

PESTER-ing for Integration: closing the planning-delivery gap in integrated water management, experiences from Ashford

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Abstract

Planning and delivery are two very distinct, but inherently related, phases of the urban growth and integrated water management (IWM) process, whether creating conventional, integrated or sustainable urban environments. The journey from the planning stage, when stakeholders' aspiration and enthusiasm is high, to the delivery stage, when partnerships can become strained and resources exhausted, can take a number of different pathways. These pathways can be influenced by numerous externalities and lead to different end points, which may not necessarily achieve desired objectives. This study analyses the journey towards IWM in Ashford, Kent, UK, by utilising the 'PESTER' framework to assess externalities influencing the journey from planning to delivery. Insights into influences on the journeys' trajectory are outlined, recommendations for modifying the pathways suggested and the implications for different end points discussed.

Keywords

Externalities, framework, integrated, planning, transition, water management

Background

Despite a significant volume of research into sustainable urban water management technologies and systems, Brown *et al.* (2008) assert that there are numerous challenges to practice and to 'closing the loop' between planning and delivery. Consequently, journeys or 'transitions' towards sustainable or IWM within cities or growth areas are complex and convoluted (Binz and Truffer (2010).

Additionally van de Meene *et al.* (2010) identify that favourable capacity attributes for transitioning to a sustainable urban water management regime in Australia included emphasising learning, diversifying policy tools and institutional arrangements and enhancing partnership working facilitated by respect, trust and mutual understanding.

Furthermore, it is recognised that synergies, innovation, cost savings and environmental benefits may be achieved through more holistic thinking, different scales of provision, by greater integration between different service sectors and through different business delivery models. However there is a notable absence of significant examples of such an approach having been applied to the delivery of water, energy and other services, in the UK (Macrorie and Sharp, 2010).

This study outlines research undertaken to analyse the journey through the planning and delivery phases of urban growth in Ashford, UK, with a particular focus on the IWM aspects of the process. The aim of the study was to identify externalities influencing the planning-delivery journey, in order to provide recommendations on closing the gap on IWM implementation in urban growth areas.

Method

Data collection was undertaken by conducting exploratory interviews with key stakeholders who were responsible for:

- Developing the 'Greater Ashford Development Framework' (master plan);
- Designing and delivering water and wastewater services;

- Delivering and managing the planned infrastructure and growth.

The qualitative data analysis tool NVivo was used in conjunction with the 'PESTER' framework (Shirley-Smith *et al.*, 2008), to non-hierarchically thematically analyse the interview transcripts.

The PESTER framework expands on the three pillars of sustainability (social, environmental, economic), to incorporate political, technical and regulatory factors influencing development and water management processes. Table 1 summarises the definitions used for each PESTER factor within the present study.

Table 1 PESTER factor definitions used in the interview transcript analysis

PESTER Factor	Factor Definition (in terms of influence on policy/decision making, planning and delivery)
Political	Non-regulatory/non-legislative i.e. guidance (non-mandatory standards/position statements) rather than compliance. Includes responsibilities, governance, ownership and relationships between stakeholders/organisations.
Economic	Economic or financial - cost, funds/funding, investment, willingness to pay, affordability, tariffs.
Social	Involvement of and impacts on citizens and other stakeholders (awareness raising, education, behavioural change, quality of life, health impacts).
Technical	Feasibility, performance (ability to meet regulatory targets, reliability), ability to implement/ease of implementation/integration.
Environmental	Consideration of water, energy, quality, quantity issues.
Regulatory (including legislation)	References to legislation, regulation or other mandatory/enforceable policy requiring compliance. Different to general policy (guidance/statements) in that there are penalties for non-compliance.

In assessing a project or scheme using PESTER, a percentage importance value (IV) is assigned to each of the six elements. This can be done qualitatively or quantitatively using a number of methods (estimation, discourse/content analysis, questionnaires, interviews). In this study interview data was used. The IVs were then used to construct a 'PESTER Pie', which is a pie chart visually demonstrating the relative importance of the factors in influencing planning/decision making/delivery.

Utilisation of such an approach enabled key externalities influencing the planning-delivery process to be elucidated. The use of NVivo also permitted quantification of the occurrence of the PESTER factors within the transcripts, subject to the caveats of assumed internal consistency in the interview questions, validity of the derivation of *a priori* themes and the subjective nature of the definitions used for each factor. Consequently, to fully represent the factors explored, additional themes were added *a posteriori* during the analysis, as they emerged from the data. These are discussed in the following section.

Results

Negative and positive aspects of the PESTER factors were identified, consequently both are discussed in the following sections, which provide a synthesis of how the factors were demonstrated in the interviews.

Political

Political influences arose in a number of ways, which included dealing with non-statutory requests and steers from central government, which were viewed both positively, in relation to approaches to behaviour change and negatively, in relation to house building targets. Consequently, in terms of ownership and governance, it became apparent that there was a certain degree of dissonance between the requirements of national and local agendas:

“What we’re delivering in Ashford is what Ashford wanted not what the government told us to do...”

Such statements allude to a desire to retain a degree of autonomy from central government in planning, decision making and project delivery. This was interesting from political and timing perspectives, as during the interview period the 2010 coalition government announced the revocation of RSS and its replacement with a ‘Localism Bill’ (Planning Inspectorate, 2010) emphasising placing the planning system within local communities. Several interviewees also referred to political bargaining power required at certain stages of the process and the importance of activities being seen to be following the appropriate political agenda. Therefore the political kudos of undertaking certain ‘favoured’ activities also appeared to be influential, but with the realisation that measures still needed to be economically and technically viable. As a result, consideration of larger scale alternative options, involving less tried and tested technologies, were viewed as politically less favourable due to previous negative experiences resulting in political figureheads receiving criticism from their electorate.

Economic

Economic and financial influences were frequently referenced by interviewees in both positive and negative ways. In terms of securing funds and investment to permit exploration or implementation of water/energy options, experiences were variable. In the early stages of the growth/infrastructure delivery process central government was viewed as being restrictive as funds were held by central government. However, this changed with modifications to the planning process and funds were then decentralised allowing greater local control, which was viewed positively. to by over half of the interviewees. In relation to financial benefits accrued from implementing water/energy saving schemes, there appeared to be limitations regarding how benefits could be received and by whom:

“While there may be overall cost savings or non-tangible benefits, it’s where those cost-benefits lie.” and “...crux of the problems with integration is who pays and who benefits.”

Additionally, energy companies were viewed (by a range of organisations, not just those concerned) as being more favourably funded for certain schemes by government than water service providers, with the latter having to ‘piggy back’ the former in order to be able to implement preferred schemes by cost-sharing. In terms of strategic infrastructure the WSP funding landscape did not seem to be prohibitive to investment, though the focus was on water quality enhancement than on integrated water management or integration of water and energy (and did not recognise any complementarity between the objectives).

Social

Social influences were overwhelmingly positive, demonstrating an emphasis on the planning, implementation and delivery of the 'Savings at Home' pilot project. Within this project, home visits were made to discuss water and energy-saving measures (hard and soft) with home owners, to promote the value of resource efficiency (in terms of both financial savings and environmental protection). Similarly, the role of individuals and communities in implementing water and energy efficiency schemes and delivering savings for environmental and social benefits was frequently mentioned. However, limited mention was given to the attitudes or perceptions of individuals or communities in relation to more alternative structural options, such as combined heat and power plants (CHP), photovoltaics (PV) or rainwater harvesting (RWH) systems. Where such options were mentioned in relation to user interactions with them, they were generally sceptical of users' abilities:

"Heat pumps, people don't know how to use them...Control systems don't exist at this stage and we'll have the user to try to inform in this process, we've been dumbing down the user."

However, with regard to negative social impacts, two main issues arose:

- Uncertainty of the long-term nature of any behavioural change induced by water-energy efficiency projects;
- Uncertainty in how to reach private householders who did not wish to participate in retrofit initiatives.

Technical

In terms of positive technical impacts, the key item mentioned in relation to social aspects of water-energy integration was the use of meters, including smart meters. To some degree this reinforces the view that a technological 'fix' will be integral to facilitating long-term behaviour change. However, the difficulties in achieving the ambitions set out at the masterplanning and core strategy phases were evident, both in terms of the demonstrability of considered 'soft' and 'hard' options. Additionally, there was a preference for well-established, rather than experimental or emerging technologies. Consequently, feasibility and performance aspects of alternative technologies were raised as negative technical impacts. It was also identified that some stakeholders did not share the government's perspective on the technical measures required to achieve the building regulations or codes:

"...we can achieve 90l without too much difficulty...not necessarily saying we agree with what we're doing to achieve that...DEFRA have made a u-turn to suggest you can use it [rainwater harvesting] as a flood control measure and we felt that seemed to confuse things a great deal..."

Overall, the technical factor seemed to generate the most uncertainty and unanswered questions from interviewees, particularly in relation to water-energy integration.

Environmental

Overall environmental influences were not well represented within the interview transcripts. This is not to say that environmental factors were not important to planning, decision making and delivery processes in Ashford. In fact, it indicates the opposite. Due to the emphasis placed on sustainability and planning to minimise environmental impacts from the outset, environmental issues had become embedded in all facets of the water-integration and urban growth agendas. Consequently,

perceived positive environmental factors underpinned the majority of planning and delivery processes and subsequently there appeared to be an unspoken emphasis on these issues within the interviews.

Regulatory

Policy, regulation and legislation were regarded as a positive way to focus organisations' processes and actions. However, regulation was also seen as having negative impacts, as well as being a constraint in facilitating consideration of less tried and tested solutions/options:

"It's such a regulated industry that they feel constrained about what they can do..."

There were also examples of where policy and legislation had not been locally implemented or enforced due to political influences on decision making:

"Frequently the PO [planning officer] is called upon to guide applications submitted by developers and encourage them to include SuDS solutions as part of the drainage strategy, but without the legal authority to impose these solutions."

Finally, during the interview period the 2010 coalition government announced the revocation of RSSs and a review of OFWAT (the water service industry financial regulator), which ignited thoughts of uncertainty going forward in relation to future regulation:

"...without any national government framework that provides or allows authorities to be rather prescriptive over these things then you know we stand no chance anyway because developers would say well I'm sorry...but your planning policies are out of sync with national policies..."

Non-PESTER Factors

During the coding of transcripts a number of non-PESTER related themes arose, which were:

- Communication
- Knowledge
- Risk/Risk Aversion
- Scepticism
- Scale
- Timing

The most prominent of these were knowledge, risk and scale. In terms of knowledge, having the appropriate knowledge/access to knowledge and the timing of gaining such knowledge appeared to be crucial for planning and incorporating adaptive capacities. This indicates that better links may be required between agencies responsible for delivering development and knowledge-generating bodies such as universities and research institutions. There were numerous references to "disconnects" in communication within and between organisations, as well as inadequate knowledge sharing. With regard to risk, large number of interviewees referred to issues of risk, whether perceived or actual. These were identified across the 6 PESTER factors and were seen as having negative impacts on decisions, actions and consideration of integrated water-energy options:

"...came down to management of risk and that it was felt generally by the majority of people involved, that it [traditional infrastructure] was easier to operate and regulate."

This illustrates that although technical aspects were the focus, the risk associated with a lack of technical confidence/skills was the primary influence on the

decision not to pursue certain identified options. Consequently, different scales of sustainable/integrated options were subject to technical, political and regulatory constraints on their implementation:

“I think there seemed to be differences about different types of... the scale of development, you know, and... 6,000 houses and a new urban extension, you can do a different solution which might work, but a development of 50 houses... there seem to be problems of different scales.”

Quantifying PESTER Factor Influences

King (2004) cautions against using the frequency of occurrence of codes within text, warning that frequency does not necessarily relate to prominence. Additionally, Oppenheim (2005) warns against heavily quantifying small numbers of interviews, as they may not be properly representative of a population. Keeping these notes of caution in mind, it was decided to explore the relative contribution of the PESTER factors further using the quantitative functionalities of NVivo9. As 21 interviews were analysed in the present study, the transcript analysis only provides a general indication of factors influencing the decision making, planning, design and delivery phases of urban growth in relation to Ashford.

Figure 1 illustrates the IVs associated with the PESTER factors derived from the interview transcript. It is evident that negative political, positive social, negative economic influences dominated decision making, planning, design and delivery in Ashford. The high proportion of positive social influences demonstrates the emphasis on the planning, implementation and delivery of the ‘Savings at Home’ pilot project, an initiative within the decision making control of organisations directly responsible for Ashford’s growth. Economic influences were more or less balanced, as funding circumstances changed from being favourable (pre-recession) to less certain (during/post-recession). The most notable finding is that overall the factor demonstrating the greatest impact was negative political influences. However, as already discussed, the majority of political issues were, in fact, related to other PESTER factors and therefore acknowledgement of the inter-relation of influences is paramount. Finally, the complexity of actors involved in decisions regarding the potential integration of water-energy, as well as their interaction, also significantly influenced the extent to which options were deemed feasible. These are illustrated in Figure 2.

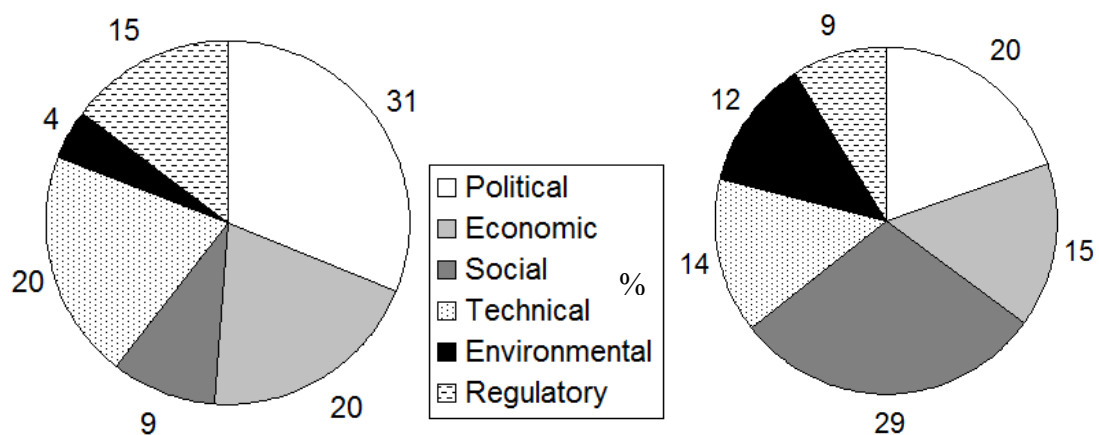


Figure 1 PESTER Pies illustrating the percentage contribution of negative and positive influences on decision making and delivery of integrated water management in Ashford

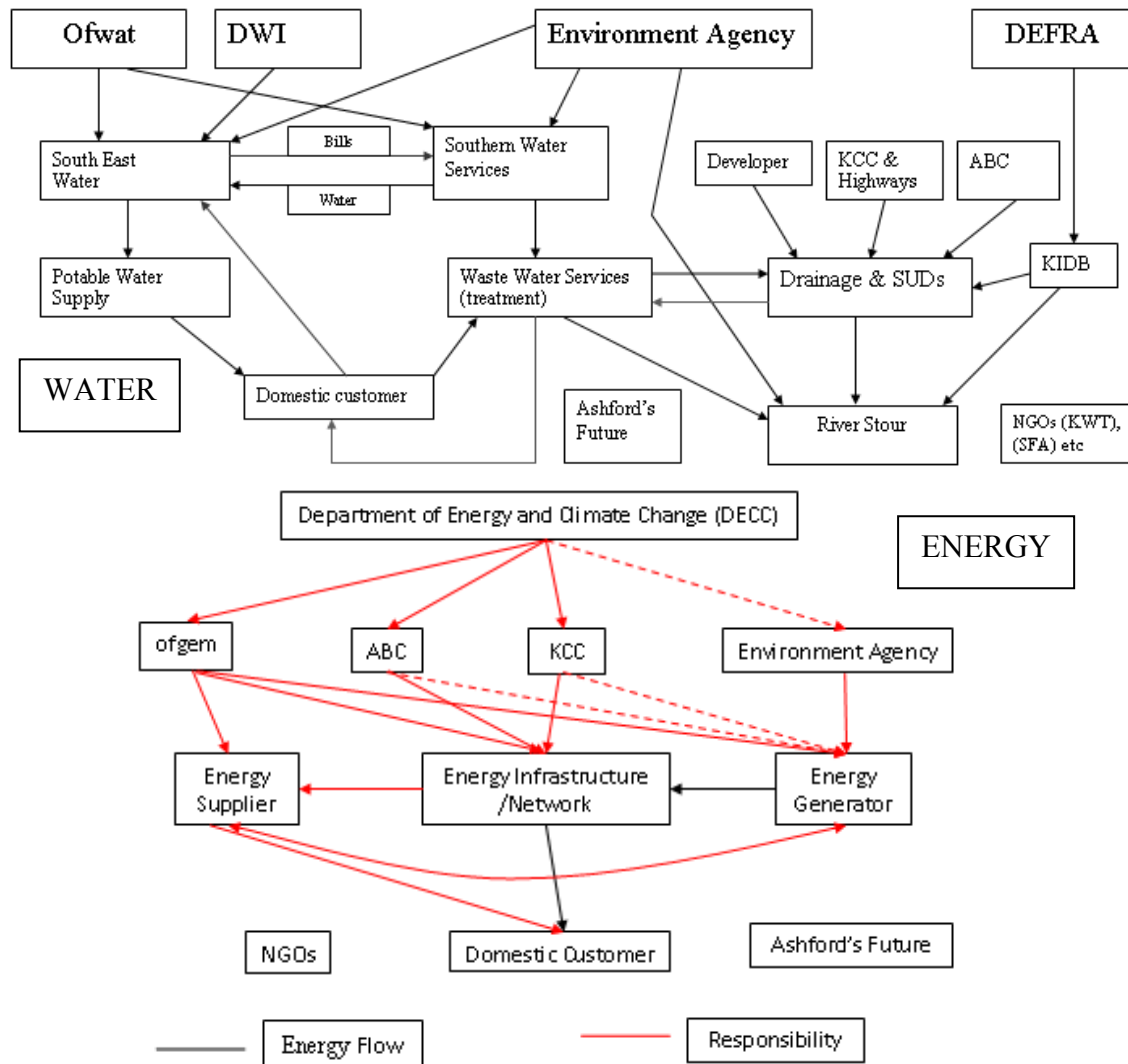


Figure 2 The complex interconnection of responsibilities in relation to water and energy in Ashford

Conclusion

Application of the PESTER framework, to interviews with key stakeholder organisations, has provided a synthesis of the factors influencing planning, design, decision making and delivery of water-energy integration in the context of sustainable urban growth in the Ashford area. Overall, negative political factors appeared to demonstrate the most influence on processes, but these were inherently linked with other factors. Re-contextualisation of the PESTER analysis led to the derivation of key messages relating to the need to incentivise adaptability, enhance enforcement of regulation, increase knowledge dissemination, emphasise the importance of scale and provide clarity on the complexities of regulation and schemes that overlapping sectors. The PESTER framework (with sub-factors) is demonstrated to be a useful tool for the analysis of complex socio-technical processes.

Consequently, the following recommendations have been identified:

- i) Provide clarity on mechanisms for benefiting through endorsed incentive schemes;
- ii) Promote/legislate for a culture of organisation/process adaptability and partnership working;
- iii) Enhance capacities for the enforcement of planning legislation;
- iv) Strategise communication and knowledge transfer/sharing activities;
- v) Provide guidance on issues of scale.

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References

- Binz, C. and Truffer, B. (2010) Sustainability transitions in global technological innovation systems – The case of water recycling technology. DIME Workshop on Globalization and Environmental Innovation in Newly Industrializing Countries, 05-07 May 2010.
http://www.dime-eu.org/files/active/0/Binz_Truffer_DIME2010_Ettlingen.pdf
 Accessed 8th September 2010
- Brown, R. R, Sharp, L. and Ashley, R. M. (2005) Implementation impediments to institutionalising the practice of sustainable urban water management. 10th International Conference on Urban Drainage, Copenhagen, Denmark, 21-26 August 2005.
- King, N. (2004) Using Templates in the Thematic Analysis of Text. In Cassell, C. and Symon, G. (Ed.) *Qualitative Methods in Organizational Research*. Sage, London.
- Macrorie, R. and Sharp, E. (2010) Promoting domestic water & energy efficiency: a review of the pilot 'Savings at Home' retrofit intervention (Ashford, Kent). AIA Project Internal Report (WA2). Produced by the University of Bradford.
- Ooenheim, A. N. (2005) *Questionnaire Design, Interviewing and Attitude Measurement*. London, Continuum.
- Planning Inspectorate (2010) Regional strategies – revocation.
http://www.planning-inspectorate.gov.uk/pins/advice_for_insp/rs_revocation_20_07_10.pdf
 Accessed 27 July 2010
- Shirley – Smith, C.J., Cheeseman, C. and Butler, D. (2008) Sustainability of water management in Zaragoza City. *Water and Environment Journal*, 221 (4), 287-296.
- van de Meene, S. J., Brown, R. R. And Farrelly, M. A. (2010) Capacity attributes of future urban water management regimes: projections from Australian sustainability practitioners. *Water Science and Technology*, 61 (9), 2241-2250.