the preparation stage of a strategic plan. To understand the relationship between the key elements and the application context of SA tools, information flow in the

decision-making process has been explored. Finally, the key factors that contribute to the non-usage of sustainability assessment tools during decision-making were identified and grouped under three categories based on the survey responses and the most cited literature.

### **3 Applications of SA tools in strategic planning**

Sustainability assessment at a strategic planning level should analyse the multiple causes and effects of complex urban problems with a view to developing policy options for a strategic solution. SA helps policy makers to get an insight into the dynamic interactions and complexity of social, economic and environmental parameters of sustainable development; e.g. economic growth, resource usage and assimilative capacity of the natural environment (Hopkins 1998). These indicators are analysed over a period of time taking into considerations the observed local and national trends.

To explore the applications of sustainability assessment tools in strategic decision-making, the lifecycle stages of a strategic plan was examined. It should be noted that the UK planning system has gone through a major reform in recent years to promote sustainability and to enhance the efficiency of the decision-making process. One of the significant changes was the restructuring of the strategic decision-making process where it became mandatory for planning authorities to undertake sustainability assessment during the preparation of a strategic plan.

The lifecycle of a strategic plan can be categorised into three key stages: production/preparation, implementation and monitoring and review (DCLG 2004). Stakeholders' involvement in all three lifecycle stages has been illustrated in Figure 1. Once the plan preparation process is finalised, it sets out the framework for implementation of the plan allowing for project level development. During implementation, the projects that may have a significant impact on the built environment requires a sustainability assessment to be conducted before applying for planning permission. At the final stage, the performance of the strategic plan is monitored on a regular basis against the implementation plan at a project level. As a good practice some local authorities conduct sustainability assessments to review effectiveness of the policies of the strategic plan.

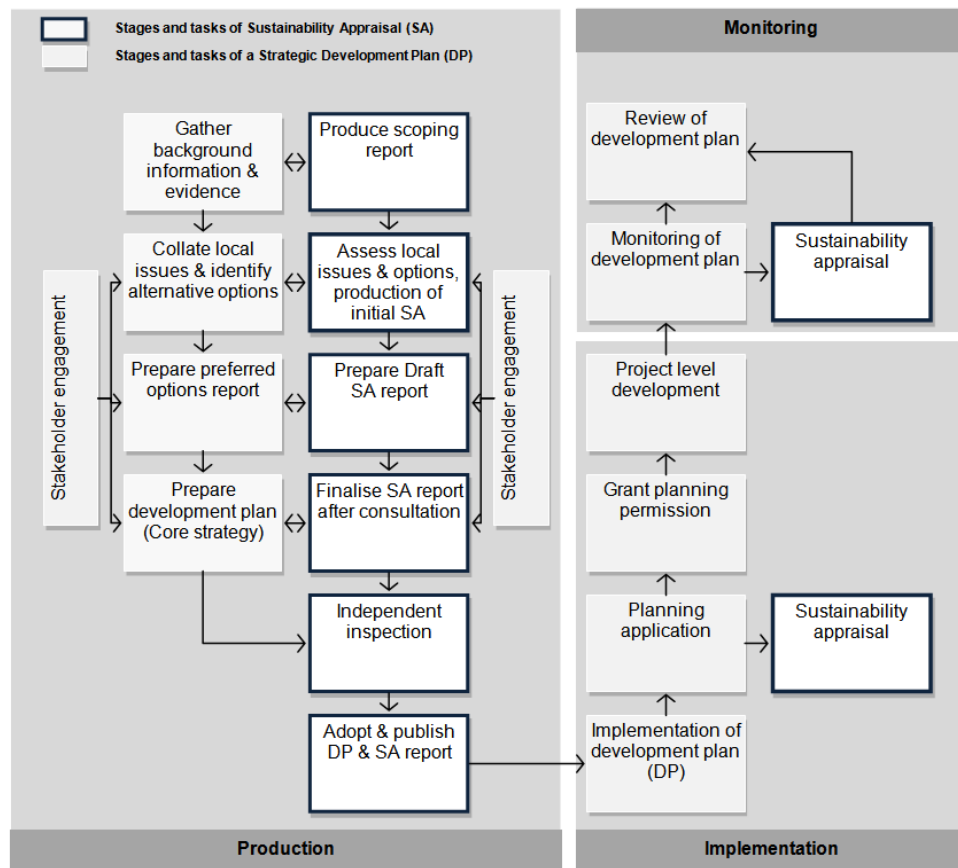


Figure 1: Lifecycle stages of a strategic plan.

The process of sustainability assessment encompasses a set of interrelated and iterative activities. It is reported that effective decision-making for sustainability often depends on the activities that help to maintain a consistent flow of reliable and accurate information in an organisational setting (Watson et al. 2005). These activities range from the identification of sustainability indicators to the development and validation of the preferred option(s). Based on the case study, this research identified key activities that are associated with information flow; in other words, the activities associated with the production of the evidence base. Figure 2 illustrates the tasks involving information flow within a sustainability assessment. The tasks depicted are: the identification of sustainability indicators and information capture, storage, access/retrieval, processing/analysis, modelling and dissemination.

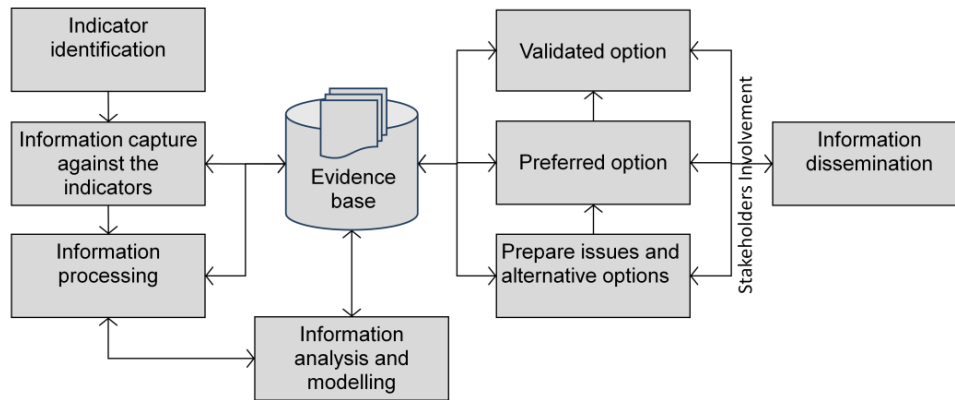


Figure 2: The tasks involving information flow within sustainability assessment.

## 4 Barriers to Adoption

In the current policy setting, sustainability assessment often requires decision makers to deal with complex and poorly defined/structured urban problems (Rotmans 2006) and take into account diverse perspectives of stakeholders in an environment full of uncertainties. According to Hopkins (1998), the modern decision-making tools are expected to meet the multidimensional demands of the assessment work, which include but are not limited to the:

- simultaneous evaluation of impacts from interrelated development parameters of a plan;
- generation of alternative plan options;
- performance prediction of the generated options; and
- management of a large volume of information to facilitate communication between processes and stakeholders.

Successful application of tools offering the range of services, described above, is likely to improve the efficiency of the decision-making and thereby contribute to sustainable development. Limited resources and organisational uncertainties often constrain the application of such decision-making tools in practice. Against this background, concepts from information science were considered to identify the key barriers to the adoption of SA tools in strategic planning. Adoption of tools or systems in an organisation often relies upon three aspects: people, resource and technology (Mustapha and Sayed, 2006). Based on the findings of the questionnaire survey the key barriers to adoption have been grouped under these headings, as shown in Figure 3, to structure the discussion on the survey results that follows.

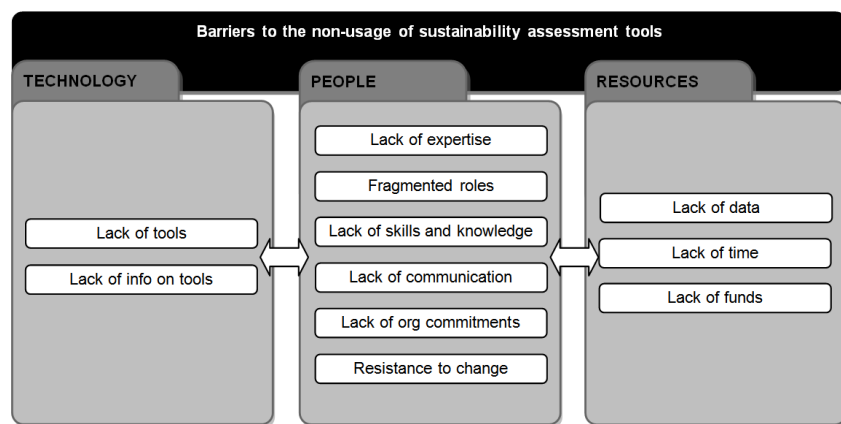
### 4.1 Barriers associated with technology

The majority of the survey respondents use the Sustainability Assessment Framework (SAF) Sustainability Appraisal Metrics (SAM), developed according to

the Department for Communities and Local Government directive (DCLG 2005), as the primary tool to assess sustainability at strategic planning level and to comply with the statutory requirements. However, the following limitations of SAF/SAM were identified by the respondents:

- lack of clear guidance and standard methodology for conducting SA;
- limited scope for quantitative analysis;
- resource intensive nature of the tools; and
- reliance on subjective measures for decision-making.

The findings are in line with the previous study by Hurley et al. (2008), which argues that the SAF/SAMs are useful for setting the context of the decision-making process but are inadequate to capture the essence of the complex



problems involving a variety of actors with different perspectives.

*Figure 3: Major barriers to adoption of sustainability assessment tools.*

More than half of the respondents cited occasional use of other SA tools alongside SAF/SAM. The commonly used tools were:

- Resource and Energy Analysis Programme (REAP) (Barrett et al. 2005);
- BRE Environmental Assessment Method (BRREAM) (Brownhill and Rao 2002);
- Bespoke metrics;
- Ecological footprinting;
- The Aalborg Charter (ESCTC 2001);
- Geographical Information System (GIS); and
- Quality of Life Assessment (QLA).

GIS is the tool of choice for spatial analysis and visualisation of environmental constraints. When asked about the non-usage of SA tools other than SAF/SAM on a more regular basis, some of the respondents cited the non-availability of user-friendly tools capable of analysing and predicting a wide range of issues in an integrated way. This finding echoes with that of the past studies; e.g. a study by Brown et al. (2006) identified that most SA tools were designed to assess specific



aspects of sustainability and in most cases the environmental dimension only. Such tools restrict the stakeholders from getting an understanding of the complex interdependence of socio-economic and environmental issues of the strategies in question.

The lack of support for effective information management among SA tools was another important issue raised by the respondents. The management of the large volume of information generated for and by the SA process was essential to the respondents for effective collaboration among stakeholders as well as for enhancing public participation in the planning process. Some practitioners found the existing information management systems to be inadequate to cope with the demanding and iterative nature of SA. This finding is supported by the existing literature that highlighted the need for new and improved technical tools to increase the quality, diversity and impact of participation on planning and policy outcomes (Elwood 2002, Innes and Booher 2000, Innes 1990, Goelman 2005, Holden 2000). Modern SA tools need to be designed to allow the assessment and visualisation of the state of the urban area taking into account the wider implications of a proposed strategy in a varying temporal scale (Kapelán et al. 2005, Rotmans 2006). Key criteria for such tools are can be summarised as:

- integrated assessment of sustainability;
- systematic risk and uncertainty modelling;
- advanced impact assessment;
- user-friendly visualisation of the decision parameters;
- effective management of shared repositories of information; and
- innovative and interactive calibration and validation of the underlying models.

Among other factors, the lack of appropriate information about SA tools has been cited as a limiting factor for their uptake in practice.

## **4.2 Barriers associated with people**

It is acknowledged that sustainability assessment is an intellectually challenging task requiring a diverse range of skills and assimilative knowledge on the components of sustainability. The key skills associated with the SA are:

- the ability to identify and assess significant local issues;
- competence in qualitative and quantitative analysis;
- the ability to forecast the dynamic spatio-temporal interactions of the local urban systems;
- the ability to manage large volumes of information; and
- technical competence in the use of SA tools, which are often designed based on complex theories (Kapelán et al. 2005).

The respondents were asked to give their views on human factors contributing to the non-adoption of tools in the context of sustainability assessment. The responses pointed toward the fact that the potential of applications of SA tools has not been sufficiently understood because of the lack of a comprehensive knowledge of the complexities surrounding strategic sustainability and the absence of clear guidelines to carry out the assessments. This is often compounded by the lack of in-house expertise to perform sustainability assessments.

Around one third of the local authorities surveyed in this research stated that they either fully or partially rely on external consultants to perform sustainability assessment on behalf of the respective organisation because of the lack of relevant in-house expertise. This practice will perpetuate the lack of development of in-house expertise.

A survey conducted by the Local Government Association reported that 80 per cent of the local planning authorities (LPAs) in the UK had experienced difficulty in delivering effective planning services in the previous 12 months due to skill shortage, especially in the strategic planning (PP 2004). Previous reviews, most notably by Sir John Egan (2004) have also highlighted the lack of skilled professionals to this effect. Uncertainty regarding the type of skills and knowledge required by the practitioners often hinders the adoption of tools in strategic planning.

Fragmentation is another key barrier to the successful implementation of sustainability assessment in strategic planning. Most public and private organisations encouraged employees to be specialised in specific subject areas and often group them together in various geographical locations (Moobela et al. 2007), which has created fragmentation and compartmentalisation of knowledge and skills. This is most visible in local governments with little collaboration among departmental groups, as observed in a local government authority. Sustainability assessment was sub-tasks through various departments; e.g. housing, transport, environment, social and demographic, retail and economic. The delegation of an integrated task to various independent departments impeded the overall efficiency of the assessment process. However, fragmentation is common in large multi-disciplinary projects/assessments in other fields, which demonstrate similar challenges relating to the efficiency of the tasks undertaken (Garnett and Kouzmin 1997).

Lack of corporate commitment and resistance to change were also identified as barriers. Communication gaps that may exist within an organisation or between the client and the consultant are also found to hinder the effective implementation of SA tools. Poor communication between tool users and the policy makers are found to have the same effect. One of the consultants interviewed reported that on some occasions additional efforts were needed to convince clients of the potential of applications of sustainability assessment tools in solving existing urban

problems. Lack of client interest may also discourage the external consultants from using the tools.

### **4.3 Barriers associated with resources**

More than half of the respondents cited that inadequate funding to support the adoption of SA tools was one of the most tangible barriers associated with resources. Especially in the private sector, the allocation of funding for SA tools is often weighted against the immediate financial gain of the organisation that may result from the use of the tool. In most organisations, internal and/or external persuasion is needed to fund adoption of new methods, even in the case where potential benefits are fully understood.

The application of a specific tool can be limited by the availability of the required data, usually defined in specific formats. Lack of interoperability, resulting from disparate underlying information models of data, often restricts the adoption of innovative tools. It has been observed that users prefer to use techniques that consume readily available data without pre-processing. Lack of time to become trained as a proficient user and to acquire new knowledge, often required in the context of SA, has also been reported as one of the barriers.

## **5 Conclusion**

The findings reveal that lack of appropriate tools to satisfy the demands of the sustainability assessment process and the lack of required expertise are the major barriers to the adoption of SA tools in practice. In the complex platform of decision-making, the adoption of tools is often constrained by the chain effects of interrelated barriers. Emerging policy context calls for robust and integrated tools that will perform efficiently to guide the decision-making process. Joined-up efforts from industry and academia are needed to enhance the robustness of the SA tools, which needs to be designed as resource efficient, user-friendly, adaptive, innovative, communicative and interactive. Local and national initiatives are needed to overcome the barriers faced by the practitioners. With regard to the shortage of relevant professional expertise and a lack of comprehensive knowledge and technical skills to carry out sustainability assessment, research in strategic planning needs to look at the context at which sustainability assessment tools are developed and applied.

Sustainability assessment is a complex and resource intensive process. It is evident that the main reason behind conducting the sustainability assessment during strategic planning is statutory requirements. In the current context the potential benefits of this relatively new practice to aid the decision-making process are not fully understood, which also affect the adoption of tools. The desired goals of sustainability assessments can only be achieved when the local leadership is

convinced of its usefulness and the local planning authorities are motivated, trained and supported with necessary resources.

## 6 Acknowledgement

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