Contemplating 'Quality Street': integration of environmental quality in planning sustainable urban development

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Contemplating 'Quality Street': integration of environmental quality in planning sustainable urban development

Nadenken over 'Quality Street': integratie van omgevingskwaliteit in de planning van duurzame stedelijke herontwikkeling
(met een samenvatting in het Nederlands)

Proefschrift

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What is the city
but the people?
(William Shakespeare: Coriolanus
Act III. Scene I)

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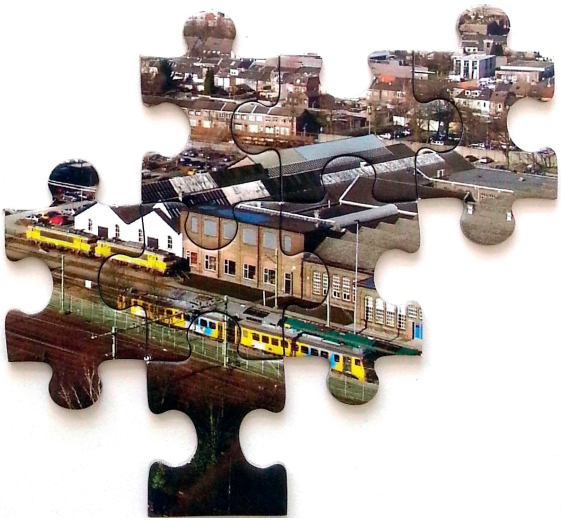
CHAPTER 1

Introduction



1.1. THE CHALLENGE OF SUSTAINABLE URBAN DEVELOPMENT: QUALITY VERSUS SPACE

Today, over 50% of the world's population is living in cities, and this number is projected to further increase. Therefore, achieving sustainable development is, more and more, becoming a challenge of attaining sustainable *urban* development. Sustainable urban development can be defined as the pursuit of urban space of high quality, without compromising the conditions for this process to continue (Fischer and Amekudzi, 2011; WCED, 1987). Whatever definition of sustainable development one embraces, it always entails balancing economic, social and ecological interests (e.g. Campbell, 1996); see Fig. 1.1. Whether in such a balancing exercise all three sorts of interests, in principle, should bear equal weight or not has been subject of scientific debate. In the – mostly European – literature about environmental policy integration, the above definition of sustainable development has been interpreted to demand priority of environmental interests over economic and social interests (Lafferty and Hovden, 2003). Other authors have contrasted this 'strong' form of integration with 'weaker' ones, such as harmonisation and coordination (Jordan and Lenschow, 2010; Runhaar et al., 2009) In this dissertation, we take the stance that sustainable urban development does call for prioritisation of environmental quality, but that, as Mullally and Dunphy (2015) state, this prioritisation should be analysed as a matter of degree.

The environmental interests involved in the trade-offs indicated here are often: use of space; substitution of open-ended flows of materials by closed cycles; reduction of energy use and emissions; minimal use of hazardous materials and a healthy and green environment (Næss, 2001). Thus, at first glance it seems to make perfect sense to develop compact cities, minimising the use of open or natural space outside urban areas, reducing

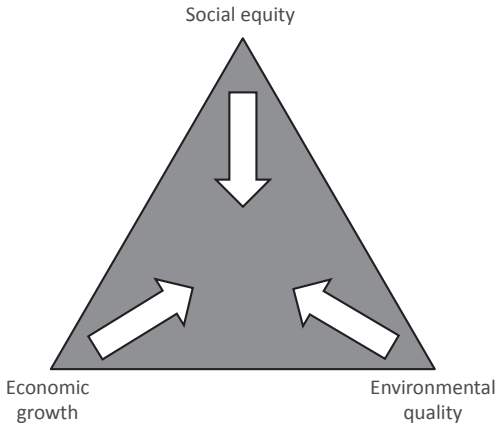


Fig. 1.1. Sustainable development as a trade-off among conflicting interests (After Campbell, 1996).

the need of travelling by car – although this is contested by some (see e.g. Neuman, 2005; Simeonova and Van der Valk, 2009) – and enhancing opportunities for collective forms of clean energy production. The different urban functions always compete for scarce urban land and space, although the intensity of this competition may differ. In particular, the environmental impacts of urban functions are often perceptible in a wider area, resulting in spatial-environmental conflicts (De Roo, 2000). This happens especially when intrusive activities, e.g. busy transport routes or heavy industry, are realized in the vicinity of sensitive functions, such as residential areas. In the reverse case, sensitive forms of land-use are planned in places where, due to a heavy environmental burden, some environmental quality standards cannot be maintained. There are many examples, but the most prominent among them can be encountered when redeveloping disused and derelict industrial sites, harbours, military compounds and railroad yards (De Roo, 2000, 2001; Bartelds and De Roo, 1995).

The pursuit of compact, high-density, mixed-use inner-city urban development, then, further complicates the urban planning process. In itself, this is complicated enough as it is. The aim is always to optimise urban environmental quality along with social and economic objectives. Yet, the elements for the solution of the planning problem at hand complicate these efforts, for they are distributed among multiple actors, each active in multiple decision-making arenas. These arenas only partly overlap, and their composition changes over time. Within these arena's, issues are continuously reframed (Teisman, 2000), also under the influence of dynamic public and political agendas. In addition, planning decisions at the local level have mutual relations with higher spatial and administrative scale levels (Termeer et al., 2010), complicating these attempts even more. The 'Quality Street' example in Box I illustrates this in a fictive example.

The research presented in this dissertation focuses on inner-city compact (re)development. Here, 'compact' refers to a mix of high-density residential and other functions. In these cases, integration of urban environmental quality in urban planning is particularly difficult because the spatial-environmental conflicts are most pronounced. Competition for space is high, due in part to environmental impacts. Also there is a large number of actors involved and many interests are at stake, some of which go beyond the local jurisdiction.

The central premise here is that, within such a multi-actor, multi-level setting, trade-offs among the multiplicity of interests at stake are likely to be made at the expense of urban environmental quality (Miller and Wood, 2007). This is problematic because, in western urbanised areas, large proportions of the population already are exposed to high levels of noise, air pollution and industrial risk. Table 1.1 provides an indicative list of spatially relevant environmental impacts, demonstrating that considerable numbers of people experience environmental quality levels beyond thresholds that can be considered 'safe'. These levels of exposure may lead to health and safety risks (Howley et al., 2009; Weber and Driessen, 2010). Noise, for example, is known to have serious health impacts

Box I. 'Quality Street'

Over the years, a certain city has attracted many new inhabitants. As a result, it has expanded considerably into the countryside. National planning guidance, aiming to reduce urban sprawl and protect the countryside, requires municipalities to realise any future real estate development within existing city boundaries. Therefore, a derelict part of an industrial estate near the river, just beyond the railway that borders the city centre, is transformed into a mix of high-rise office and apartment buildings, a shopping mall, a large car park, and cultural facilities. There will be ample green and open space. In addition, the area is conveniently close to the train station and the city centre. The new neighbourhood is going to be called 'Quality Street'.

Admittedly, environmental quality is somewhat problematic: previous industrial activity has caused severe soil pollution and the remaining industry produces a considerable amount of noise and odour. The railway is also a source of noise, and freight trains regularly transport dangerous substances. The car park is expected to attract a lot of traffic: commuters and visitors to the shopping mall during the day as well as cinema visitors at night. Yet, the plan's proponents feel that such is the price for living in an attractive new part of the city, with a magnificent view of the river and a variety of urban amenities close by.

While preparing the urban plan, the municipality seeks scientific advice about the environmental quality in the area. According to the experts, remediation of the top layer of soil is feasible, and some pollution at greater depth, that is considered immobile, can be left untouched. The expected air pollution levels remain within current European requirements. Noise constitutes a genuine problem: even if the urban plan is optimized so as to have as few residential buildings as possible next to the railway, noise levels remain close to, or in some places below, the minimum quality requirements. Noise levels are even expected to rise, as the train company plans to increase passenger train frequencies. Transport of dangerous substances, in combination with the intended high population density, causes a sharp increase in societal risk. Because of national regulations, offices, shops and residential buildings are not allowed within a distance of about fifteen metres from the railway. The municipality's planners and, ultimately, the City Council, have to weigh all of these aspects in their final decision to establish a proper land use plan.

The municipality and the developer, both investing a lot of money and effort in the intended development, are keen on finalising the plan. Yet, their room for manoeuvre is limited by national noise and safety regulations. To complicate matters, decisions influencing environmental quality are made at higher government tiers: the province is stimulating industrial activity in the region, the Ministry of Transport intends to increase travel and transport by train, and Europe intends to further tighten air quality standards.

Some citizens worry about the expected level of environmental quality. A committee is formed, initiating a hefty discussion, that is taken up by the local press, by participants in public consultations and, finally, by one of the political parties in the City Council. The municipality's environmental department, in a memo to the responsible administrators, urges that the residential buildings be surrounded by a buffer zone. This would considerably reduce the number of apartments and, therefore, the real estate proceedings. Being deemed to be too costly, their proposal is brushed aside. Instead, some technical provisions are made to comply with environmental regulations, albeit barely. The opposing party grudgingly agrees.

(World Health Organization, 2011). Also, levels of air pollution that city dwellers are exposed to, often in high numbers, are well known to be detrimental to human health (Brunekreef and Holgate, 2002; Ren and Tong, 2008; Lelieveld et al., 2015). Even if air quality meets environmental standards, it can still be considered detrimental to human health (World Health Organization, 2004). In addition, compact urban areas increase the

risk of industrial calamities (Ale, 2005a). From this perspective, compact redevelopment of environmentally highly burdened sites may be sustainable in terms of use of space and other resources but not in terms of a more healthy environment.

Table 1.1. Numbers of people exposed to insufficient levels of environmental quality

Indicator	Europe	Individual countries
Air pollution		
Percentage of urban population exposed to PM2.5 above threshold	**11%** (2012, EU-28) (European Environment Agency, 2014a)	
Number of premature deaths attributable to particulate matter (PM2.5)	**403,000** (2011; EU-28) (European Environment Agency, 2015) **375,000** (Europe, 2010) (Lelieveld et al. 2015)	**1628** (2014; Netherlands) (Compendium voor de leefomgeving, 2015)
Number of premature deaths attributable to nitrogen dioxide (NO_2)	**72,000** (2011; EU-28) (European Environment Agency, 2015)	
Number of premature deaths attributable to ground level ozone (O_3)	**16,000** (2011; EU-28) (European Environment Agency, 2015)	
Noise		
Number of people exposed to traffic noise L_{den} > 55 dB, reported	**42 million** (2012; EEA member countries) (European Environment Agency, 2014b)	**5.9 million** (2010; Netherlands) (Schroten et al., 2014)
Number of people exposed to traffic noise L_{den} > 55 dB, estimated	**125 million** (2012; EEA member countries) (European Environment Agency, 2014b)	
Number of people exposed to traffic noise L_{den} > 65 dB	**37 million** (2012, estimated; EEA member countries) (European Environment Agency, 2014b)	**425,000** (2010; Netherlands) (Schroten et al., 2014)
Industrial risk		
Number of people exposed to industrial risk		**16.5 million** (2005; France) (Laurent, 2010)
Number of houses within $1{:}10^6$ y^{-1} risk contour		**'Several thousands'** (2010; Netherlands) (Compendium voor de leefomgeving, 2010) **10,656** (2005) (PBL, 2008)

$1{:}10^6$ y^{-1} = mortality risk limit of one in a million years (or one in a million per year).
dB = decibel; this is a logarithmic measure of sound level.
L_{den} = Day Evening Night Sound Level; this is the average sound level over a 24 hour period, with a penalty of 5 dB added for the evening hours, and a penalty of 10 dB added for the night time hours.
PM10 = particulate matter with aerodynamic diameter of 10 μm or less.

Fictitious as the 'Quality Street' case (Box I) may be, it contains all the elements that are found to occur in practice and that illustrate the problem that is central to this research: why do environmental considerations, in cases where it really matters, seem to play such a subordinate role in decision-making about urban plans, despite a widely supported pursuit of quality and sustainability? Modern inner-city redevelopments near railways and/or industry are eminent examples of situations where 'it really matters': a combination of high-density, mixed function development at a site that is heavily burdened by noise, pollution and risk.

There is a considerable body of scientific literature concerning the integration of environmental interests into other sectoral policies. This body of knowledge, however, was found to largely neglect analysis of integration at the lowest administrative levels, where the actual implementation of policies often has to occur (Watson et al., 2008). Those contributions that have, indeed, analysed environmental policy integration at the local level, tend to restrict themselves to focus on distinct policy sectors – notably water management (e.g. Alahuhta et al., 2010), waste policy (e.g. Watson et al., 2008; Nilsson et al., 2009), and energy (e.g. Nilsson, 2005). These studies have revealed the existence of various barriers that hinder or even prevent integration. Those barriers can be of a cognitive nature in cases where policy sectors have different paradigms (e.g. Alahuhta et al., 2010); or they can be institutional, if policy sectors are institutionalised in different ways (e.g. Watson et al., 2008). Or they can be political, in that other sectoral interests gain more weight in decision-making (e.g. Bulkeley and Betsill, 2005). Only few studies have investigated environmental policy integration into urban planning (Mullally and Dunphy, 2015). In the Netherlands, De Roo and Miller observed that the gap between environmental policy and urban planning was partly bridged by a shift in responsibility from central to local government (De Roo, 1998, 2000; Miller and De Roo, 2004; De Roo and Miller, 1997).

Other studies focussed on a single aspect of urban environmental quality (e.g. noise, see Weber and Driessen, 2010) or on specific policy instruments (Simeonova, 2006; Runhaar et al., 2009; Glasbergen, 2005). Outside the Netherlands, there appears to be much less attention to environmental policy integration in urban planning. This may seem surprising, as the balancing of environmental and other interests is something universal. A possible explanation is the widespread conception of urban planning as a framework *par excellence* for the integration of a variety of interests. If integration of all types of spatial interests is urban planners' core business, then why should special attention be paid to environmental considerations? The many instances of the 'Quality Street' example demonstrate that scientific interest in the matter is justified for two reasons. First, more knowledge is needed to better understand the difficulties involved in making integrated trade-offs in urban planning, in particular concerning the integration of environmental quality interests. Secondly, this knowledge may help urban planning practice to consider environmental quality more fully.

This dissertation, therefore, has a twofold objective: adding to the scientific literature about environmental policy integration, it aims to explain the factors that complicate integration of environmental interests into urban planning. Second, its objective is to raise awareness among urban planners, local politicians and environmental consultants about the importance of urban environmental quality considerations and to provide them with strategies to better integrate these considerations into the decision making process about spatial plans. This is important, because the type of urban plan that is the focus of this research – compact urban development within existing city limits and close to busy infrastructure – is taking place in numerous places and for a variety of reasons. These include e.g.: making optimal use of public transport nodes – often referred to as 'transit oriented development' (Cervero and Sullivan, 2011) – and reducing urban sprawl – known as 'smart growth' (Janssen-Jansen, 2005), 'new urbanism' (Janssen-Jansen, 2005), or 'compact city development' (Richardson and Gordon, 2013).

This introductory chapter is constructed as follows: the next section discusses the central perspective of this research, namely the integration of environmental interests in other (sectoral) policies, with a focus on policy implementation at the local level. It then aims to identify which knowledge is currently lacking, leading to the formulation of the research questions of this dissertation in section 1.3. Section 1.4, on the basis of the literature, theorises about some factors that might explain the observed lack of integration of environmental interests in urban planning. This sets the scene for the following chapters, each of which is dedicated to one of these factors. Next, section 1.5 discusses the methodology of the study and, finally, section 1.6 provides an overview of the whole dissertation.

1.2. INTEGRATING 'ENVIRONMENT' INTO URBAN PLANNING

1.2.1. Environmental policy integration: normative and analytical approaches

As was illustrated in Fig. 1.1, sustainable urban development aims at making trade-offs between economic, ecological and social objectives. Such a process has all the features of what Underdal (1980, p. 159) terms an 'integrated policy'. In the words of Lafferty and Hovden (2003, p. 8): *"For a policy to be 'integrated', three criteria need to be satisfied: comprehensiveness, aggregation, and consistency. 'Comprehensiveness' refers to time, space, actors and issues; 'aggregation' to the evaluation of policy from an 'overall' perspective, (that is, not merely from the perspective of a particular actor or issue area); and 'consistency' implies that the different components of an integrated (that is, aggregated and comprehensive) policy are in accord with each other. The latter requirement applies across different departments and different levels of governance"*.

Building on this definition of integrated policy, Lafferty and Hovden (2003, p. 9), define *environmental* policy integration (EPI) as: *"the incorporation of environmental*

objectives into all stages of policymaking in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of policy; accompanied by an attempt to aggregate presumed environmental consequences into an overall evaluation of policy, and a commitment to minimize contradictions between environmental and sectoral policies by giving principled priority to the former over the latter".

This strongly *normative approach* to EPI is grounded in the Brundtland report, the UNCED process and the EU's Maastricht treaty. In addition to this principled priority, Runhaar et al. (2009) distinguish two more levels of integration, namely *coordination*, where merely frictions between environmental and other policies are avoided, and *harmonization*, which is treating environmental objectives and other interests on an equal basis. The latter two forms of EPI are considered to be 'weak', whereas giving principled priority to environmental considerations is referred to as a 'strong' form of EPI (Jordan and Lenschow, 2010).

The rationale behind EPI is that environmental policy in itself will not be able to attain its objectives (Alahuhta et al., 2010) because of the strong influence exerted on environmental quality by sectors such as agriculture, transport, energy and industry. Therefore, the integration of environmental policy objectives and decision-making in other sectors of society has been a key feature of strategies for sustainable development throughout Europe and in many other countries (Jordan and Lenschow, 2009, p. 3).

EPI can also be regarded as an *analytical approach* to a governing process (Jordan and Lenschow, 2009, p 11), in which different communicative, organisational and procedural instruments are developed and applied. Communicative instruments include ideas about what and how to integrate. Organisational instruments '*alter the context (for example the rules and frameworks)*' (ibid. p. 11), whereas procedural instruments aim at altering decision-making procedures, e.g. by making impact assessment compulsory. The next subsection will elaborate on EPI as a policy analysis approach.

Throughout EPI research literature a distinction is made between vertical and horizontal EPI (Lafferty and Hovden, 2003). Vertical EPI is now understood as "*the accord between general policy goals and statements and the actual implementation programmes*", whereas horizontal EPI concerns integration across societal sectors, i.e. "*the accord between multiple policies affecting the same issue*" (Nilsson and Persson, 2003, p. 339). Originally, this distinction pertained to (supra)national government policies (Lafferty and Hovden, 2003). Nowadays, both horizontal and vertical EPI have a broader meaning, in that horizontal EPI not only concerns integration among a government's sectoral policies, but also those of non-governmental actors within these sectors (Watson et al., 2008; Nykvist, 2008). Vertical EPI at a single government level, originally, was distinguished from implementation of national policies by lower tiers of government (Lafferty and Hovden, 2003). Nykvist (2008) demonstrates that other authors have interpreted 'vertical EPI' in ways more akin to the vertical dimension of multi-level governance.

1.2.2. Environmental policy integration: substantive, process and institutional perspectives

When performing a policy analysis of EPI, various perspectives can be taken. Jordan and Lenschow (2009, pp. 16-17) distinguish a cognitive, a political and an institutional perspective. The *coginitive* perspective focuses on what the authors term the 'communicative instruments' of EPI, i.e. the ways in which ideas are conveyed about what to integrate and how to do it. By contrast, the *political* perspective analyses how cultures and interests within a policy sector resist EPI as it is perceived as an outside pressure. Lastly, the *institutional* perspective looks at EPI as a coordination problem and focuses on the organisational and institutional changes necessary to implement EPI. In our research, we take virtually the same perspectives. Instead of the term 'cognitive perspective', used by Jordan and Lenschow, we prefer the use of the term 'substantive perspective', as it focuses on what and how to integrate. Also, we somewhat broaden Jordan and Lenschow's 'political' perspective to include all relevant aspects of the decision-making process – actors, interests, decision-making strategies – and term it 'process perspective'. Hence, we will study EPI in urban planning from a *substantive*, a *process* and an *institutional* perspective.

From a *substantive* perspective, urban planning is about steering public and private activities that aim at meeting societal needs in such a way that there is an optimal use of available space. EPI, then, amounts to include environmental impacts into these considerations. For most environmental aspects, the origins, propagation and effects are well understood and environmental assessment methods provide knowledge to inform decision-making. Regarding some other environmental issues, experts are still faced with a lot of unknowns. Climate change, for instance, necessitates urban planners to take into account several scenarios with respect to e.g. flood risk. Still other elements of urban environmental quality, such as nuisance, remain highly subjective (Van Kamp et al., 2003). Analysing EPI policy from this perspective amounts to asking: what is urban environmental quality and how does it relate to other objectives of urban planning?

From a *process* perspective, the analysis is rather about how different values are weighed in decision-making about urban plans. Environmental quality is considered a collective interest, but obviously not the only interest at stake. Competing interests are the provision of housing and facilities to all citizens; the shaping of opportunities for private companies to prosper; and a wide variety of other interests concerning the use of space. In preparing an urban plan, all these interests are weighed. This is not merely a matter of rational choice, for power relations and political bargaining are also in play (Richardson, 2005). For our analysis of EPI from the process perspective, the question is: how are environmental values upheld during decision-making, among a variety of other interests?

Taking the *institutional* perspective, in most Western countries a multi-level governance structure can be seen where, according to the subsidiarity principle (Jordan and Jeppesen, 2000), authority is devolved from the central state to the lowest effective

administrative level. Effective in this sense means that the administration's authority is congruent with the spatial scale of the social and natural processes that have a bearing on the decisions that are being made (Termeer et al., 2010; Cumming et al., 2006). Environmental quality standards are set at different administrative levels. In the Dutch context e.g., it is the European Union (EU) who determines air quality requirements, whereas national government decides about permissible levels of noise. At the local level, municipalities can develop their own policies regarding odour nuisance. In addition, the lower administrative levels (province, municipality) are responsible for implementing higher-level policies. Analysing EPI from this perspective, thus, involves the way in which national – and European – policy objectives are reached during implementation at the local level as well as the room for manoeuvre that these local authorities have in making their own choices.

1.3. THEORISING ABOUT EXPLANATORY FACTORS

1.3.1. The conception of urban environmental quality

First, taking the substantive perspective on EPI, we found scientific literature on EPI and urban environmental quality is rather scarce[1]. Simeonova and Van der Valk (2010) specifically studied the integration of a *variety* of environmental quality aspects into urban planning. Other authors have looked into the integration of *a single* environmental quality factor, such as waste (Nilsson et al., 2009) and noise (Weber and Driessen, 2010). Nilsson et al. (2009) find that decision making at the local level – in this case about building waste incineration plants in Sweden – was driven by different motives than those of national waste policy: whereas the national paradigm regarded waste as a resource, locally it was still perceived as a something requiring disposal. In the case of integration of noise policy into urban planning, Weber and Driessen (2010) stress the importance of a substantial paradigmatic shift from discussing noise in (objective) numerical terms, to a conception of (subjective) annoyance, laying the basis, in their view, for EPI.

Taking these arguments a bit further, explanations of limited EPI in inner-city urban redevelopment may be found in scientific discourse about 'quality'. After all, sustainable urban development aims to maintain and increase quality of life, without compromising the conditions for this process to continue, here and elsewhere (Fischer and Amekudzi, 2011). This 'quality of life' encompasses health, socio-cultural aspects (Van Kamp et al., 2003), and what in this dissertation will be defined as 'urban environmental quality': the

1. A November 2015 search in Scopus for the combination of "environmental policy integration" and "urban environmental quality", "urban quality", or "environmental quality" in title, abstract or key words yielded only four documents, including the article that is now Chapter 5 of this dissertation.

ability of the physical environment to satisfy the needs of human beings and ecosystems (Opschoor and Reijnders, 1991; Van Kamp et al., 2003). Negotiating among economy, equity and environment (Fig. 1.1) to arrive at sustainable urban development, then, also involves trade-offs between various, incommensurable aspects of urban environmental quality.

How can these different quality aspects be made operational and how can synergies and trade-offs between them be envisaged? In other words, how can different quality aspects reinforce one another, or to what extent may the increase of one aspect of quality compensate for the loss of another? Glasbergen (2005) argued that it is unclear what the components of 'urban environmental quality' are and how these relate to subjective criteria. Furthermore, several authors have identified elements that constitute the broader concept of 'quality of life'. They suggested that some of these elements may be conditional upon one another (see e.g. Doi et al., 2008). In sum, it is uncertain in what way different aspects of urban environmental quality are interdependent, how they can be balanced and what 'optimal' urban environmental quality should be the outcome of such trade-offs.

For the integration of urban environmental quality into urban planning to be successful, it seems likely that urban planners and decision-makers should at least be aware of the distinct aspects of urban environmental quality and of possible interdependencies, both among those aspects themselves and between urban environmental quality and other interests[2]. Chapter 2, therefore, probes into the concept of urban environmental quality, structuring it along three lines: what are the dimensions of urban environmental quality and how – if at all – are these dimensions related. How do objective measures of quality relate to the subjective perception of quality, and how does the application of different time frames affect the conception of urban environmental quality, in view of multiple time scales and shifting preferences? In sum, considering urban environmental quality in complex planning problems amounts to answering three key questions: 'quality of what?', 'quality for whom?' and 'quality at what time?'

1.3.2. Bounded rationality of decision-making

From the process perspective, it seems interesting to look into the ways in which EPI is sought to be operationalised by feeding environmental considerations into decision-making about urban plans and developments. Results of EPI research can be found in several distinct bodies of literature, among others that about environmental assessment, that can be seen as a typical strategy for EPI (Runhaar et al., 2014). Through environmental assessment, environmental consequences of projects and plans come into view (Pischke and Cashmore, 2006). At the project level, this is achieved through some form

2. In other words: there is a need for 'internal' integration as well as for 'external' integration of urban environmental quality.

of environmental impact assessment (EIA). However, its effectiveness proves to depend upon the context (e.g. Che et al., 2011). At a more strategic level, like that of urban planning, strategic environmental assessment (SEA) has been suggested as a tool to introduce environmental interests (Bina, 2008). SEA, too, is found by many authors to influence decision-making only modestly and in a context-dependent way (Runhaar and Driessen, 2007). In trying to understand the sub-optimal effect of SEA on decision-making, Nilsson and Dalkmann (2009) characterise decision-making about plans and policies as a 'bounded rational' process in which multiple rationalities can be observed and values and political power play a role (see also Richardson, 2005). There is an, often large, number of stakeholders involved, who deliberate in multiple and only partly overlapping decision-making arenas about the plan and connected issues. The way in which actors perceive reality and the goals they pursue are influenced by their values and problem perceptions. Various alternative ways of pursuing these goals are considered. The consequences of each are evaluated and a decision is reached. There are several consecutive rounds of decision-making. In addition, *within* each of these stakeholders, a row of decisions is taken. The actors involved can also be active on different spatial scale levels. In this way, a seemingly chaotic chain of decisions ensues (Teisman, 2000; Van Bueren et al., 2003).

The bounded-rational character of decision-making in urban planning may very well explain why an EPI strategy that is based on rational argument – such as EIA or SEA – sometimes fails. The outcome of a decision chain need not be optimal in terms of a rational weighting of 'scores' of each of the alternatives with respect to all preferences of the actors involved, as is the underlying idea of EIA and SEA. In Chapter 3, we investigate whether this is the case by, inversely, establishing the effect of a *remedy* for the limited influence of SEA on decision-making, that was suggested by Dalkmann et al. (2004), in the form of so-called 'decision windows'. In the context of complex urban planning a decision window is a relatively short period of time within a round of decision-making, in which different interests meet and are combined or in which issues are reframed to arrive at a shared problem definition and a solution. If decision windows demonstrably allow environmental considerations to enter the decision-making process in urban planning, it is plausible that it is the complex and bounded-rational nature of decision making in urban planning that is a barrier to EPI.

1.3.3. The limited use of expert knowledge in decision-making

Also from the process perspective, and connected to the previous explanatory factor, a third explanation of limited EPI in urban planning is sought in the fact that not only environmental assessment (EIA and SEA), but, more generally, all types of expert knowledge about the environment seem to be underused by decision-makers (Brown, 2003; Owens et al., 2006). Yet, it is well recognised that planning sustainable urban development requires knowledge about the environmental effects of policy decisions – in the words

of Atkinson and Klausen (2011, p. 231) "(…) *policy integration is a matter of knowledge use*" – and, more particularly here, of urban plans. Also the EPI literature acknowledges the importance of expert knowledge (Yin et al., 2015; Söderberg, 2011).

If, indeed, scientific knowledge is vital to decision-making, then why is it underused? Scientific literature suggests a pronounced divide between decision-makers and environmental quality specialists, who feel that their scientific input to the urban planning process is not sufficiently used (Brown, 2003; Evans, 2006; Owens et al., 2004). Many authors have studied this gap between scientists (and scientific knowledge) and decision-makers. They suggest three important causes: first, scientists and decision-makers are part of distinct epistemic communities. Second, decision-making is characterised by bounded rationality; it is inherently political in nature and involves values and power (Owens et al., 2004; Nilsson and Dalkmann, 2009; Richardson, 2005; Siew, 2008). Moreover, scientific knowledge is about complex phenomena and inherently uncertain and undetermined (Van den Hove, 2007). In most of the literature concerned, the perspective adopted has been that of the *providers* of knowledge (e.g. Brown, 2003; Evans, 2006; Edelenbos et al., 2004; Gocmen and Ventura, 2010). Little is known about the *demand* side. Therefore, Chapter 4 explores the relation between EPI and the way in which decision-makers use expert knowledge about environmental consequences when making decisions about an urban plan.

1.3.4. Constraints by higher-tier environmental policies

From an institutional perspective, EPI is a matter of multi-sectoral and multi-level coordination (Jordan and Lenschow, 2010; Söderberg, 2011). A fourth explanatory factor, then, comes from the involvement of multiple administrative tiers in governing urban environmental quality. This is a consequence of both the multi-scalar nature of urban environmental quality (Cash et al., 2006; Cumming et al., 2006) and of the fact that, in decentralised states, governance arrangements are made in accordance with the subsidiarity principle, implying that decision-making takes place at the most effective administrative level (Jordan and Jeppesen, 2000). Thus, it depends upon the geographical scale of the bio-geochemical and social processes that underlie the issue at what administrative level decisions are taken. This is congruent with the contention of Bulkeley and Betsill (2005) that analysis of the bottlenecks in implementing sustainable development – and, in particular, sustainable cities – 'on the ground' requires a multilevel and multi- and trans-scalar approach.

Traditionally, environmental problems have been abated by issuing exposure or environmental quality standards (and consequently by compelling citizens and companies to take measures so as to comply with these standards). In many countries, standards are in place that maximise the amount of pollutants in air, soil and water or the noise from traffic and industry. These standards are mostly determined by national government

– sometimes as national implementations of supra-national directives – and applied throughout the country as a generic norm. Environmental standards influence urban planning in that they necessitate planners to maintain a certain distance between intrusive activities and sensitive functions (De Roo and Miller, 1997; De Roo, 2001). In planning high-density, mixed-function inner-city redevelopment, there simply is insufficient space to observe the required distances (De Roo, 2000). Abatement of the sources of noise, risk and pollution also has obvious limits. Environmental standards then are found to get in the way of desired urban development (De Zeeuw et al., 2009).

Theoretically, higher-tier environmental policies could influence EPI in urban planning in several ways: first, urban environmental quality standards are conducive to EPI in that they give some degree of 'principled priority' to the environment, enforcing a minimum level of quality for air, noise, odour, et cetera. Secondly, these standards obviously limit the room for manoeuvre that local authorities have to make their own, integrated, trade-offs, resulting in an overall level of urban environmental quality that is perceived as being sub-optimal. Thirdly, higher tiers of government implement their own – environmental as well as other sectoral – policies, that may influence urban environmental quality at the local level. Examples are the expansion of industrial estates and the increase in passenger train frequency. In Chapter 5, a multi-level governance perspective is applied to analyse how environmental regulations at various administrative levels contribute to – or constitute bottlenecks for – EPI in urban planning.

1.3.5. Devolution upon sub-optimal governance levels

Finally, a fifth factor that possibly complicates integration of environmental interests in urban planning also follows from the institutional perspective. As mentioned in the previous sub-section, decision-making about an urban plan is local, whereas many aspects of urban environmental quality are subject to processes at multiple spatial scale levels. Governing each of these environmental quality aspects requires steering at the corresponding administrative level (Cumming et al., 2006; Cash et al., 2006; Newig and Fritsch, 2009). This entails devolving authority from the central state to higher or lower tiers of government, according to the principle of *subsidiarity*, in order to have decisions be taken at the lowest level that is appropriate. The EPI literature does not address issues of devolution and subsidiarity, other than in the context of the EU and its member states (e.g. Jordan and Jeppesen, 2000). Therefore, we turn to research on the governance of multi-scalar phenomena.

Environmental problems and solutions span multiple spatial scale levels (Cash et al., 2006). A single urban regeneration project usually affects environmental quality at spatial scale levels above that of the city. Conversely, urban environmental quality within the project is influenced by activities and policies at higher levels. As was argued in the previous sub-section, this may cause interferences between policies executed by higher

administrative tiers and decision-making at the local level. Cash (2006) refers to this as '*cross scale, cross level dynamics*'. The resulting tensions can be dealt with by improving the links between administrative levels (Termeer et al., 2010). In practice, however, conflicts between local development and higher-tier environmental objectives are sometimes resolved by devolving the authority to set environmental objectives to the municipal level. Flexibility in planning, then, is given priority over compliance with environmental quality standards. It is likely that EPI – as far as the higher-tier environmental objectives are concerned – is hindered when the authority to decide about urban environmental quality is devolved completely to an administrative level that is no longer 'consistent with effective action' (Jordan and Jeppesen, 2000, p. 66).

Acknowledging that flexibility is sometimes necessary, Chapter 6 compares two different ways to organise coordination between different administrative levels in such a way that environmental quality can be optimally guaranteed at all spatial scale levels, while still allowing for flexibility at the local level.

1.4. GOAL, SCOPE AND RESEARCH QUESTIONS

1.4.1. Goal

Theory about EPI thus provides three useful perspectives to try and find factors that might explain the extent to which EPI in urban planning is successful. Yet, in this research EPI is not a goal in itself, but rather a means to bring about sustainable urban development. The objective of this dissertation, therefore, is twofold. First, it aims to contribute to the scientific body of knowledge about EPI by identifying and explaining factors that influence the success of EPI in urban planning. Second, through these analyses of EPI it aims to deliver new insights for urban planners, local politicians and environmental consultants about the nature and importance of urban environmental quality in sustainable urban development and about the processes and institutional arrangements that can be used to govern it.

1.4.2. Scope

In urban planning, environmental interests pertain to what will be termed, throughout this dissertation, *urban environmental quality*. This is thought of as the ability of the physical environment to satisfy the needs of human beings, ecosystems and artefacts (Opschoor and Reijnders, 1991; Van Kamp et al., 2003). An impressive body of literature exists about what these needs are (for an overview see: Jacobs, 2000; Van Kamp et al., 2003). Urban environmental quality partly overlaps with the concept of 'quality of life'. This is a concept that usually refers to many more aspects of the environment than the usual physical ones, encompassing also health and socio-cultural aspects (Van Kamp et

al., 2003). Urban environmental quality – as well as quality of life – entails both objective and subjective dimensions. Mainstream environmental policy is primarily concerned with the *objective* dimensions of the *physical* environment, like the levels of noise, odour or chemical pollutants[3]. However, when making trade-offs between urban environmental quality and other interests, the *subjective* perception – e.g. the level of actual annoyance by noise and odour – becomes important. This is also the case when aspects of urban environmental quality are traded off against one another, for instance in a case where a fine view of the surrounding landscape can be thought to compensate for a questionable level of air quality. This dissertation focuses on the former, traditional environmental quality aspects (soil, water, air, noise, odour and industrial risk), while taking the broader perspective whenever trade-offs are concerned.

Balancing interests, including the integration of environmental interests, is particularly difficult in cases where there are multiple, strongly competing claims for land and space, because many, often intensive, competing societal activities are planned in close proximity to each other. The scope of this research, therefore, is limited to high-density, mixed-function, inner-city redevelopments in areas where neighbouring industries or infrastructure are the cause of considerable burdening by multiple forms of pollution. In Fig. 1.2 and Fig 1.3, two typical examples are shown. Fig. 1.2 is an aerial photograph of the railway zone in Tilburg, that clearly illustrates the presence of several aspects of urban environmental quality, both positive and negative: traffic and railway noise, industrial risk from freight transport, but also the presence of industrial heritage. Fig. 1.3 visualises how railway noise impacts on residential buildings in Zutphen – and on some of the remaining industrial heritage.

While the scope of the cases used to illustrate the arguments is limited to the Dutch context, that of the scientific literature underlying the arguments is much wider. Therefore, the insights are expected to be applicable in other Western countries as well. The cases are representative of many hundreds of hectares of derelict railway locations in the Netherlands (Stuurgroep spoorzoneontwikkeling, 2009), but also of redevelopment projects in former harbours and industrial estates. As was demonstrated in section 1.1, such redevelopment processes present themselves in many western cities. Worldwide, there are many transit-oriented developments showing similar characteristics and ambitions (Cervero and Sullivan, 2011).

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3. In the Dutch context, two terms exist pertaining to environmental quality, each having a distinct meaning. The term kwaliteit van de leefomgeving' (also: 'leefomgevingskwaliteit'), literally meaning 'quality of the environment', is used to denote environmental quality in the broad sense, in which it is also often used in international literature. The term 'milieukwaliteit' (literally: 'environmental quality') refers to environmental quality in a much more limited sense, connected to the extent to which the environment is burdened by pollution, noise, odour and industrial hazards. In this dissertation, the term 'environmental quality' is used in this more strict sense. The broader concept is referred to as 'urban environmental quality'.

Fig. 1.2. Multiple urban environmental quality issues in Tilburg. Railway noise, industrial risk, soil pollution, industrial heritage, green space, compactness, city centre amenities.

Fig. 1.3. Railway noise and new residential buildings in Zutphen.

1.4.3. Research questions

As argued in section 1.1, the central premise of this dissertation is that the integration of urban environmental quality into decision-making in inner-city redevelopment planning is limited. The principal research question, then, is: *what factors explain the limited integration of urban environmental quality into decision-making processes in inner-city redevelopment planning and what effective strategies for further improvement can be derived from the results of this investigation?*

This central research question can be further detailed using the three perspectives mentioned in section 1.2.2. From the *substantive perspective*, the issue is what elements constitute urban environmental quality and how these elements can be balanced among each other and with economic and social objectives in urban planning. The first question to be answered, then, is:

1. What is the nature of urban environmental quality and how does this nature facilitate or complicate integration of urban environmental quality into urban planning?

From the *process perspective*, which focuses on the way in which decisions about urban plans are made, two more research questions can be raised about the way in which environmental interests enter the decision-making process and, more specifically, how expert knowledge about environmental impacts of alternatives that are considered during planning is used by decision-makers:

2. How do the actors involved in inner-city redevelopment planning balance environmental interests against other interests in the decision-making process?
3. How is expert knowledge about environmental impacts used by each of these actors in decision-making about urban plans in inner-city redevelopment planning?

Taking the *institutional perspective* prompts two final research questions focusing on the multi-level nature of environmental governance. One is related to the multi-scalar nature of environmental quality and the fact that, concomitantly, a multi-level governance system is required to steer it[4]. The other, more specifically, relates to the ensuing need of coordination of environmental governance among these multiple governance levels:

4. In what way and to what extent do multi-level relations of governance influence integration of urban environmental quality considerations?
5. How may EPI into inner-city redevelopment planning be influenced by the necessity to coordinate environmental governance at different administrative levels?

Thus, we study sustainable urban development through an EPI lens, which gives us three different perspectives on the integration of environmental quality in urban planning. The diagram in Fig. 1.4 shows our object of study, sustainable urban development, in the centre. We start our research from EPI theory, hence the arrow linking environmental policy

4. Multi-scalar refers to the multiple spatial scales on which processes occur that are connected to environmental quality. Multi-level refers to multiple administrative levels at which these processes are governed.

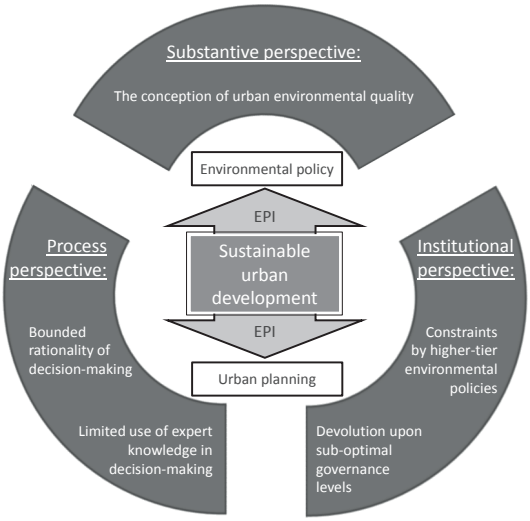

Fig. 1.4. Environmental policy integration (EPI) is used as a specific lens to study sustainable urban development from three different perspectives, yielding five explanatory factors for successful integration of urban environmental quality in urban planning.

and urban planning. The EPI lens offers three different perspectives, hence visualised surrounding the study object. Within the substantive, process and institutional perspectives, the five explanatory factors that originate from these perspectives are shown.

1.5. METHODOLOGY

This section describes the research strategy used, the selection of the cases and the data acquisition methods used.

1.5.1. Research strategy

This dissertation is the result of five research sub-projects, each highlighting a specific part of the problem of limited EPI in planning difficult (high-density; mixed-function; multiple high environmental impacts) inner-city redevelopment, following the three perspectives outlined above. Each of those sub-projects, presented in the following chapters, has its own research methodology, which is described in each individual chapter. All of the chapters have also been published in or submitted to peer-reviewed scientific journals.

The overall research strategy was as follows: in each sub-project, we developed a theoretical framework on the basis of a literature study. The resulting insights were subsequently illustrated by exploring a limited number of cases. This explorative case-based strategy (Yin, 2009) is well-suited for in-depth study of complex realities ('t Hart et al.,

2001). The research sub-project presented in Chapter 4 is an empirical study, in which theoretical insights derived from a literature study were confronted with urban planning practice, based on a larger number of semi-structured interviews rather than being illustrated through case studies.

This strategy allowed for a limited number of cases and a small but illustrative selection of interviewees in each case, sufficient to highlight the relevant perspectives: that of the project leader, the responsible alderman, the environmental consultant and, when appropriate, the neighbouring industry. Desk research of underlying documents (such as environmental reports, plan motivations and appeal court proceedings) further contributed to the internal validity of the research.

The unit of analysis is the urban planning process at the municipal level. The dependent variable is the degree of integration of environmental interests in urban planning, where environmental objectives are given principled priority, are being harmonised with other sectoral objectives or are merely coordinated with those other objectives. The independent variables are the explanatory factors: the extent to which an integral vision of urban environmental quality is present at the local level; the occurrence of decision windows; the extent to which expert knowledge plays a role in decision-making; municipalities' room for manoeuvre; the way in which subsidiarity is given shape. The ways in which these variables are made operational is described in each of the following chapters.

As there is no comprehensive theory about governing urban environmental quality in inner-city redevelopment, throughout this research different perspectives are used, each with its own theoretical framework (quality of life; networked decision-making; bounded rational decision-making; the science–policy divide; multi-level governance; subsidiarity; scale mismatch; reflexive law). In the last and concluding chapter, these perspectives prove to yield complementary and partly overlapping conclusions.

1.5.2. Case selection

Six inner-city redevelopment projects were selected for this research. They are listed in Table 1.2, together with the main interests that were at stake. All cases involve moderate to high density mixed-function development near industry and/or busy railways or highways. The size of the developments varies between 5.5 and 80 hectares. Selection of the cases was based on the type of problem that predominantly determines environmental quality. In all cases, at least two of the following environmental impacts are problematic: industrial, railway or highway noise; industrial risk from transport; odour nuisance from industrial activities; soil pollution from former industrial activities. In four cases, there was an explicit ambition to strive for sustainable urban development, reflected in targets for energy efficiency and the use of environmental friendly building materials. The cases of Vlaardingen and Zaanstad were selected because these allowed comparison of two different legal regimes specifically intended to cope with conflicts between urban

Table 1.2. Cases and the main interests at stake.

			Environmental interests							
Case	**Social interests**	**Economic interests**	**Energy & building materials**	**Flood risk**	**Railway noise**	**Industrial noise**	**Odour**	**Industrial risk**	**Soil pollution**	**Road traffic noise**
Tilburg	Improve city centre amenities; improve train station facilities; build city campus; build residences	Build shops; build office buildings	x		x			x	x	x
Vlaardingen	Build residences, including social housing	Build office buildings		x		x	x	x		
Utrecht	Build residences, including social housing; improve participation	Capitalise municipality's assets	x					x	x	x
Woerden	Build residences, including social housing; improve / extend existing school and shopping mall	Capitalise municipality's assets; build office buildings	x		x			x		x
Zaanstad	Build residences; enhance urban environmental quality	Maintain business attractiveness and a mixed residential-business atmosphere	x			x	x			
Zutphen	Build residences	Build office buildings	x		x	x		x		x

development and environmental quality. Selection of cases is further underpinned in each of the case studies in the subsequent chapters.

Although the cases are all taken from planning practice in the Netherlands, we argue that the *problematique* of balancing incomparable interests and the degree of priority that is given to environmental interests in this process is nearly universal. The type of urban planning problem in which these matters are particularly difficult to resolve – compact inner-city development in areas where environmental impacts are high – occurs frequently and confronts urban planners with dilemmas that are highly comparable with the ones described here. Therefore, our results can be readily generalised.

1.5.3. Data collection and data analysis

Empirical data were collected through document research and interviews. Documents used include the formal land use plans and the underlying assessment reports regarding environmental quality (mainly noise, soil pollution, industrial safety and energy). Interviews have been conducted with project leaders, advisors, real estate developers and local administrators, between May 2011 and May 2015. One round of interviews, with local politicians, was conducted by telephone. All other interviews were face to face. Interviews were semi-structured. Appendix A contains a list of interviewees. Appendix B through E contain the questionnaires that were used when conducting the interviews. Selection of documents and interviewees is underpinned in more detail in each of the case studies in the following chapters. Data obtained from interviews with different stakeholders and those obtained through document analysis were related to one another by triangulation, wherever possible.

1.6. DISSERTATION STRUCTURE

This dissertation is built around five papers. Each of these papers investigates one of the explanatory factors discussed in section 1.3. A concluding chapter brings together the conclusions of the individual papers and reflects on them from a more holistic perspective. The dissertation structure is represented in Fig. 1.5.

Chapters 2 through 6 each go into one of the research questions outlined in section 1.4.3. First, Chapter 2 endeavours to elucidate the illusive character of urban environmental quality and what this means for EPI, both in theory and practice. Next, Chapter 3 probes how environmental interests and values may enter the decision-making process. Then, from our investigation into the perception of the science–policy gap by local politicians, Chapter 4 analyses the limited use of expert knowledge about environmental impacts in decision-making about urban plans. Chapter 5 is concerned with possible constraints for local decision-making posed by higher-tier environmental policies, while Chapter 6 looks

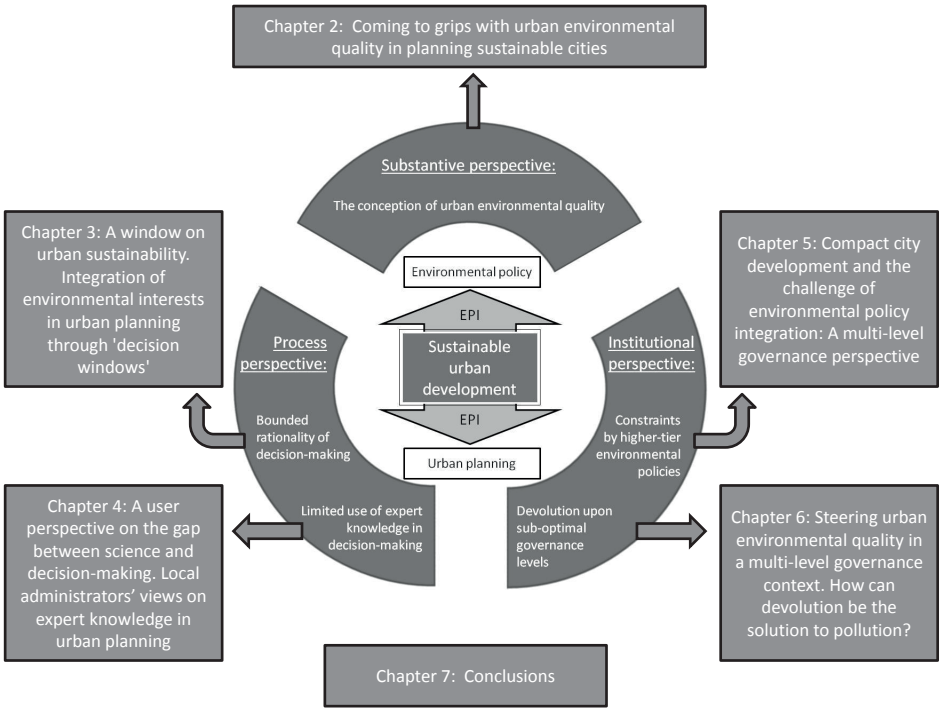

Fig. 1.5. Dissertation structure. Each explanatory factor is investigated in one of the following chapters.

at the coordination challenges between the administrative tiers in a multi-governance structure. These chapters all have a somewhat broader scope than our actual research questions. Therefore, finally, Chapter 7 changes focus back again onto the central research question, drawing overall conclusions and reflecting upon those.

CHAPTER 2

Coming to grips with urban environmental quality in planning sustainable cities[5]

Rien van Stigt, Peter P.J. Driessen, Tejo J.M. Spit

5. This chapter has been submitted as a scientific paper.

ABSTRACT

Based on a review of recent literature, this paper addresses the question of how urban planners can steer urban environmental quality, given the fact that it is multidimensional in character, is assessed largely in subjective terms and varies across time. The paper explores three questions that are at the core of planning and designing cities: 'quality of what?', 'quality for whom?' and 'quality at what time?' and illustrates the dilemmas that urban planners face in answering these questions. The three questions provide a novel framework that offers urban planners perspectives for action in finding their way out of the dilemmas identified. Rather than further detailing the exact nature of urban quality, these perspectives call for an approach to urban planning that is integrated, participative and adaptive.

2.1. INTRODUCTION

Sustainable urban development is not a goal in itself; it is aimed at maintaining and increasing quality of life in a city, without compromising the conditions for this process to continue, here and elsewhere (Fischer and Amekudzi, 2011). As any urban planner will recognise, the design and functioning of a city's physical environment are meant to contribute to this quality of life (Velázquez and Celemín, 2014; Silva and Mendes, 2012; Ogneva-Himmelberger et al., 2013). Yet, we cannot be sure about exactly *how* that contribution comes about. Reviewing recent scientific literature about 'quality of life' and 'urban environmental quality', this paper finds three main causes for this lack of understanding.

Firstly, it is well-established that quality can be conceptualised taking perspectives on different domains and sub-domains of life: e.g. life as-a-whole, city life, economic life, social life et cetera (Pacione, 2003; Van Kamp et al., 2003). In each domain, multiple and only partly distinct dimensions can be distinguished; examples in the urban sub-domain are: the environmental quality; the availability of facilities; and the amount of green space (Moore et al., 2006; Silva, 2015). Urban quality of life, as well as its sub-domain equivalent urban environmental quality – which is the focus of this paper – thus has a multidimensional character. Knowing this, though, does not help urban planners understand exactly *how* these multiple dimensions of urban quality influence one another, in order to make sensible trade-offs between them.

Secondly, it is also widely accepted that quality can only partly be gauged from objective conditions; it is the subjective perception and evaluation of these objective conditions that ultimately determines how the level of quality is perceived, whether in terms of quality of life (Felce and Perry, 1995) or urban environmental quality (Moore et al., 2006). Although objective and subjective measures of quality differ fundamentally, they are generally considered to complement one another and, jointly, to well represent quality (Santos and Martins, 2007; Perlaviciute and Steg, 2012; Marans, 2003, 2015; Pacione, 2003). The mere observation that 'quality' has different meanings for different people, however, does not help planners in optimally and equitably stimulating urban quality.

Thirdly, people's preferences vary over time, both within and across generations, and consequently, so does quality (Ruth and Franklin, 2014). Pacione (2003) suggests that people accommodate to conditions over time. Furthermore, satisfying a specific set of needs in the short term may still compromise other needs on the long term (De Haan et al., 2014). Quality issues themselves also vary across time: there has been a tremendous increase in urban quality – as measured by objective indicators – in most Western countries (UNEP, 2012). On the other hand, new quality issues arise, mirroring changing concerns in society (ibid.), e.g. climate change or endocrine-disrupting compounds (Rudel et al., 2003). Even knowing this, urban planners are often uncertain when, to what extent and at what cost such new issues must be addressed.

This paper reviews the relevant scientific literature about urban environmental quality and urban quality of life. What we found to be lacking is the implications of the accumulated knowledge for urban planners. We therefore suggest a novel perspective, which demonstrates that the multi-dimensional, partly subjective and time-dependent character of urban environmental quality confronts urban planners with serious dilemmas when trying to influence this quality. These dilemma's include: making trade-offs between incomparable quality dimensions; allocating urban quality equitably; and planning a sustainable level of urban environmental quality over time in the face of uncertainty. The perspective we take is created by answering three questions: 'quality of what?', 'quality for whom?' and 'quality at what time?' In our literature review, we explore these questions and subsequently illustrate the dilemmas – and some possible ways out of them – with examples derived from secondary material. In doing so, this paper contributes to urban planners' repertoire of actions in steering urban environmental quality.

The paper is structured as follows: The next section briefly describes our research strategy. In section 2.3, we seek to answer the question 'quality of what?' by identifying the multiple dimensions of urban environmental quality and reviewing distinct attempts to operationalise these dimensions and to make trade-offs between them. Section 2.4 addresses the question 'quality for whom?', delving deeper into the significance of objective and subjective indicators for urban quality and the relations between them. In section 2.5, the matter of 'quality at what time?' is further explored, analysing how the urban environmental quality agenda has changed over time and is likely to change in the future. From these questions, three dilemmas for urban planners arise that are empirically illustrated with, mostly Dutch, examples in section 2.6. In the last two sections, we offer perspectives that may help to solve these types of dilemmas and present our conclusion.

2.2. METHOD

We performed a literature search in Scopus, using three consecutive strategies. The first was a general search on 'quality of life' and 'urban environmental quality'. As evidenced by a special issue of Landscape and Urban Planning on urban environmental quality, the topic gained scholarly interest at the beginning of this century. We therefore limited our search to post-1999 articles. In June 2015, searching for ("quality of life" AND "environmental quality" AND urban) in title, abstract and key words, limited to social and environmental sciences, yielded 70 papers; a search for "urban environmental quality" in title, abstract and key words yielded 52. The contributions found could largely be clustered into two main groups: one concerns dimensions of quality and indicators, the other has a focus on the perception of quality – both quality of life and urban environmental quality. The remainder deals with issues of policy, equity and demography in relation to

environmental quality. We discarded articles that appeared to have no focus on urban environmental quality *per se*. The first two clusters gave rise to questions that help structure our research: 'quality of what?' and 'quality for whom?' The initial inventory was then followed by two more in-depth searches on the relations between urban environmental quality dimensions and on the relationship between objective and subjective indicators of quality. Searches were performed in all fields using strings like ("urban environmental quality" AND dimensions AND relations) and ("urban environmental quality" AND dimensions AND subjective AND objective) and variations of those. The third question, 'Quality at what time?', was inspired by Pacione (2003), who argues that people's perceptions and preferences change over time and by contributions relating quality to sustainability, particularly its temporal aspects (De Haan et al., 2014; Marans, 2015).

In the assembled literature, we identified dilemmas that urban planners are confronted with when specifying quality in terms of 'what', 'for whom' and 'when'. Drawing on our previous research (Van Stigt et al., 2013a; Van Stigt et al., 2015) and based on a wider internet search, we found practical examples illustrating those dilemmas. For analytic reasons, we treat the dilemmas separately, although in practice they often prove to be connected.

2.3. QUALITY OF WHAT? THE MULTIPLE DIMENSIONS OF URBAN ENVIRONMENTAL QUALITY AND THEIR INTERACTIONS

2.3.1. Urban environmental quality

There are many approaches to 'quality', differing in the domains or sub-domains of life they address and in the type of indicator – either objective or subjective (Pacione, 2003) – they use. Common designations are 'quality of life', 'liveability', 'urban quality of life', 'environmental quality' and 'urban environmental quality'.

Building on earlier work by Van Kamp et al. (2003) and Opschoor and Reijnders (1991), we define urban environmental quality for the purpose of this paper as the ability of the physical environment to satisfy the needs of human beings, ecosystems and artefacts in cities. Urban environmental quality is regarded here as a sub-set of quality of life, pertaining to only those needs that are, directly or indirectly, related to the physical environment. It has many different dimensions, ranging from the concentration of pollutants in the atmosphere or the level of ambient noise to the presence of cultural amenities, the distance to the nearest form of public transport or the amount of green and open space.

2.3.2. Dimensions and indicators of urban environmental quality

In order to grasp urban environmental quality – and to steer it – scholars have suggested a wide range of indicators. Indicators may be based on objective as well as subjective data, and either focus on one or two dimensions, or aim to be quite comprehensive. With respect to objective indicators, our literature search yielded various examples of one-dimensional quality assessments: ambient air quality (e.g. Mendes and Silva, 2007; Braniš, 2009), noise (e.g. Seidman and Standring, 2010; Weber and Driessen, 2010), metal concentrations in soil (e.g. Hamzeh et al., 2011) and abundance and quality of green space (e.g. Pereira et al., 2012). A two-dimensional assessment was found to combine e.g. air quality and noise (Silva and Mendes, 2012). More comprehensive methods combine objective indicators of multiple dimensions into a single index (e.g. Silva, 2015; Wan et al., 2009). Often, geographic information systems (e.g. Joseph et al., 2014; Velázquez and Celemín, 2014; Hamzeh et al., 2011) and/or satellite data (Nichol and Wong, 2009) are used to map quality aspects or indices.

Another line of inquiry uses statistical methods to find correlations between observed – usually self-reported – variables and latent variables that predict (urban) quality of life. Bonaiuto et al. (2003) used principle component analysis to find 19 perceived quality indices for residential environmental quality. Doi et al. (2008) studied infrastructure related elements of quality of life and Lee (2008) used structural equation modelling to find the principal dimensions of quality of life in Taipei. In the same city, Tu and Lin (2008) used principal component analysis to identify six dimensions of residential environment quality (Urban Planning and Design, Security and Social Relationship, Transportation and Commercial Services, Residential Atmosphere, Environmental Health, and Facility Management). All in all, there is a good deal of knowledge about which dimensions constitute urban environmental quality and related measures of quality, but there has been little research into how these dimensions interact.

2.3.3. Interrelationships between quality dimensions – empirical findings and theory

There is some recent research demonstrating that distinct dimensions of urban environmental quality influence one another. In a comparative study of three green spaces in Sheffield (United Kingdom), Irvine et al. (2009) demonstrate a relationship between the perception of sound and the attributes of the greenery. Park users expressed a hierarchy of preference for sound, valuing natural sounds over those of people or mechanical sounds. As the prevalence of these types of sound differ according to the ecological quality of the green space, it follows that these two aspects of urban environmental quality are related.

There is also some empirical evidence that quality dimensions interact in a hierarchic fashion. Johnston et al. (2002) elaborated an econometric model of a watershed management program consisting of several measures, as well as the financial cost of combinations

of those measures. Each combination of measures led to certain environmental benefits, such as surface and ground water quality and public access to watershed recreation sites. Willingness to pay was derived from stated preferences for certain combinations of measures and cost contained in the plan. The model results show that the willingness to pay for surface water quality was dependent upon other qualities inherent in the plan in a rather counter-intuitive way. People were willing to pay more for one unit improvement of surface water quality if the plan also led to ground water quality deterioration. They were willing to pay less for improving surface water quality if the plan also improved public access to recreation sites. This suggests that some dimensions of quality have a higher weight than others. The actual nature and shape of this relationship, however, remain obscure.

A model allowing for a trade-off between two distinct dimensions of urban environmental quality was proposed by Silva and Mendes (2012). They developed a composite index for city noise and air quality. This index combined normalised concentrations of five pollutants, each being given equal weight, and noise, which was, in turn, given equal weight compared to air quality. A later modification combined air pollutants using weights derived from their dose-response relationships: the more damaging to health, the higher the weight. Noise and air quality were still combined using equal weights for both (Silva, 2015). The model illustrates the complexity of weighing quality dimensions and to make trade-offs between them.

From a theoretical viewpoint, dimensions of quality have, since Maslov (1954), been envisaged to have a hierarchical relationship: as acknowledged by Perlaviciute and Steg (2012), some quality aspects are likely to be found relatively more important than others, and this perception of importance may vary across different groups. Building on theories from social psychology, De Haan et al. (2014) suggested three hierarchically dependent levels of societal needs in a dynamic model explaining how needs that are met – or failed to be met – on one level influence expression of needs at other levels. In this model, basic societal needs such as sustenance, health, safety and shelter must be met before higher-level needs that include social cohesion, healthy ecosystems and convenience, are in order. Also Jacobs (2000) theoretically distinguished four different levels of urban quality – biological, social, psychical and metaphysical – that each are contingent upon satisfaction of the underlying levels.

At the basic level, phenomena and processes belong mainly to the domain of the natural sciences (Jacobs, 2000). Once basic needs are met and other, higher-level quality aspects come into play, subjective judgments about that quality are introduced (Ruth and Franklin, 2014). We will come back to this in the next section.

2.4. QUALITY FOR WHOM? OBJECTIVE AND SUBJECTIVE MEASURES OF URBAN QUALITY AND THEIR RELATIONSHIP

It is widely acknowledged that quality indicators can be of a subjective as well as an objective nature (Fischer and Amekudzi, 2011; Lee, 2008; Howley et al., 2009; Marans, 2003; Moore et al., 2006). Subjective indicators, such as citizens' complaints (for instance about noise nuisance), are used to assess urban environmental quality (Carvalho and Fidélis, 2009). Felce and Perry (1995) argue that quality of life is determined by objective life conditions as well as an individual's satisfaction with these conditions. Furthermore, the individual's assessment of both *objective* conditions and *subjective* satisfaction with these conditions is influenced by personal values and aspirations, determining the relative importance of each of these conditions. These elements – conditions, satisfaction, values and aspirations – influence one another. They may vary over time (see also section 2.5) and may be culturally determined (Felce and Perry, 1995).

Recently, several scholars have looked into the *relationship* between objective quality determinants and their subjective evaluation. Over-all, there appears to be very little correlation between the two. Housing prices in the centre of Madrid, for instance, were found to negatively correlate with subjective measures of air quality and noise but – unexpectedly – positively with objective measures of air pollutants (Chasco and Le Gallo, 2013). Likewise, McCrea (2006), found only weak correlation between objective measures of population density and subjective perception of overcrowding as well as between objectively assessed and subjectively perceived access to educational, commercial, medical and leisure facilities. Subjective urban quality of life could be predicted well from the subjective variables, but showed no significant correlation with the objective measures.

Von Wirth et al. (2014) also found that residents' satisfaction with the city correlated well with subjective measures of accessibility of city centre amenities and safety in public spaces. Contrary to McCrea (2006), they did find a strong link between objective and subjective access, the discrepancy being attributed to differences in spatial scale and typology of the areas under study. In another study, Lotfi and Koohsari (2009) found that the subjective assessment of accessibility of public spaces is dependant not only upon objectively measured distance, but also upon feelings of safety and perceived quality of the (pedestrian) route.

Surprisingly, Santos and Martins (2007) did find a fair correlation of objective conditions and their subjective evaluation by Porto's residents. Only with three out of fourteen indicators, the level of agreement found between objective and subjective measures was low.

Taking a somewhat different approach, Okulicz-Kuzaryn (2013) compared cities' Mercer[6] liveability index to residents' satisfaction with the city. Only moderate correlation was found. More specifically, the liveability index showed no correlation with residents' positive attitude towards foreigners, whereas satisfaction with the city did. Trust in fellow inhabitants was found to correlate well with both the liveability index and residents' satisfaction with the city.

In sum, people's experiences and values strongly influence their perceptions of quality. In other words, urban environmental quality is, to a large extent, 'in the eye of the beholder'. Relations between objective indicators and subjective perceptions of urban quality have been researched for only a few of a wide variety of indicators, and the evidence about these relations generally points towards a weak correlation between the two. Therefore, merely using objective indicators to assess urban environmental quality will result in a distorted image. Subjective evaluations of these objective attributes should complement the assessment.

2.5. QUALITY AT WHAT TIME? URBAN PLANNING IN THE FACE OF UNCERTAINTY

As we saw, urban environmental quality is derived from notions about quality of life and liveability, which *per se* have no temporal dimension. However, as De Haan et al. (2014, p. 126) point out, "*increasing liveability is not necessarily healthy for society or the ecosystems associated with the societal system. (...) [A] liveable society is not necessarily a sustainable one, just as a happy life is not necessarily a long and healthy one*" From the perspective of sustainable urban development, urban quality means meeting societal needs in a way that can be sustained over time, thus introducing a temporal dimension.

Urban environmental quality is not constant in time anyway. Along with changing patterns of social activity, objective conditions change and so do the perceptions of these conditions in society. In the 1960s, untreated industrial emissions to water and air were considered problematic because of locally elevated concentrations. During the 1980s, problems at higher spatial scale levels were recognised, such as 'acid rain', the wet and dry deposition of acid-forming sulphur and nitrogen compounds. Nowadays, urban environmental quality issues include reduction of vulnerability to climate change. In many societies, environmental problems have reached the political agenda, often resulting in effective pollution control. As a result, urban environmental quality has improved considerably since the beginning of the 20th century; health levels and life expectancy

6. http://www.imercer.com/content/quality-of-living.aspx; last accessed April 2015.

are higher than ever before (De Hollander and Staatsen, 2003)[7]. However, new issues may influence the current quality level, either in a negative or a positive way. Climate change, for instance, is predicted to cause heat stress in cities as well as more frequent flooding, whereas technological developments in transport and industry are expected to lower emissions of environmental pollutants. The extent to which these developments will affect urban environmental quality is difficult to forecast.

People's preferences also change during the course of their lives – with respect to the specific needs of a certain life phase – and as a result of societal developments. Thus, definitions of liveability change not only across the life course but across generations (Ruth and Franklin, 2014); the same holds for urban environmental quality. Therefore, demographic changes, such as an increasing fraction of elderly people, can be expected to change the perception of and demand for urban environmental quality. One example is the finding that some middle-class families with young children decide to stay in the city centre, rather than moving to the suburbs (Karsten, 2003). Another is the contemporary scientific interest in the impact of climate change on the elderly (e.g. Carter et al., 2014). The fact that scientific literature on the latter topic before 2008 is scarce, indicates that new quality issues tend to 'pop up'. Therefore, we cannot be sure we are prepared for future challenges.

2.6. IMPLICATIONS: DILEMMAS IN URBAN PLANNERS' PRACTICE

2.6.1. Making trade-offs between quality dimensions

Section 3 presented some evidence that distinct dimensions of environmental quality are interrelated. Theoretically, this relationship is hierarchical; in other words, loss of quality in one dimension that is at the bottom of the hierarchy is not automatically compensated by an excess of another quality aspect at a higher level. As a consequence, planners must first meet societal needs at the basic level; in terms of urban environmental quality this means assuring compliance with at least all legal environmental standards.

In practice, however, urban planners may face a serious dilemma here. In pursuit of sustainable urban development, compact cities are *en vogue*, often at the expense of the quality of the urban environment (Howley et al., 2009), in terms of pollution and lack of green space. Manoeuvring space for making trade-offs is often limited by (supra-) national standards protecting residents' health and safety and the unimpeded functioning of ecosystems. It may be difficult for urban planners to comply with these standards. Protective measures, such as acoustic screens or remediation of polluted soils, are not always feasible: they are often costly and may create disadvantages that negatively impact

7. Such is not the case in many newly industrializing countries (UNEP, 2012).

other aspects of urban quality. In addition, a new development is planned precisely because it increases urban quality as a whole. Should one then abandon a plan just because it fails to meet legal requirements concerning only one aspect of urban quality?

An example of such a dilemma can be found in Roosendaal, a Dutch town where a partly derelict industrial estate near the train station was transformed into a high density mixed-function area (Gemeente Roosendaal, 2008). From the start, the town's urban planners realized that the impact on environmental quality resulting from the remaining industry was severe. Even after optimally positioning the residential buildings, some of them could not be made to comply with regulations concerning industrial noise. Noise reduction at the source had been accomplished at an earlier stage of the development, and further reduction of source levels was deemed unrealistic. Under the circumstances, an obvious solution would have been to fit the buildings' design with a so-called 'deaf façade' (i.e. a façade that has no open windows or is equipped with an external transparent screen). For some of the buildings, however, the view of the surroundings was thought to contribute much to the area's quality, leading to the rejection of a deaf façade (Gemeente Roosendaal, 2008). Instead, the – relatively small – excess of noise was compensated for by an increase in other qualities. Permitting higher noise levels as well as the compensatory measures were contested in court (Raad van State, 2011). One point of disagreement was that the municipality had not sufficiently investigated means of reducing noise levels at the source. Another concerned the amount of compensation – in this case an extra insulation of three decibels. These objections neatly illustrate that compensation is complex, precisely because of the incommensurability of urban environmental quality dimensions and the unknown nature of the relations between them.

2.6.2. Uniform quality for all versus accommodating individual preferences

The second type of dilemma concerns the extent to which government needs to actively steer urban quality. It is the dilemma between a right-wing paradigm, relying on market forces, and a left-wing approach of high ambitions, full governmental responsibility with respect to sustainability and taking into account disadvantaged societal groups. The outcome, obviously, depends on the political agenda and on the distribution of political power within the City Council, which wields political power at this particular point. If the plan results in a level of urban quality that does not live up to the expectations of the constituency, local politicians who commit themselves to a plan risk losing votes at the next elections[8]. An urban development project does not occur overnight, but takes place over a period of several years. Changes in the political (e.g. government elections)

8. Alternatively, residents vote with their feet and leave the area altogether, giving way to mostly lower-income groups; such dynamics could be detrimental to the original plan.

or economic (e.g. financial crisis) context may change the political agenda as well as the composition of the City Council.

This may be illustrated by the thwarted ambitions of the municipality of Woerden, the Netherlands (Van Stigt et al., 2013a). Private parties took the initiative to convert an office building situated near the railway into apartments. However, the transformation did not meet municipal safety regulations regarding transport of dangerous substances. These regulations were based upon a previous high risk estimate, whereas the actual risk was assessed to be well below the national standard. The responsible alderman, of liberal signature, took the stance that he would have willingly allowed the initiative, provided the future residents would consciously agree to the – very low, but not zero – risks present. This illustrates that legal requirements often pertain to objective indicators of urban environmental quality that, as a rule, are bad predictors of subjectively perceived quality (see section 2.4).

More generally, proper planning involves informed decision-making, usually based upon expert knowledge. Expert judgement about urban quality, however, may differ from the quality as perceived by local stakeholders. Thus, planners cannot in advance determine whether the plan will offer the quality that is desired. Situations may then occur, in which planners, in order to comply with regulations, provide residents with solutions that they would rather not have, such as a sound barrier that blocks their view, whereas they are not bothered by the noise anyway.

This may be illustrated by two controversies surrounding noise barriers. The first is offered by a Dutch municipality that, in compliance with national railway noise standards, started a procedure for building a 2.7 m high noise barrier along the railway. A majority of residents, however, objected, as they would rather keep the view they have of the trains and the surroundings beyond and feared that the barrier wouldn't protect the higher stories of their homes anyway (Gemeente Zwolle, 2011). The second example is the heavily opposed noise barrier around the Agricultural Business Centre in Bakewell, UK. The District council responded to complaints about noise from the cattle market and came up with plans for a barrier, which would be 180 metres long and rise to a height of 5.5 m. Residents claimed the barrier would ruin the historic character of the market town (Berardi, 2012).

2.6.3. Prepare for long term environmental changes or not?

The third dilemma identified here is whether to take measures to improve urban environmental quality now, in the face of many uncertainties, or postpone action until more is known about the nature and seriousness of the problem at hand and about how it will evolve over time. As we argued in section 2.4, uncertainties stem from demographic changes, changes in people's preferences and from changes in the physical environment itself. We will illustrate the latter with two practical examples: one in which urban

environmental quality is expected to improve over time and one in which it is forecasted to decrease.

Our first example is found in Zutphen, a Dutch town where a newly built residential area was planned to be shielded from railway noise by a block of office buildings (Van Stigt et al., 2013a). However, market conditions for offices are unfavourable and therefore the realisation of the buildings was postponed, leaving a large number of the houses in the area to be exposed to noise levels above national environmental quality standards. A recently passed law (Verschuuren, 2010) was invoked allowing for a temporary exemption under the condition that, within a period of ten years, the original quality standards must still be complied with.

The Dutch town of Vlaardingen provides an example of the reverse dilemma: here the municipality wishes to restore the link between the old city centre and the nearby river Meuse by refurbishments of existing real estate and development of a new, mixed function area that is partly located between the old river dike and the river itself (Gemeente Vlaardingen, 2003). To reduce flood risk, the ground level in parts of the area will be raised (Gemeente Vlaardingen, 2004). The question is: by how much? It is difficult to answer because of the many uncertainties surrounding climate change and the concomitant changes in water level and flood risks. In answering this question, the municipality itself assumes a time frame of 50 years, whereas national authorities, urge them to adjust it to 100 years, which would amount to far higher investments and solutions that, from an architectural perspective, are less desirable.

2.7. PERSPECTIVES FOR ACTION

2.7.1. Making trade-offs between quality dimensions: an integrated approach to urban planning

An integrated approach holds the promise of efficiency: leaving decisions about quality in separate silos – urban design, environmental policy, health care, social and economic policy – during the early stages of planning, will most probably end up with serious clashes between incompatible quality dimensions during the execution and management phases (Davidson and Venning, 2011). That is why the European Commission embraces a thematic strategy on the urban environment, including a guidance on integrated environmental management (European Communities, 2007), and why there is a continuous debate within the scientific community about strategies and instruments for environmental policy integration (e.g. Persson, 2004; Jordan and Lenschow, 2010). More recently, there have been calls for considering wellbeing, health and environment in an integrated, systemic and interdisciplinary way, creating a common knowledge base (Carmichael et al., 2012), and for aiming research towards emerging issues (European Environment

Agency, 2014c). These calls suggest there may be gains in considering urban quality as an integrated whole. However, such consideration inherently brings about the question how individual standards for distinct quality aspects may be 'merged' into an integrated one that guarantees the same or higher level of quality than did the individual norms.

As a way out of this dilemma, exceeding environmental standards is, in practice, sometimes allowed (see 2.6.1), provided other dimensions of urban quality compensate for this loss of quality. As we argued, trade-offs among urban quality dimensions are problematic, due to the multidimensional character of urban quality. If indeed there is, as in some theoretical approaches to urban quality (e.g. Jacobs, 2000), a hierarchy of quality dimensions, quality demands at a lower level must all be met before a quality dimension at a higher level can be considered. The literature does not provide any means of weighing one quality dimension to another, nor for balancing the distinct aspects within each dimension. The available empirical evidence indicates that the relationships among dimensions of urban quality are far from understood. Nevertheless, the mere existence of such relationships suggests difficulty in balancing the various aspects of quality. If other quality dimensions are conditional upon some basic dimension – that Jacobs (2000) terms 'biological' and Lynch (1984) 'vitality' – comprising adequate and safe food and water, absence of disease, pollution and hazard, as well as an adequate fit of noise levels to human requirements of sensory input, this would imply a crucial role for environmental quality aspects in the more strict sense.

Thus, aspects of urban quality that relate to these basic-level dimensions cannot be compensated for by qualities that are at higher levels in the hierarchy. In other words: compensating for inadequate urban environmental quality aspects – such as noise or pollution levels – by other aspects of urban quality (such as the view or the proximity of facilities) is not desirable. Rather, one should make optimal use of policies that may reduce the source of this quality loss. In fact, this is a process requirement in the Dutch compensation approach (Glasbergen, 2005; Simeonova and Van der Valk, 2010; Korthals Altes and Tambach, 2008). Compliance with standards must be proven unfeasible with usual legal means, and even tailor-made solutions must be shown to provide inadequate solutions to the problem. Therefore, as a rule, reduction at the source must be exhaustively attempted, before taking recourse to compensation.

2.7.2. Quality for all or individual preferences? A bit of both, in a participative planning process

The dilemma between uniform quality and accommodating individual preferences might, at first sight, seem trivial, since Western states have public environmental policies in place that guarantee a certain level of urban environmental quality. In some cases, complying with environmental standards may turn out to be very costly. Offering compensation to those who experience a loss of quality if these standards are violated may be

in order – notwithstanding the argument in section 2.7.1, that great care must be taken making trade-offs between one dimension of urban quality and another. Three important considerations apply for such trade-offs to be made in an informed and equitable way.

First, planners cannot know what constitutes sufficient compensation (Glasbergen, 2005). If urban quality is to be understood as the extent to which the physical environment supports the needs of its residents and users and these needs are to a large extent subjective, then obviously trade-offs can be made only by the people concerned, rather than by professionals acting in the public interest. The qualities to be realised in an urban plan must, therefore, be discussed in an open planning process. In such a participatory process, stakeholders learn from one another what the most relevant dimensions of urban quality are in any particular case (Golobic and Marusic, 2007).

These discussions may be complicated by the fact that the professionals' objective variables sometimes collide with the participants' subjective assessments. This is not to say that there is no role for science at all. Precisely within a participative process, mutual learning must occur – the customer is not always right, but neither is the expert. Science may inform such a deliberative learning process. For this to happen, it is vital that all stakeholders trust the producers of scientific knowledge (Bickerstaff, 2004). It should, however, be borne in mind that scientific knowledge is only one factor that determines people's stance towards environmental risks; many other psychological and socio-cultural factors play an important role as well (ibid.).

Second, when one resorts to compensation of quality aspects that do not meet a certain desired level, the question arises how to allocate the compensation costs. Sticking to the *polluter pays principle*, one could argue that the cost of compensatory measures should be borne by those who cause the deviation of the environmental standard in the first place. This is, however, not always feasible. In many cases, the loss of quality cannot be attributed to a single polluter (for instance traffic noise). In addition, in cases where a polluter has been given a permit, it would be unjust to present them with the costs of compensating for something that had previously been allowed, but that is now detrimental to the plan at hand. In such cases, the costs tend to be borne by the buyers of the real estate, which is more expensive because of the needed extra insulation or other building measures. In the Roosendaal case (see 2.6.1), this would – both literally and proverbially – amount to a *Dutch treat*. Another approach would be to allocate the remediation cost to the parties that are expected to gain from the plan. This could be either the municipality, whose assets rise in value, or the developer, who receives the proceeds of the real estate. It could even be all of the new users and residents, who benefit from the high overall urban quality and agree to bear the cost of the compensation for the few who suffer from an unacceptably low level of only one quality dimension.

Third, environmental problems manifest themselves at spatial scales that are much larger than the local scale on which an urban plan focuses, and human activities at this

local scale are very much intertwined with socio-economic processes at a global scale. Approaching urban quality through a deliberative process in which only local stakeholders participate holds the risk of turning a blind eye to these larger scale social and environmental problems. To prevent this, the planning process can be designed to include individuals or groups representing social and environmental interests that transcend the local.

2.7.3. Take action now or later? Adaptive planning for sustainable urban development

As was argued in section 2.5, urban planning has to deal with a variety of changes in e.g. demographics, societal activities and preferences. We cannot be sure how quality will develop in the future – neither in terms of objective indicators nor in terms of people's changing demands for and perceptions of quality. Furthermore, new quality issues may present themselves, and issues that *are* known today may gain weight on the political agenda. European air quality standards, for example, are well above WHO guidelines, and exposure levels below these standards have been reported to be associated with adverse outcomes, e.g. low birth weight (Pedersen et al., 2013), lung cancer and an increase in natural-cause mortality (Pope et al., 2002; Beelen et al., 2014). There is also firm evidence that environmental noise has impacts on health, notably ischemic heart disease, cognitive impairment of children, sleep disturbance, tinnitus and annoyance, even at sound levels that are common in busy cities and towns (World Health Organization, 2011).

Furthermore, contemplating urban environmental quality from a sustainability perspective introduces even more time-dependency. Climate change may serve as a case in point: urban planners nowadays are involved in implementing policies to mitigate greenhouse gas emissions and to adapt to increasing incidences of heat waves and rain storms.

All these uncertainties call for adaptive planning. By taking an adaptive approach, planners acknowledge that sustainable urban development is not a static end-point, but a process of continuous prudent experimentation, monitoring the results and learning to make cities resilient to future changes (Ahern, 2011). Lynch (1984) goes even further in arguing that with any intervention, planners should contemplate the possibility of 'undoing' it.

2.8. CONCLUSION AND DISCUSSION

Urban quality is illusive in nature; it has multiple dimensions that can be assessed by objective as well as subjective measures, and it varies across time. We have shown that this particular character of the concept confronts planners with several dilemmas. By answering three questions – 'quality of what?', 'quality for whom?' and 'quality at what

time?' – urban planners may find their way out of these dilemmas; however, additional research is needed to more completely understand how elements of quality interact and are perceived and how all of this changes over time. Nevertheless, recent literature on urban environmental quality already provides planners with useful perspectives for action. Rather than developing more urban quality indices, these perspectives call for an approach to urban planning that is integrated, participative and adaptive, meanwhile incorporating interests that are impacted at different spatial scales.

The three questions raised in our discussion have been treated separately for convenience, yet they are related in several ways. The question 'quality of what', for instance, relates to environmental standards that also reflect the issue of 'quality at what time?', because they were designed in the past and merely reflect the quality that was deemed acceptable at that time. Increasing knowledge may cause these norms to become more demanding in future.

'Quality of what', also relates to the question of 'quality for whom?'. In the first place, a conception of sustainable urban development – and, thus, of urban environmental quality – that favours high-density, mixed-use redevelopment of former industrial buildings in the proximity of public transport has been shown to exclude low-income tenants (Poitras, 2009). Secondly, in cases where environmental quality standards are about to be exceeded, measures taken to improve urban quality may not result in the same quality for all people who live in the area (e.g. Marshall et al., 2014). More particularly, lower-income groups may receive a relatively large share of the environmental burden, which, as we argue here, should preferably be mitigated by environmental standards. However, these groups have less access to those qualities that are distributed through market forces (Kruize et al., 2007). In compact cities – a type of sustainable urban development favoured in many Western countries – low-income groups benefit from public transport, better access to amenities and less social segregation, whereas housing that is available to them tends to be small and costly (Burton, 2000). Conversely, the well-off have been found to favour residential areas that are highly burdened by noise and risk (Chasco and Le Gallo, 2013), but have a nice view or a lively atmosphere; in addition, they can afford the cost of extra insulation (Kruize et al., 2007).

CHAPTER 3

A window on urban sustainability. Integration of environmental interests in urban planning through 'decision windows'[9]

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9. This chapter was published in Environmental Impact Assessment Review (2013;42,18-24).

ABSTRACT

Sustainable urban development requires the integration of environmental interests in urban planning. Although various methods of environmental assessment have been developed, plan outcomes are often disappointing due to the complex nature of decision-making in urban planning, which takes place in multiple arenas within multiple policy networks involving diverse stakeholders. We argue that the concept of 'decision windows' can structure this seemingly chaotic chain of interrelated decisions. First, explicitly considering the dynamics of the decision-making process, we further conceptualized decision windows as moments in an intricate web of substantively connected deliberative processes where issues are reframed within a decision-making arena, and interests may be linked within and across arenas. Adopting this perspective in two case studies, we then explored how decision windows arise, which factors determine their effectiveness and how their occurrence can be influenced so as to arrive at more sustainable solutions. We conclude that integration of environmental interests in urban planning is highly dependent on the ability of the professionals involved to recognize and manipulate decision windows. Finally, we explore how decision windows may be opened.

3.1. INTRODUCTION

With over half the world's population living in cities and continuing urbanisation worldwide (UNEP, 2012), designing, building and governing sustainable cities are highly important. Essentially, sustainable urban development entails balancing three conflicting interests: overall economic growth, social justice and environmental protection. Schematically, this is represented by Campbell's (1996) well-known '*planning triangle*', the corners of which represent these interests, whereas the sides of the triangle represent the three main conflicts among them: the property conflict between social justice and economic growth, the development conflict between social justice and environmental protection, and the resource conflict between environmental protection and economic growth. Campbell envisaged sustainable urban development to be at the centre of the triangle, to be arrived at through a process of negotiation in which planners engage, while at the same time developing and promoting "*a substantive vision of sustainable development*" (Campbell, 1996). In practice, however, achieving sustainable urban development appears to be problematic (Mayer et al., 2005; Boyko et al., 2005; Boyko et al., 2006).

The challenge of attaining sustainable urban development is the integration of environmental interests into the urban planning process or, rather, the decision-making process that underlies urban planning. The technical-rational (Owens et al., 2004) response to this challenge has been, from about the 1970s, to inform decision-making with the environmental consequences of available options (Jiliberto, 2011). As a result, environmental impact analysis (Runhaar et al., 2012) became a routine part of decision-making on projects in the built environment. As an analogy, strategic environmental assessment (SEA) was conceived in the early 1980s to assess environmental impacts at more strategic levels of decision-making, commonly referred to as 'policies, plans and programmes' (Van Doren et al., 2013; Partidário, 2005; Shepherd and Ortolano, 1996; White and Noble, 2012). More recently still, as the technical-rational view of planning was being succeeded by a more communicative and deliberative one (Richardson, 2005), SEA scholars focused on the rationality of the decision-making process rather than on that of the decision itself (Dalkmann et al., 2004; Caratti and Dalkmann, 2004; Gezelius and Refsgaard, 2007; Bina et al., 2004). Science has contributed much to a variety of methods and tools to facilitate integration of environmental interests in decision-making, either with a substantive or a procedural focus (Nielsen and Jensen, 2010; Cerreta and De Toro, 2010; Olazabal et al., 2010; Runhaar, 2009). However, little use appears to be made of such instruments (Jensen and Elle, 2007) and their actual effect is fiercely debated (Stoeglehner, 2010; Jha-Thakur et al., 2009; Nykvist and Nilsson, 2009; Retief et al., 2008; Cashmore et al., 2007; Runhaar and Driessen, 2007). Computer-based decision support systems have been developed for accumulating, processing, analysing and presenting information (Kapelan et al., 2005), but these, too, do not appear to be put to use much in practice (Gocmen and Ventura,

2010; Vonk et al., 2005; Te Brömmelstroet and Schrijnen, 2010). Still, planners seem to have an urge to know where they find themselves with respect to the centre of Campbell's (1996) '*planning triangle*': literature about sustainability indicators abounds (e.g. Block et al., 2011; Rosales, 2011; Shen et al., 2011). Again, it is being questioned whether such indicators are helpful in finding our way to sustainable urban development (Davidson, 2011).

Within this considerable body of research, only minor focus has been on the complexity of planning (e.g. Zellner et al., 2008; De Roo, 2000; Nooteboom, 2007). Increasingly, the scientific community recognises that decision-making on urban development is a process which is extremely complex: multiple stakeholders negotiate in multiple arenas within multiple policy networks, constituting a seemingly chaotic sequence of smaller, interrelated, decisions (Van Bueren et al., 2003; Van Bueren and Ten Heuvelhof, 2005; Teisman, 2000). In each of these arenas, stakeholders negotiate different, but related, issues. Any stakeholder may even be active in several arenas at a time. In part, this complexity explains why impact assessments are rarely being used in decision-making (Nooteboom and Teisman, 2003; Vonk et al., 2005). This paper applies these insights to the question what role environmental interests play in the decision-making process on urban development. In particular, it focuses on so-called 'decision windows' in the urban planning process. Decision windows have been described as critical phases in the decision-making process in which environmental concerns can be integrated into the considerations at hand (Dalkmann et al., 2004).

This paper addresses the following question: to what extent may decision windows help understand and promote integration of environmental interests in complex decision-making processes about urban planning? To answer this question, we draw on theories about decision-making in networks (e.g. Van Bueren et al., 2003). We further conceptualize decision windows as moments in an intricate web of substantively connected deliberative processes in which issues are reframed within a deliberative arena and interests may be linked within and across arenas. Empirically, we illustrate the value of adopting such a perspective by studying two cases of inner-city redevelopment in the Netherlands. The importance of this research is twofold. Firstly, it furthers our understanding of the ways in which environmental interests are effectively integrated into decision-making on urban spatial development. Secondly, and perhaps more importantly, it gives indications as to how these decision windows may be partially manipulated.

In the remainder of this paper, we first introduce the concept of decision windows and then elaborate on it, relating it to other, comparable concepts in the literature on decision science, such as Kingdon's (1995) 'policy windows' and Teisman's (2000) 'rounds model'. After accounting for the research method used, we describe the two cases. We then reflect on our findings and present our conclusion.

3.2. A 'windows' perspective on decision-making

In the planning literature, it has long been recognised that decision-making is a bounded-rational process (Nilsson and Dalkmann, 2009; Simon, 1957). This recognition has led to a variety of responses, ranging from ignoring the consequences of bounded rationality to resorting to incrementalism, in which every new option is thought to differ only slightly from the status quo (Alexander, 1984). In the SEA community, it has led to an awareness that, instead of merely informing the decision-making process about environmental consequences, it would be more effective to focus on the integration of environmental objectives into the deliberation (Kornov and Thissen, 2000). To this end, Dalkmann and others (2004) introduced an analytical SEA (ANSEA) approach, in which so-called 'decision windows' are the object of analysis. Decision windows are "*critical phases in the decision-making process where (sub-)decisions are on the agenda. These windows (…) are windows of opportunity (…) for integrating environmental information and values*". The authors refer to the 'multiple streams model' of decision making (Kingdon, 1995) in order to underpin, at least theoretically, how environmental interests may be integrated when a decision window occurs. However, they do not use the model to further characterize the decision windows themselves. Rather, they identify decision windows by meticulously describing the decision-making process. For several reasons, however, it is unlikely that an *a priori* functional description of the decision-making process will yield the identification of all relevant decision windows. Firstly, decision-making processes are often too complex (Pischke and Cashmore, 2006). Secondly, ANSEA seems to build on the premise of a single arena of deliberation (Caratti, 2002; Bina et al., 2004). However, decision-making in the public realm has been shown to take place in multiple arenas within multiple policy networks (De Bruijn and Ten Heuvelhof, 2002). Thirdly, according to Kingdon, the opening of a policy window may be predicted from a prescribed decision-making procedure, but may also appear quite unexpectedly. Such a decision window is likely to be missed by the analyst who relies merely on the *a priori* functional description. Therefore, let us try to elaborate the concept of decision windows.

In Kingdon's multiple streams model, a so-called 'policy window' opens when three separate but concurrent streams join: the problems stream, the policies/solutions stream and the politics/participants stream. The problems stream consists of all kinds of societal problems, most of which do not receive much attention from decision-makers. In the policies/solutions stream, policies and ambitions float around, only to be noticed by policy-makers when they suit their needs. The politics/participants stream, finally, consists of administrative and political occurrences, such as a new administration, political change following elections or even general public concern. When the streams join, a window of opportunity can open for action on a given initiative. Often, a 'policy entrepreneur', in

the form of a person or institution, actively seizes the opportunity that arises upon the opening of such a policy window.

Factors that govern the opening of a policy window are either changes in the problems stream, such as a crisis or a 'focusing event', or in the politics/participants stream, such as a swing in the national mood (Simon and Alm, 1995). Generally, a policy window remains open for only a short period of time; after it has closed, a new opportunity must be awaited for a policy to stand a chance of being enacted.

Rather than exploring all possible options to solve a problem, in the 'streams model' policy-makers hook up solutions that are ready to be implemented to problems that become paramount due to change in the political constellation. In Kingdon's words: "*A problem is recognized, a solution is developed and available in the policy community, a political change makes it the right time for policy change and potential constraints are not severe*" (Kingdon, 1995, p. 165).

Public decision-making takes place in multiple arenas within multiple policy networks (Howlett, 2007; Van Bueren et al., 2003; Nooteboom and Teisman, 2003; De Bruijn and Ten Heuvelhof, 2002; Teisman, 2000). Within these arenas, decision-making can be envisaged as going through several rounds, in which multiple actors articulate their own problems and solutions, resulting, over time, in consecutive decisions by each of the actors, individually or in concert. The nature of such a 'decision round' is defined by Teisman: "*A round of decision-making begins and ends with the adoption of a certain combination of a problem definition and a (virtual) solution by one or more actors. The assumption is that the actors assess to what extent other actors share their definition of reality and proceed to interact on this basis*" (Teisman, 2000, p. 947). Similar to the multiple streams model, the 'decision round' model considers a decision as the result of joining three streams. In addition, the model acknowledges the interdependency of decisions by various actors in complex public decision-making, thus meeting Brunner's (2008) critique that the multiple streams model may not capture, *inter alia*, the influence of networks on decision-making.

Combining these theoretical views, a decision window can be conceptualized as a moment or relatively short period of time within a decision round, in which different interests meet and are combined, or in which issues are reframed to arrive at a shared problem definition and a solution. This may, objectively, not be the 'best' solution, but one that, at that particular time, is deemed feasible and acceptable to those involved. This outcome could be a compromise between stakeholders, but could also be a win-win solution.

3.3. METHOD

Rather than making a functional description of the decision-making process as advocated by ANSEA (Bina et al., 2004; Dalkmann et al., 2004; Caratti, 2002), we identified decision windows in the cases we studied as follows: we first identified the environmental issues presenting substantial problems for decision-making in each case. For clarity, we regard a 'decision' as being a result of a deliberation process, formalized by a body designated to govern an institutional entity (e.g. a formal ruling by municipal government or the signing of a covenant or contract by a private actor). Next, we investigated which stakeholders were principally involved with the issue and identified their stakes and the arenas in which they were participating. Finally, we analyzed the way in which the problem was articulated and related to other issues in the same or a different arena, in order to arrive at a decision that would be acceptable to all stakeholders. The problem of integration of environmental interests is most pronounced in situations in which environmental objectives are in conflict with other claims. For our purpose, a case was deemed adequate if it presented decision-makers with a difficult trade-off concerning one or more environmental interests identified in the literature on sustainable urban development and spatial planning in industrial countries (Næss, 2001). We selected two complex cases of inner-city urban redevelopment, showing high ambitions with respect to sustainable urban development and having to deal with considerable environmental problems. In the cases studied, three types of issues appeared to be relevant: reduction of energy use, replacement of open-ended flows and environmental quality, predominantly noise and industrial risk. The cases can be considered to be representative of many present-day redevelopments in the Netherlands, as there are several dozens of redevelopment projects in railway zones, former harbors and former industrial estates. Worldwide, there are also many transit-oriented developments showing comparable characteristics and ambitions (Cervero and Sullivan, 2011). If the concept of decision windows proves its value in analyzing such complicated cases, we may presume the insights will be useful anywhere.

In each of the cases, the decision-making process was analyzed through document research and semi-structured interviews with stakeholders. Document research was based on publicly available plans, policy documents and minutes of city council meetings. In each case, four interviews were conducted with the alderman responsible for the project, the municipality's project leader(s) and the project's environmental advisors[10].

10. These interviews were semi-structured. First, respondents were asked to indicate specific moments in the planning process where 'sustainability' started to play a (more significant) role in each particular case. Next, they were asked what occurrences or persons triggered that moment and, finally, how this influenced decision-making. The interviews were held between 29 June and 30 September 2011 or between 28 June and 12 September 2012. Each interview lasted for about one hour. All eight interviews were electronically recorded, typed up and slightly edited, after which transcripts were sent back to the interviewees for comment.

3.4. CASE STUDIES: ISSUES, NETWORKS AND ARENAS

We selected two cases of inner-city redevelopment in medium-sized Dutch cities that have, over the years, built up a reputation of seriously contemplating the integration of environmental policy in other municipal policy sectors and that have proven to foster high ambitions for sustainable urban development. Both cases entail planning of a new residential or mixed-function area. In both, ambitions for sustainability are high.

3.4.1. Utrecht

The 'Veemarkt' (Cattle market) area in Utrecht (about 316,000 inhabitants (CBS, 2014)), is situated at the site of a former market hall, where cattle and, more recently, cars used to be traded. City Government decided in 2005 to locate the market activities elsewhere and redevelop the 19.7 hectare area. Because the idea stems from a City Council debate in 2004 about the city's capacity to make money out of its assets, the project was burdened from the outset with an aim to bring in a considerable amount of money. The program includes 550 dwellings, a playing field, a primary school, an institute for child care and possibly a small supermarket. Relocating existing market activities took considerable time and discussion; however, in 2008 City Government decided to close down the market hall and, subsequently, to resume plan formation.

The issues at stake

Importantly, the final decision to develop the area included additional objectives. Firstly, the area should be 'leading in sustainability' – the meaning of which was, at the time, not made explicit. Secondly, innovative methods for public participation in the planning process should be explored. Thirdly, the project was, at that time, aimed to provide for 500 dwellings, 40% of which must be social housing. And, lastly, existing adjacent sports facilities should be expanded to include two extra playing fields. All of these objectives were drawn from established municipal policy, except the wish for innovative methods of participation, which originated from the fact that public participation in planning processes in Utrecht generally had been perceived by residents as unsatisfactory.

The project manager, realizing that the ambitions of several distinct city government departments had been compiled without much coherence, initiated a feasibility study in which all ambitions were related and cost indications were added. Subsequently, he enforced a political decision on the outcome of this study. Upon this, City Government decided to support all of the goals, with the exception of the creation of two new playing fields, reducing that to one. Furthermore, it was decided to have the area developed by a private party.

Following advice of an external advisor already involved in the project, public participation was aimed at generating ideas that could be used as ingredients for planning,

rather than having residents react to concept plans provided by the municipality's specialists. From fall 2009 through the summer of 2010, dozens of interested people from all over Utrecht attended a dozen meetings and workshops. Several themes resulted from the inventory and subsequent elaboration of ideas, one of which, surprisingly, was private commissioning. Another theme was reuse of the existing market hall. Sustainability, a third theme, comprised ideas on sustainable energy, green and public space, bicycling, building materials, noise, adaptability of buildings and continuing public participation.

The municipality's Environmental department advocated operationalizing sustainability by means of the area's sustainability profile, a process that sums the area's scores on a dozen sustainability themes, resulting in a final mark between 3 and 9 (Nielsen and Jensen, 2010). Thus, the term 'leading in sustainability' was translated into a sustainability mark of 8. The project's score on noise and industrial safety were low, due to the vicinity of a highway and a nearby petrol station supplying liquefied petroleum gas (LPG), respectively. By taking appropriate measures (e.g. closed building blocks and keeping distance to the petrol station) legal standards could well be met.

In the course of the planning process and as a result of public participation, ambitions for sustainable energy supply were translated into a value for the buildings' energy performance coefficient (EPC) substantially below the Dutch legal standard of 0.6. External advisors made it clear that a value of 0.3 was economically feasible, even in view of the finance department's aim to raise a considerable amount of money, provided that use was made of district heating. A main hot water pipeline happened to run nearby. Some of the individuals, collectively building their own private homes, wanted to go even further, taking into account the return of investment they wished to receive over time. In the case of social housing, however, the investment would mainly be carried by the housing company. The company has limited possibilities to charge the residents, who receive the benefit of lower energy cost. A collective system of energy supply was deemed most adequate and district heating was found to be most cost effective, although it was considered not to be 'leading in sustainability'. In addition, therefore, the plan entailed a more innovative energy adaptive concept for building, in which the building core is well insulated and buildings are prepared for future sustainable energy generation, for instance by choosing optimal orientation of roof surfaces to be fitted with photovoltaic cells. The discussion, however, was overtaken by events: due to a considerable decrease in housing demand, the rate at which houses will be built and sold was decreased as well, resulting in the energy company's decision, in the spring of 2012, to refrain from participating, as the investment in pipelines was deemed to be too risky.

Policy networks, arenas and decision windows

At the onset, redevelopment of the Veemarkt area was very much a City Government affair, in which merely several municipal departments (of housing, finance, environment,

communication and sports) were involved, each having their own interests. The feasibility study can be regarded as a first, obvious, policy window, connecting many – but not all – of these interests.

A second decision window opened after the innovative participation had started: interested parties from outside City Government, mainly private citizens, got involved. Within this arena, deliberation resulted in shared views of what 'leading in sustainability' should entail and, moreover, in strong ideas about private building. At the time, the latter resonated well with the circumstances: due to the economic crisis no single real estate developer was willing to risk developing 500 dwellings in a single project, as was the municipality's original idea, or even 550, as was deemed necessary by then to meet the financial aim.

The finding that district heating – in combination with more innovative means of energy supply – would best fit the condition of an EPC value of 0.3 as well as that of a high financial revenue of the project brought about a new arena in which the municipality negotiated with the energy company. Here, however, no decision window opened, as the energy company decided to refrain from investment in the necessary infrastructure.

A fourth round of decision-making concerned the issue of industrial safety. Supply of LPG by the nearby petrol station caused restrictions to the plan's lay out. As a result of Dutch risk regulations having been tightened in 2004, many instances of LPG outlets in residential areas no longer comply with standards. Utrecht was faced with a handful of such cases, all owned by the same petrol company. This opened up a decision window at a higher spatial scale than the project's: in a new arena, formed by the municipality and the company, the closure of all problematic LPG outlets in the city was negotiated against the company being allowed to open up one new outlet at an unproblematic site.

Conclusion

In the Veemarkt planning process, a decision window emerged when the issue of *institutional* builders being reluctant to develop relatively costly real estate was resolved by having a collective of *private* builders invest in sustainable energy. The problems stream and solutions streams joined with the economic crisis which can be regarded as part of the politics stream. In the resulting decision window, the problem was being reframed. Our findings indicate that such reframing was a result of early input of citizens who responded to the call to participate in planning a neighborhood that would be leading in sustainability, rather than coming from deliberate municipal policy.

Apart from reframing problems within an arena, the existence of multiple parallel arenas may open a decision window. In this case we found that the safety problem caused by the LPG outlet, which could not be satisfactorily solved in one arena, was taken to another, where it was part of a larger problem awaiting a solution. However, the case study also demonstrates that linking issues in parallel arenas is not always successful. Clearly

the most rational choice for a sustainable and, in view of financial constraints, affordable energy supply, would have been district heating in combination with photovoltaic cells and ground source heat pumps. Indeed, this was the outcome of deliberations in the arena in which future residents (and private builders), advisors and the municipality participated. However, the company supplying district heat negotiated with the municipality in a separate arena where the finding that the company could not put together a sound business case (and the municipality was unwilling to financially contribute) outweighed other considerations. Here, no decision window presented itself.

3.4.2. Tilburg

Tilburg, (about 206,000 inhabitants (CBS, 2014)) has a rich industrial history of tobacco and textile industry that after WW II has been gradually replaced by commercial and non-commercial services. Some of the industrial heritage have been converted for cultural activities. The city hosts two major institutions for higher education. The city council acknowledges that, all across its activities, sustainability is no longer an ambition, but a necessity (Gemeente Tilburg, 2010).

For a city this size, the city centre is perceived by the municipality as being too small and having too few amenities. Directly north of the city centre is a railway with the train station. An elongated strip of land (approximately 39 hectares and 1,3 km long), which, for the most part has had an industrial function since the construction of the railway, is now being redeveloped into an area of metropolitan character. Plans for this so-called 'Spoorzone' (or railway zone) feature a high density mix of functions: offices and apartment buildings, some of them high-rise, as well as higher education, leisure and a conference venue. Actual development takes place in several phases. Currently, some parts are being realized, whereas a master plan has been approved for the central part of the area. This part will be developed by a public-private partnership (PPP) consisting of a private real estate developing company and the municipality.

The issues at stake

From the onset, the ambition was to have CO_2-neutral development. Planning entails wind energy and ground source heat pumps for heating and cooling. These measures must be reflected in a high sustainability score of 8 on a scale of 1 – 10 for five dimensions of sustainability, among which energy efficiency of buildings, building materials and water consumption of households.

As in the Utrecht case, the Tilburg plan contains significant investment in sustainable energy supply, especially in ground source heat pumps and necessary piping; in Tilburg, the PPP will bear the initial cost and at a later date sell the installations to an established energy utility. Part of the area's electricity supply will come from a nearby windmill park.

At the same time, several cities in the region are considering the foundation of a joint sustainable energy utility.

The vicinity of the railway introduced two more issues related to sustainable urban development: noise from passenger and freight trains and industrial safety problems arising from railway transport of dangerous substances. Dutch national government plans to intensify rail transport, resulting in up to 50% higher frequencies of passenger trains and a rise in the frequency of freight trains. Facades nearest to the tracks will be exposed to levels of noise well beyond national standards. Such impact, however, is allowed by Dutch noise policy (Weber et al., 2011), provided facades have no parts that may be opened, at least one side of the building is not highly exposed to noise and noise levels within the building comply with standards.

The Tilburg railway is also a major transport route for dangerous substances. There is a legal standard for the probability of death due to a calamity involving such substances, a norm which decision-making on urban plans must comply with. Furthermore, a guidance value exists for societal risk, i.e. the probability that a group of people is killed as a direct consequence of a calamity, as a function of the size of that group. Expected excess of the guidance value compels local government to account for the risk in relation to the societal benefits of the proposed development and the measures taken to reduce the risk and abate any possible effects. Societal risk is assessed through model calculations, taking into account the patterns in time of both transport and presence of the population.

At the time the land use plan for the Spoorzone was conceived, environmental impact assessment revealed that the guidance value for societal risk was exceeded, based on transport volumes reported in 2003. Later estimates of transport intensities yielded much higher predictions of societal risk. In order to put an end to recurring conflicts between safety and urban development, the national government has established transportation ceilings for most of the transport routes, including the one through Tilburg. Together with other cities along the railway, Tilburg has successfully lobbied to influence the height of these ceilings, resulting in maximum future risk levels that are comparable to current levels. However, due to an increase of population density conceived in the final plan, societal risk is over five times the guidance value.

In view of the restrictions posed by railway noise and rail transport, a purely residential character of the area would not be feasible. An obvious solution in such cases is to plan less sensitive functions, such as office buildings, directly facing the railway. This would, however, result in a vast amount of office space, which could not be absorbed by the Tilburg market. Therefore, a solution was sought involving one of Tilburg's universities, which was interested in establishing a campus in the area, but only on the condition that it could dispose of its current buildings. Thus, a new interdependency was introduced by connecting the problem to a new solution that was floating around in the solutions stream.

Policy networks, arenas and decision windows

For the development of the central part of the Spoorzone, the principal arena is the public-private partnership. Stakeholders are the real estate developer and civil servants from several municipal policy networks (urban development, environment, finance). The most obvious decision window in this arena is the process of drafting the final agreements, first the one that led to the joint elaboration of the master plan and next those for actual development. In time, other stakeholders, such as an energy utility, will enter the arena, which may alter the final outcome.

The issue of the intensity of railway traffic, which determines railway noise in the area, is settled in a distinct arena, at the level of national government. In it, stakeholders are the Ministry of Infrastructure and Environment, the Association of Dutch Municipalities and Dutch Provinces. The Tilburg case study revealed that, at the local level, a decision window presented itself when Tilburg's university was found to be interested in coming to the Spoorzone, for higher education is not considered to be a sensitive function in Dutch noise policy.

For the issue of industrial risk due to railway transport in Tilburg – and other cities in the region – another arena is relevant. It is constituted by the Ministry of Infrastructure and Environment, Dutch railway and transport companies, chemical industries involved, emergency services and a task force formed by representatives from affected municipalities and provinces. The task force succeeded in lobbying for mitigating measures, such as safer composition of freight trains, and a considerably lower societal risk. For Tilburg, this opened up a decision window, as the municipality had the opportunity to link its interest to that of other cities affected by the risk, most notably the city of Breda, which previously had reached agreement with the national government about a maximum value for societal risk.

Conclusion

In the Tilburg case, we found that at least two dimensions of sustainable urban development, noise and industrial risk, were very much influenced by decisions in policy networks and associated arenas distinct from decision-making on the urban plan, but substantively closely related. As for the latter, deliberative decision-making on the intensity of transport of dangerous goods by rail resulted in lower risk to the Tilburg population, thus enabling the desired densities in the Spoorzone. In the case of railway noise, however, national government's desire to enhance passenger and freight transport outweighed local considerations of environmental quality. Yet, buildings of the university campus will shield part of the noise, making it easier to realise an adequate noise level in the rest of the area. Thus, the introduction of a new stakeholder into the process, allowed for reframing the problem.

3.5. UNDERSTANDING DECISION WINDOWS

3.5.1. How do decision windows arise?

The cases studied illustrate that decision windows may originate from connecting different, but related, issues in such a way that problems and solutions can be reframed. This is in line with the theoretical framework outlined in section 3.2, where stakeholders within an arena agree on a combination of a problem definition and a feasible and acceptable solution. Our case studies confirm that opening of a policy window is brought about by either changes in the problems stream (e.g. the unfeasibility of developing 550 dwellings in one single project) or in the politics stream (e.g. sudden importance of novel forms of participation). As in the ANSEA approach (Dalkmann et al., 2004), we find that the structure of the decision-making process may help in recognising decision windows. In addition, we observed how decision windows appear quite unexpectedly (e.g. when the issue of risk from LPG supply was linked to a related problem stream at a higher spatial level). Both cases further suggest that such linkage need not be limited to one single arena, but that issues may be linked between distinct arenas.

We also find that, when a decision window does not arise or when it cannot be optimally used, in line with Kingdon's (1995) theory, another opportunity must be found, opening a new round of decision-making on how to realize each stakeholder's objectives.

3.5.2. What makes decision windows effective?

A decision window may be termed 'effective' if environmental interests are truly integrated into decision-making, resulting in fuller consideration of these interests than would have been the case without using the opportunity that presents itself. Dalkmann and others (2004) provide generic criteria for adequately incorporating environmental information into decision-making: the decision-making process should be comprehensive, timely, transparent, participative and consistent. In our more elaborated conception of decision windows, the key to success appears to be that all stakeholders agree on both the definition of the problem and a solution that is feasible and acceptable. As, in a decision window, such an agreement is reached by constantly reframing the issue, decision-making must not only meet the generic criteria mentioned, but also be flexible. The finding that issues may be linked across multiple arenas also puts the criterion of comprehensiveness in a different perspective: to be comprehensive, the decision-making process should also encompass relevant issues in distinct, but substantively related decision-making processes, perhaps on a larger spatial scale or, consequentially, at a higher level of government.

3.5.3. How may the occurrence of decision windows be influenced?

First, and most clearly, the interaction of both stakeholders and advisors is of crucial importance. In networked decision-making, stakeholders depend on one another;

these interdependencies are not always clear (Van Bueren et al., 2003), but the process of interaction may increase participants' understanding. In order to arrive at a joint problem definition and a mutually agreed solution or initiative (Van Bueren et al., 2003; Teisman, 2000), exchange of information, knowledge and perceptions is required. As De Bruijn and Ten Heuvelhof (2002, p. 234) put it, "*'Negotiated knowledge' results from a process of interaction: participation by stakeholders guarantees they will be committed to the negotiated knowledge; participation by the analyst guarantees that it meets professional standards*". Our findings suggest that early participation in the planning process offers the opportunity to reframe objectives in ways that optimally link different interests. However, participation in itself does not necessarily lead to sustainable outcomes (Bond et al., 2011). Second, therefore, sustainable urban development must be firmly anchored in political objectives. Our research reveals the importance of strong political commitment. Political support also brings about a sense of urgency that is required (De Bruijn and Ten Heuvelhof, 2002) and assures that the outcomes of participative deliberation will be adequately translated into formal decision-making (Edelenbos et al., 2009). Thirdly, our research underlines the importance of 'policy entrepreneurs' (Kingdon, 1995), who are able to see and seize opportunities for linking together the problems, solutions and politics streams. In practice, it would be advantageous to have people of such capabilities in the role of project manager or senior advisor. In summary, we find that decision windows are significantly influenced by third parties.

3.5.4. Do decision windows help solve difficult trade-offs?

This paper started from the assumption that sustainable urban development entails balancing economic, ecological and social interests (Campbell, 1996). Particularly in inner-city redevelopments, balancing these interests entails difficult trade-offs. As a result, none of the stakeholders fully get what they want. Instead, they settle for what is acceptable to each of them and what is feasible for them jointly. Yet, both cases presented in this paper demonstrate that reframing problems and linking them to other issues provides opportunities that might otherwise not have existed, resulting in plans that meet the sustainability and environmental quality objectives. Thus, making use of decision windows, one need not per se 'settle for less' with respect to sustainability.

3.6. CONCLUSION AND DISCUSSION

Our research demonstrates that the concept of 'decision windows' (Dalkmann et al., 2004) is useful for understanding to what extent environmental interests are being integrated in decision-making, particularly in complex cases of inner-city urban redevelopment. Because in such cases decision-making occurs in networks, the analysis of decision windows

must account for the inherent complexity and dynamics. Inspired by Dalkmann and his co-workers, we initially regarded decision windows as moments in the decision-making process where environmental interests start forming part of the considerations. Explicitly considering the dynamics of the decision-making process led us to further conceptualize decision windows as moments in an intricate web of substantively connected deliberative processes where issues are reframed within a decision-making arena, and interests may be linked within and across arenas. Our research empirically supports the original idea of Dalkmann and others (2004), that decision windows enhance environmental integration – which to date has not been widely tested (Retief, 2007). Moreover, our results demonstrate that decision windows may be manipulated.

Elaborating the original concept to make it fit better with the complexity and dynamics of the urban planning context, we found that decision windows may be opened through participation of and interaction among stakeholders, political support, and the actions of policy entrepreneurs. The latter may enter the scene in the person of a project leader, politician or advisor. He or she is able to connect an issue to other matters, within and across decision-making arenas.

Thus, rather than relying on more and more detailed information, planners and decision makers should be aware of the various ways in which decision windows may present themselves. They must be flexible enough to reframe the original problem in view of other issues that are relevant to the other stakeholders involved. Furthermore, they must recognise relevant arenas beyond the one in which they are currently active and link up a particular problem with the issues in those arenas.

CHAPTER 4

A user perspective on the gap between science and decision-making. Local administrators' views on expert knowledge in urban planning[11]

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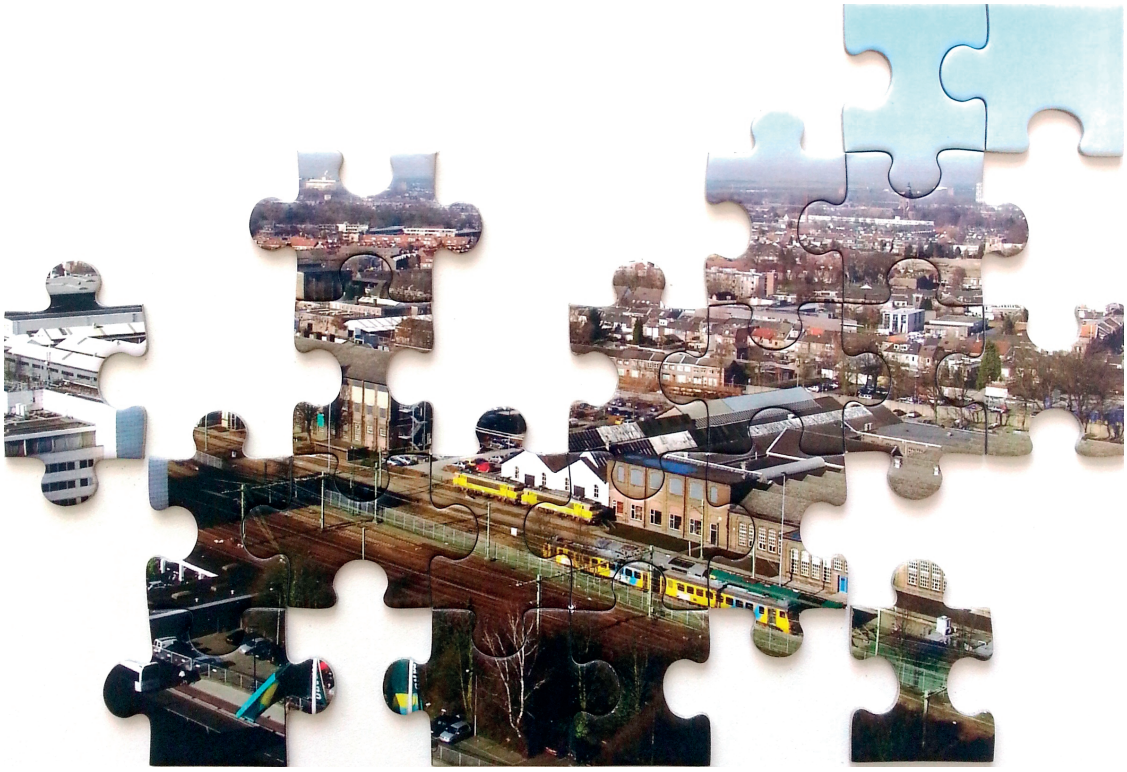


11. This chapter was published in Environmental Science and Policy (2015;47:167-76).

ABSTRACT

The role of expert knowledge of the environment in decision-making about urban development has been intensively debated. Most contributions to this debate have studied the use of knowledge in the decision-making process from the knowledge providers' point of view. In this paper, we reverse the perspective and try to understand how local decision-makers use scientific knowledge in decision-making about an urban plan and how they perceive the world of the scientific experts providing this knowledge. We approached municipal administrators in the Netherlands, responsible for local urban development, with conceptions regarding the use of knowledge that were derived from the literature on this issue. By reversing the perspective on the science–decision-making gap, we find that local administrators have a different view on this divide than do scientists. Administrators appear to have a more nuanced or even completely opposite perception of the different epistemic backgrounds of scientists and decision-makers, the inherent uncertainty of scientific knowledge and the rationality of decision-making in urban planning. We conclude that local administrators make use of expert knowledge primarily to obtain their main goal, which is balancing all interests to arrive at a decision that can count on political and public support. Rather than perceiving a problematic gap between decision-makers and experts, they nourish this gap in order to provide as much room for manoeuvre as possible for striking the intended balance of interests. There is a lesson here for environmental experts: rather than supplying decision-makers with more or better knowledge about how a plan affects environmental values, they should focus on providing better decision frameworks, by trying to enhance the weight attached to these values.

4.1. INTRODUCTION

Planning sustainable urban development involves knowledge about the environmental effects of policy decisions (Atkinson and Klausen, 2011) and more particularly urban plans. Many scientists and practitioners are producing such knowledge daily to the presumed benefit of decision-makers. But how do decision-makers responsible for urban planning perceive and use scientific knowledge about the environmental impacts that the intended developments may have? Scientific literature suggests a pronounced divide between decision-makers and environmental quality specialists, who feel that their scientific input to the urban planning process is underused (Brown, 2003; Evans, 2006; Owens et al., 2004). The perception of such a divide is nourished by a normative belief that policy making, including decision-making about urban plans, *must be rooted* in scientific knowledge (European Commission, 2008; Evans, 2006). However, Holmes and Clark (2008) reviewed several criticisms to this stance, based on the arguments that in science, there can be opposing views and that science, instead of answering questions, may pose new ones; thus, it would be an oversimplification to say that '*science is straightforwardly translated into policy*' (Owens et al., 2006, p. 635; Holmes and Clark, 2008).

If scientific knowledge is vital to decision-making, why is it underused? Siew (2008) has pointed out that three major problems concerning the science–policy interface can be identified in the literature: first, scientists and decision-makers have rather different views of the world. Second, scientists and decision-makers are part of distinct epistemic communities. And third, whereas science can deliver arguments for rational decision-making, decision-making itself is characterized by bounded rationality (Nilsson and Dalkmann, 2009; Owens et al., 2004); it has been acknowledged that public decision-making is inherently political in nature and involves values and power (Richardson, 2005). Other authors have stressed that scientific knowledge is about complex phenomena and therefore inherently uncertain and undetermined (Van den Hove, 2007); decision-makers – as well as scientists – have to deal with that uncertainty.

Producers of expert knowledge tend to describe the limited use of the knowledge produced in terms of *barriers* (e.g. Edelenbos et al., 2004; Gocmen and Ventura, 2010). If, indeed, barriers between science and decision-making exist, how can they be circumvented? Assuming that knowledge is socially constructed (e.g. Edelenbos et al., 2004), instruments have been proposed to bridge the divide between science and decision-making, such as joint knowledge production (Edelenbos et al., 2011; Hegger et al., 2012) and knowledge brokerage (Bielak et al., 2008; Partidário and Sheate, 2013; Sheate and Partidário, 2010).

The perception of barriers between science and decision-making is highly dependent on one's perspective (Owens et al., 2006). By and large, the perspective adopted in most contributions to this debate has been that of the *providers* of knowledge. Little is known

about the *demand* side, i.e., how decision-makers feel that knowledge can be of use to them. Changing perspective, therefore, this paper's research question is the following: how is expert knowledge about the environment perceived and used by decision-makers to arrive at a decision about an urban plan that they feel is feasible? Exploring this issue is important for two reasons: first it may shed a new light on the recurring question, posed in academia, regarding why expert knowledge is underutilized in the everyday practice of decision-making. Second, it may help improve the ways in which experts engage with decision-makers, rendering their advice more useful.

Reviewing recent literature on the science–policy divide in urban planning we characterized scholars' views about the role and use of science. Next, we asked municipal administrators in the Netherlands, who are responsible for urban development in their towns, to comment on those views and to articulate how they use expert knowledge about environmental impacts to arrive at a decision on an urban plan. The interviews focused on examples of inner-city redevelopment in areas that are highly burdened by environmental impacts; such situations are quite common in Dutch cities and towns. As urban planning in the Netherlands is a much more public issue than elsewhere, the examples are relevant, because there is political pressure to establish a high quality urban plan, and scientific knowledge must be used to assure adequate environmental quality or at least compliance with environmental standards.

The paper is structured as follows: First we review recent literature on the gap between knowledge and decision-making and the ways that have been proposed to bridge this divide, merging these findings into five stereotypes about the role of knowledge in decision-making. After describing our research method we present our findings, which we discuss in the final sections, drawing conclusions, particularly with regard to the question of whether opportunities for better environmental quality are being missed in today's practice.

4.2. CONCEPTIONS OF SCIENTIFIC KNOWLEDGE IN DECISION-MAKING

First, let us define what, in this paper, we mean by 'knowledge' in the context of urban planning. Knowledge can be distinguished from *information*, i.e. data that is used to answer a specific question. Knowledge, then, can be understood as information that, through some theoretical relationship, reveals some hitherto unknown aspect of reality (Krizek et al., 2009), such as the expected impact the exhaust of a factory might have on an ecosystem nearby. Different types of knowledge are known to play a role in urban planning. Rydin (2007) distinguishes four types: empirical and experiential knowledge; predictive knowledge; process knowledge; and normative knowledge. This paper focuses

on the second of those categories, more precisely knowledge obtained from natural, social and technical science, that is used to describe environmental processes and to predict their behaviour as a consequence of a spatial plan. Here, this type of knowledge is referred to as 'expert knowledge'. Another distinction is that between explicit and tacit knowledge (Healey, 2008; Nonaka and Von Krogh, 2009; Van Tilburg, 2007). This paper focuses on explicit knowledge, that has been codified in forms such as environmental assessment reports, rather than on tacit knowledge, which resides unconsciously in actions and heuristics of experts.

Next, we characterize the science–decision-making gap through the following stereotypes that can be derived from the literature:

1. Expert knowledge is indispensible for sound decision-making.
2. Decision-makers and experts belong to different epistemic communities; joint knowledge creation is necessary to bridge the gap between them.
3. Expert knowledge is inherently uncertain and undetermined; decision-makers must deal with this uncertainty.
4. Decision-making about urban plans is a bounded-rational process; therefore, although available, expert knowledge may not be used in decision-making.
5. Planning, at least in recent European practice, is regarded as a non-linear process, which makes it difficult to determine which knowledge is needed at any time during planning.

We do so in order to introduce local administrators to these stereotypic views and to elicit their responses to them. The administrators' views about the perception and use of expert knowledge in decision-making can then be compared to the stereotypes, that we elaborate on in the following subsections.

4.2.1. Expert knowledge is indispensible for sound decision-making

In much of the literature about the science–policy divide, particularly contributions about 'evidence based policy' (e.g. Nutley et al., 2010), it is assumed that science contributes to better decision-making. It is argued that science offers explanations and predictions and that an interface between science and policy arises because a decision to act must be grounded in a firm understanding of the world around us and in an assessment of the consequences of such acting (Van den Hove, 2007). But what, in the process of decision-making, constitutes useful knowledge? According to Cash et al. (2003), scientific knowledge is more likely to be used in decision-making if it is salient, credible and legitimate. '*[C]redibility involves the scientific adequacy of the technical evidence and arguments. Salience deals with the relevance of the assessment to the needs of decision makers. Legitimacy reflects the perception that the production of information and technology has been respectful of stakeholders' divergent values and beliefs, unbiased in its conduct, and fair in its treatment of opposing views and interests*' (Cash et al., 2003, p. 8086). According to

McNie (2007, p. 17), who uses the term 'scientific information' in much the same way as the term 'expert knowledge' is used throughout this paper, "*[u]seful scientific information, by definition, improves environmental decision-making by expanding alternatives, clarifying choice and enabling decision makers to achieve desired outcomes*".

From the administrators' perspective, however, it is not at all straightforward that they need or use expert knowledge; in Douglas' words: '*To some policymakers the answer to the question "What do they need from scientists?" is simple – nothing. For others, the answer is that they only want, and therefore "need", scientific input which supports or furthers their preconceived political or policy agenda. Yet others, keeping an open mind, seek high-calibre, result-neutral scientific information in the hope it will shed light on a complex technical problem and aid in the identification of feasible solutions*' (Douglas, 1995, p. 15). In the context of using expert knowledge about the environment in decision-making on urban redevelopment, Brown (2003, p. 85) took a distinct perspective: "*It might be argued that the issue is how to ensure integrated models and concepts improve environmental quality information available to these key players, but the more immediate issue is how to ensure, if it gets to them at all, can any of it be used?*" Particularly in the context of urban regeneration, urban designers have been criticized as focusing too much on the actual design from their own professional point of view, rather than directly asking the end users about their needs (Nisha and Nelson, 2012). It might, therefore, be contested that expert knowledge is useful for decision-making.

4.2.2. Decision-makers and experts belong to different epistemic communities

Urban planning involves environmental experts from many different disciplines, constituting an epistemic community, i.e. "*experts coming with different experiences, from different backgrounds, a common interest, a shared task and diversity of knowledge*" (Siew, 2008, p. 916). Decision-makers have different backgrounds and interests and therefore belong to a different epistemic community than do environmental experts. Siew (2008) contends that different epistemic communities create and interpret knowledge in different ways and that therefore forms of knowledge management are necessary to better integrate science into decision-making.

Another matter is whether in urban planning only expert knowledge counts. Many authors distinguish expert knowledge from lay (or stakeholder) knowledge (Edelenbos et al., 2004; Juntti et al., 2009) and bureaucratic knowledge (Edelenbos et al., 2011). These distinctions, based on the group or person with whom knowledge is found rather than on its content, also have led authors to suggest other ways of knowledge production. Klijn (2003) argues that in urban renewal, where multiple stakeholders are to act concertedly but approach the task at hand each from their individual perspectives and interests, knowledge is distributed among multiple actors (architects, civil servants, advisors, scientists, residents) and must be mobilized from these sources. Other scholars have also

recognized that for science to answer the questions that are crucial to decision-making, both scientists and decision-makers must engage in a process of joint knowledge creation (Edelenbos et al., 2004; Hegger et al., 2012; Van Buuren and Edelenbos, 2004; Van den Hove, 2007). Indeed, there are accounts of such processes contributing to bridging the divide between policy and science (e.g. Edelenbos et al., 2011; Van Buuren and Nooteboom, 2010; Wiek and Walter, 2009), but these could well be the exception to the rule that decision-makers keep their distance from science.

4.2.3. Expert knowledge is inherently uncertain

Siew (2008) mentions another reason why expert knowledge is underused in decision-making, namely uncertain results. Brugnach et al. (2008) argue that uncertainty may arise from either unpredictability of the system considered, incomplete knowledge about the system or different scientific frames that are common to different epistemic communities (see section 4.2.2). Obviously, expert knowledge about environmental impacts of spatial plans is based upon models and theories that are inherently uncertain. Depending upon the choice of a theory or model and even upon the assumptions made in any particular case, different and even contradictory results may be obtained by different experts. In general, if such uncertainties are not specifically being addressed, so as not to shed any doubt on the findings presented, tensions may arise that undermine trust in scientific advice (Van den Hove, 2007). Expressly acknowledging uncertainty may, however, render any advice worthless to decision-makers who prefer building decisions upon firm evidence.

Within this stereotypic view that uncertainty of expert knowledge widens the knowledge – decision-making gap, strategies have been put forward to deal with uncertainty. Raadgever et al. (2011) distinguish four types of strategies that can be found in the practice of environmental management as a reaction to uncertainties. These include: ignoring the uncertainties; mitigating them by either generation of knowledge or by interaction. Interaction entails communicating about the uncertainties, learning, negotiation or even opposition. Another reaction they found was coping with uncertainties in the policy or measures that are being developed. A similar set of responses to uncertainty was derived by Van der Sluijs (2005).

Here, the question is whether local administrators indeed use such strategies. In part, they may be hampered to do so, because in the Netherlands, assessment methods for predicting environmental impact have been highly regulated: uniform methods have been developed and legally prescribed, and relevant data have been compiled at the national scale that must be used as inputs for such assessments. Thus, local administrators are given less room to engage in a process of knowledge production of their own.

4.2.4. Decision-making about urban plans is a bounded-rational process

Decision-making is often considered to be a bounded-rational rather than a fully rational process (Nilsson and Dalkmann, 2009; Owens et al., 2004). In a fully rational decision-making process, consequences of all alternatives would be assessed and compared, applying objective criteria, to arrive at the 'best possible' outcome. In a bounded rational process, the number of alternatives that is overseen in decision-making is limited; in weighing these alternatives, knowledge of the consequences is incomplete and apart from objective criteria, also values and power may determine the outcome. Therefore, an urban plan that lacks public or stakeholder support may be abandoned by the decision-makers, although expert knowledge is available that, in the experts' view, renders a decision to go ahead with the plan fully rational from a technical perspective. Experts may, then, feel that decision-making is being irrational instead of making use of the knowledge that has been supplied by them; nevertheless, to any local administrator, seeking support from stakeholders may seem perfectly rational (Gezelius and Refsgaard, 2007).

4.2.5. Planning is a non-linear process

In the European planning tradition, the traditional linear approach (formulation of goals; design of alternatives; evaluation; establishing the plan) has been widely replaced by other planning methods (e.g. Khakee and Stromberg, 1993), that regard the planning process as being cyclical and continuous. However, if the planning process is completed in a much more chaotic and recurring manner, rather than in neatly separated phases, it is not possible to provide the required knowledge in any structured way. It is, in other words, impossible to predict which knowledge is needed at any time during planning. Some critique to this perception of planning as a non-linear process can be found in other countries, e.g. China, where a linear approach has, up till now, been *en vogue* (Zhang et al., 2012; He et al., 2011). Also in environmental assessment literature, decision-making is often still treated as a linear and rational process consisting of consecutive phases (e.g. Cerreta and De Toro, 2010). Theoretically, then, each of these phases would raise specific questions, requiring expert advice, the nature and scope of which is highly dependent on the planning phase to which it pertains.

Now how do local administrators comment on these stereotypes? And what do their opinions signify regarding the way in which they use expert knowledge in order to decide about urban development?

4.3. METHOD

This paper is an explorative study of the perspective that the users of expert knowledge have on the relation between decision-making in urban planning and science. Our

research focuses on local administrators because they are the ones who are ultimately politically responsible for decisions made by local government. We contacted[12] local aldermen, responsible for urban redevelopment, in the 32 largest and 35 average-sized municipalities in the Netherlands.

Aldermen from twenty-one municipalities, ranging in population size between 30.000 and over 300.000 inhabitants[13] were willing to participate and had experience with inner-city redevelopment. Respondents belonged to different political parties: Liberals (8), Social Democrats (4), Christian Democrats (3), Green Party (3) and other, mainly local, parties (3). Interviews were conducted by telephone between April and August 2013 and lasted about 40 minutes on average. All conversations were electronically recorded.

Our research method consisted of a written survey and personal interviews by telephone. This combination allowed us to prevent errors that are inherent to surveys consisting only of closed-ended questions, such as misinterpretation of questions (McBurney and White, 2009, p. 247). Also, closed-ended questions may reveal insufficient information as to *why* respondents check a specific answer. Respondents were therefore asked to illustrate their answer, providing examples from their own experiences. Furthermore, interviewees were specifically asked how they use expert knowledge in the decision-making process; this open-ended question was analysed in terms of decision-making frameworks or methods for weighing interests in decision-making that were mentioned.

Prior to the interviews, respondents received – by email – statements about the stereotypes derived from literature (see previous section), to which they could respond using a five point Likert scale (Monette et al., 2002), from 'strongly disagree' to 'strongly agree'. For each of the stereotypes, we constructed four to eight statements, except for non-linearity of the process, which had only two. Statements were alternately formulated in a positive and in a negative way (Swamy, 2007). Some statements reflected criteria for usefulness to decision-making, such as salience, credibility and legitimacy (Cash et al., 2003) and contribution to achieving desired goals (McNie, 2007). Other statements concerned the degree to which decision-making in urban planning is a rational or rather a bounded-rational process (Nilsson and Dalkmann, 2009) or a linear rather than a more chaotic process (Doak and Karadimitriou, 2007). We also included some statements about the uncertainty of environmental science and about joint knowledge creation (Van Buuren and Edelenbos, 2004). One statement explicitly concerned the Dutch context

12. Contact was first made by email, mediated by the contact persons of two working groups of administrators responsible for the physical environment, established by the platform groups of the 32 largest municipalities and the platform of middle-sized municipalities in the Netherlands, respectively. In some cases, if the working group member of a municipality was not responsible for urban planning, we directly contacted the alderman who was.

13. Of these municipalities, 3 have less than 50,000 inhabitants; 8 have between 50,000 and 100,000; 9 have between 100,000 and 200,000 and one has over 200,000 (CBS, 2014).

in which environmental assessments are to a high extent regulated and protocolized. Table 4.1 shows the statements that were used to operationalize the stereotypes. Control questions were added to check for inconsistent answers; these are not shown in Table 4.1. Also, some questions were added about each respondent's background, training and age. We did not analyze the relation between aldermen's opinions and any of these context variables, for the sample of 21 respondents is too small.

4.4. RESULTS

4.4.1. Usefulness of expert knowledge

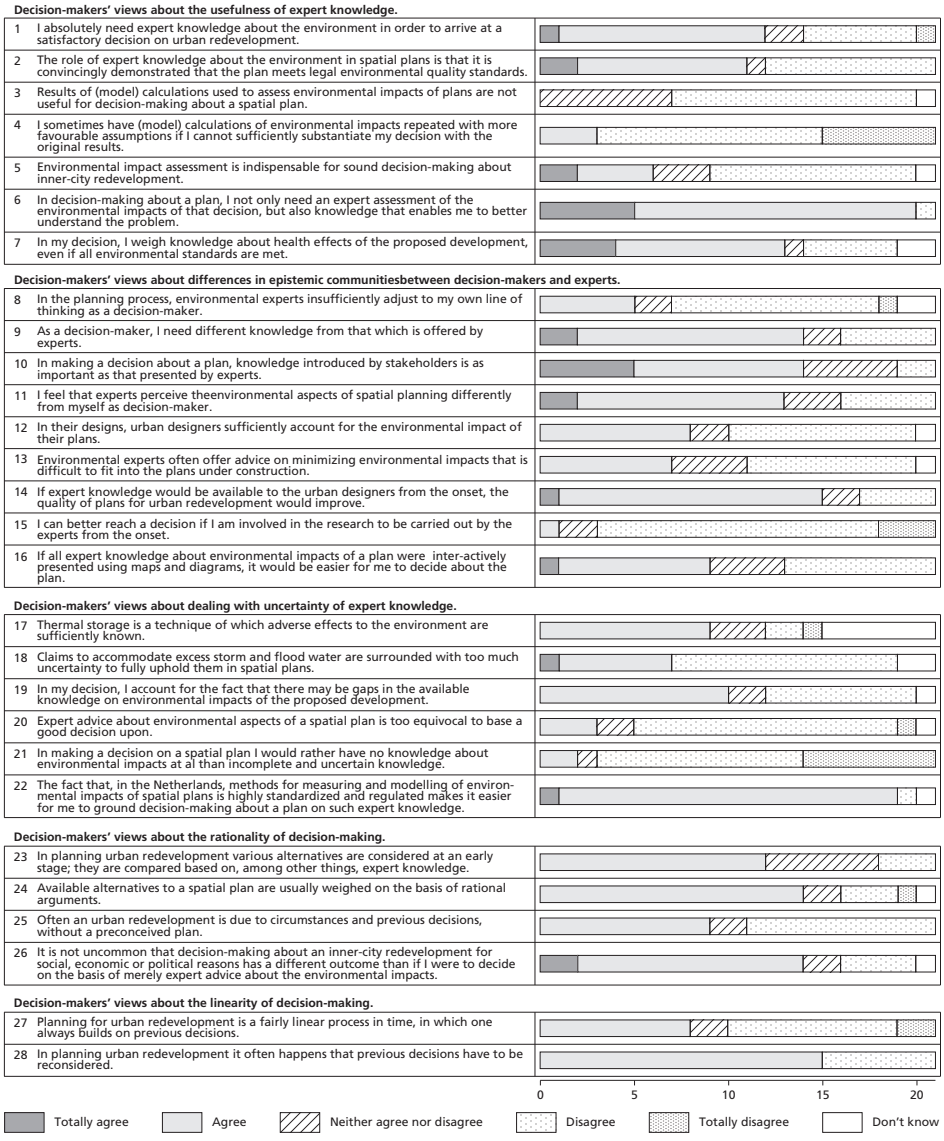
Most respondents support the view that expert knowledge is necessary for decision-making, commenting that environmental quality is regulated by national standards and is therefore a boundary condition for any spatial plan (see Table 4.1, statement 1). Those who do not agree explain that they do not possess scientific knowledge themselves, but rely on experts within their organization. However, according to half of the respondents, ascertaining that a plan meets legal standards is not the sole purpose of obtaining expert knowledge (Table 4.1, statement 2). When asked specifically to judge the usefulness of model calculations, such as assessment of noise or air pollution by road traffic, again a majority finds those useful; some respondents stated that models sometimes proved to be wrong or expressed that they were not convinced that a certain model calculated the real impact (Table 4.1, statement 3). Model calculations are, as a rule, not repeated with different assumptions in order to obtain more favourable results. Most respondents interpreted such an action as an attempt to manipulate results; even those who did not hold this view commented that multiple sets of assumptions might broaden the scope of alternatives (Table 4.1, statement 4).

By contrast, environmental impact assessment (EIA) was deemed indispensible by only a minority of the aldermen interviewed. Most respondents commented that EIA is a heavy and sometimes bureaucratic instrument and that in many cases a more common-sense approach is appropriate (Table 4.1, statement 5).

Quite in accordance to the views about statements 1 and 2, expert knowledge is valued for enabling decision-makers to better understand the problem at hand (Table 4.1, statement 6). In addition, some commented that for them it was important to be able to explain choices to stakeholders or to the public. Somewhat unexpectedly, this is true to a lesser extent if the problem concerns health impacts: not all respondents appear to take into account expert knowledge about health effects beyond national standards (Table 4.1, statement 7).

Summarizing, local administrators feel that they need expert knowledge about environmental impacts of a spatial plan. In part, this is because meeting environmental quality standards is a boundary condition for any urban plan.

Table 4.1. Decision-makers' views about decision-making and expert knowledge. The numbers shown are the number of responses in each category to the question.



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4.4.2. Different epistemic communities

The view that barriers between decision-makers and experts arise in part from epistemic differences is not supported by our interviews; although some of our respondents share this view, most do not, commenting that decision-making and expertise are different roles and that each role has its own line of thinking (Table 4.1, statement 8). In addition to environmental expert knowledge, decision-makers say they need knowledge from other sources, such as financial and legal experts (Table 4.1, statement 9). In particular, knowledge provided by stakeholders is deemed important by decision makers (Table 4.1, statement 10), in spite of the fact that interviewees are well aware that stakeholders may use knowledge to further their own interest, on the pretext of concern about the environment. Although environmental experts take a distinct perspective on an urban plan, this is not perceived by respondents as problematic (Table 4.1, statement 11). By contrast, the interviewees' comments make clear that most aldermen accept that different views are inherent to the different roles in the decision-making process: most respondents stress that they are the ones that have to balance all interests. Interestingly, when asked how they use expert knowledge in this weighing process, most respondents agree that this is done intuitively, rather than using decision tools such as multi criteria analysis, and often in consultation of the rest of the aldermen in the administration.

Trying to probe whether environmental expert knowledge would be complementary to the input from urban designers, we found that respondents feel that they are not close enough to the actual design process to be able to comment. Results indicate that the designs could be improved in this respect (Table 4.1, statement 12), and that environmental experts could also tune in more to urban designers (Table 4.1, statement 13), especially in the early stages of planning (Table 4.1, statement 14).

Quite in line with the observation that local administrators operate rather remotely from the actual planning process, a majority of our respondents feel that they should not be involved in the experts' research (Table 4.1, statement 15), although, when asked, most comment that design workshops involving experts, designers and stakeholders are being organized and are deemed useful. Not surprisingly then, only a minority thinks that decision-making can be improved by planning support systems (Table 4.1, statement 16; note that some respondents uttered their agreement here only with the promise of concise information, not with the interactive aspect of such a system).

Summarized, local administrators acknowledge the view that experts and decision-makers have different views of environmental impacts of spatial plans, but they do not regard this as being problematic, as they perceive experts and decision-makers to have distinct roles in the planning process. Aldermen mostly keep a professional distance to the details of planning, but are being informed about the main issues by their organizations' experts on a regular basis. They tend to arrive at a final decision in a rather intuitive

way, without using any tools and therefore do not feel decision-making will benefit much from the use of planning support systems.

4.4.3. Uncertainty

How do local administrators deal with uncertainty of expert knowledge? When asked to state whether adverse effects of thermal storage by means of ground source heat pumps are sufficiently known, some admit they do not know. Those who agree comment that they believe the technique to be safe and that they must decide based on what expert knowledge is available (Table 4.1, statement 17). In the same vein, most of the respondents do not feel there is too much uncertainty in spatial claims based on predictions of flood risk and excess storm water due to climate change (Table 4.1, statement 18). Possible gaps in expert knowledge are not always explicitly accounted for (Table 4.1, statement 19); when asked *how* knowledge gaps are filled, responses varied between 'have another look at it' and 'explicitly ask more expert advice'. Uncertainties appear not to stand in the way of decision-making: most respondents feel that expert knowledge is unambiguous enough to form a basis for decision making (Table 4.1, statement 20) and that they would rather have ambiguous information than no information at all (Table 4.1, statement 21). In short, the inherent uncertainty of expert knowledge does not seem to prevent such knowledge from being used in decision-making.

We also investigated whether the prescription – by national government – of standardized assessment methods for environmental impacts would be perceived as a hindrance to the use of expert knowledge. A vast majority of the respondents, however, agreed that, on the contrary, standardization and regulation of environmental assessment was helpful for building decisions upon that knowledge (Table 4.1, statement 22). In addition, some comments also referred to the regulation of environmental quality itself, through nationally established standards that spatial plans must meet.

4.4.4. Rationality of decision-making

The majority of respondents feel that decision-making about urban plans is a rational process: they confirm that multiple alternatives are considered in the early stages of planning, and that these are weighed using expert knowledge (Table 4.1, statement 23). Likewise, alternatives are compared on the basis of rational, but not necessarily environmental, arguments (Table 4.1, statement 24).

In order to find out how autonomous municipal planning is, we obtained the aldermen's response to the statement that planning is highly influenced by circumstances beyond the planners' control. Our respondents acknowledge that sometimes urban redevelopment proceeds in reaction to circumstances and previous decisions, but many respondents comment that they have ample instruments to adequately steer development (Table 4.1, statement 25). In view of comments made about the administrators' role in

decision-making, it comes as no surprise that most aldermen agree to the statement that decisions may turn out differently from what would be expected if the decision would rest on only environmental expert knowledge. From the comments, it is clear that this is due to other interests than ensuring environmental quality, such as opposition in the Municipal Council, either politically motivated or based on irrational grounds, for instance fierce public resistance to the plan (Table 4.1, statement 26).

Summarizing, local administrators regard decision-making as a rational process that is the result of balancing all interests involved. Because any plan needs political and public support, seemingly irrational outcomes, however, do occur.

4.4.5. Linearity of decision-making

The perception of planning as a linear process, in which decisions gradually build on previous choices, varies among our respondents (Table 4.1, statement 27). Most disagree, frequently commenting that in complex developments the process goes back and forth repeatedly. Even most of those who agree admit that decisions are frequently reconsidered (Table 4.1, statement 28). As an explanation for this, the lack of public or stakeholder support for a decision was most frequently mentioned. Other explanations include economic causes and a change of political conditions. One interviewee commented that he considers urban planning to be in an intermediate phase between a sectoral approach, where distinct experts were consulted consecutively on each isolated part of the planning issue, and a more integrated approach, where all aspects of the plan are considered at once and as a whole.

4.5. DISCUSSION

Our findings indicate that the reversed perspective on the divide between science and decision-making corroborates some of the views that, according to the literature, are common among scientists, while contradicting some other views. In the following, we will discuss these similarities and differences.

4.5.1. Usefulness of knowledge

First, the idea, articulated in the literature (e.g. Nutley et al., 2010), that knowledge is useful for decision-making in urban planning, is acknowledged by local administrators. In part, this can be attributed to legal requirements: in the European context, local governments have to ascertain that European and national environmental quality standards are met (Carmichael and Lambert, 2011; Van Stigt et al., 2013a). In addition, local administrators find it important to be able to explain choices, in search of public and political support for the plans at hand, which is what they require first and foremost. Therefore, any plan

that cannot count on sufficient support will be abandoned, however sound – on the basis of environmental expert knowledge – it may be. This does not mean decision-makers do not use the expert knowledge concerned in their deliberations, only that it not always gives enough weight to counterbalance other interests. However, expert knowledge is not always welcomed wholeheartedly, as environmental impact assessment is considered by many respondents as a bureaucratic and all too heavy instrument. The role of expert knowledge in exploring trade-offs, therefore, seems limited. Put differently, expert knowledge can be said to serve only to obtain or enhance political and public support for a plan, rather than to help rendering the best possible plan in the first place. This conclusion can also be deduced from our finding that local administrators aver that balancing interests is rather an intuitive process. At first glance this may seem surprising, especially as Dutch environmental law provides several instruments to aid decision-making (De Roo, 2000; Runhaar et al., 2009), but it confirms the view that expert knowledge is of use to decision-making only to the extent that it does not narrow down the number of options available. For science, in addition to what McNie (2007) states, not only "*improves environmental decision-making by expanding alternatives*", but may also reveal that options, desirable for other reasons, are less suitable because of environmental considerations. Arguably, this is most true in cases where circumstances are, to a high extent, limiting. This is notably the case in inner-city redevelopment but also, in instances that are less constrained, in all but the very early phases of development.

4.5.2. Widening the gap by denying it

The aldermen we interviewed emphatically present themselves as generalists, underlining that balancing all interests in the planning process is their main role – and theirs alone. Therefore, they keep a certain distance from the details of planning and design, putting trust in their organizations' experts to provide them with what knowledge they need to include environmental impacts in their decisions. They keep enough distance from the experts to be able to make a decision weighing all interests – rather than only protecting environmental quality, as they believe environmental experts to do. In the mean time, they obtain information from the experts that allows them to explain choices in planning to stakeholders and the public and to secure political and public support for a plan. Thus, on the one hand, and perhaps also as a socially acceptable reaction to our questionnaire, administrators acknowledge the usefulness of science for decision-making, whereas by underlining the different roles of experts and decision-makers, they give away an underlying view that, rather than perceiving a problematic gap between themselves and experts, they condone and even stimulate the traditional role of experts as 'pure scientists' or 'science arbiter' as described by Pielke (2007). Arguably, an expert who is, in Pielke's terms, an 'honest broker', let alone an 'issue advocate', would with his expert advice narrow down the room for manoeuvre that local administrators need (In 't Veld, 2000).

The finding that local administrators do not perceive a problematic divide between themselves and scientific experts also sheds a different light on means to bridge this gap, such as knowledge co-creation among experts and decision-makers (Edelenbos et al., 2004; Hegger et al., 2012; Van Buuren and Edelenbos, 2004; Van den Hove, 2007) and knowledge brokerage (Bielak et al., 2008; Partidário and Sheate, 2013; Sheate and Partidário, 2010). In the Dutch context of inner-city area development, this type of solution is not being embraced by local administrators. Most municipalities in our research do have workshops where experts, designers and stakeholders are involved in co-design, but aldermen are not personally involved. Any knowledge gathered and created there reaches the decision-making process indirectly, through the workshop-based advice that the organization's experts convey to the local administrators.

The distinct perspective local administrators have on expert knowledge is also apparent from the aldermen's view of planning support: they affirm preferring concise information and yet, in majority they do not regard planning support systems, that can interactively provide such information, as instruments that may improve decision-making. Rather, it is thought that such tools may be helpful for experts, including their own organization's civil servants. This seems to reflect the finding by other authors that planning support systems are underused (Gocmen and Ventura, 2010; Vonk et al., 2005; Vonk et al., 2007).

4.5.3. Dealing with uncertainty

The view that the uncertain character of scientific knowledge prevents such knowledge from being used by decision-makers (Siew, 2008) could not be corroborated in our study. Although a relatively high number of respondents admitted to have no idea of the long-term risk of, for instance, thermal storage in aquifers, local administrators decide using what evidence is available. Long-term effects, such as of electromagnetic radiation (from UMTS antennas or power transmission lines) that to date are not known, are not considered in decision-making. There was no mention of additional research being commissioned to fill such knowledge gaps. Rather, respondents who do not specifically weigh knowledge about health effects in their decisions feel that a national standard should provide sufficient protection against such effects. In terms of strategies for dealing with uncertainties (Raadgever et al., 2011), local administrators appear to resort mainly to ignoring, placing confidence in national environmental standards, legislation and proven technology. To a lesser extent, knowledge generation is used as a strategy, for instance when expert knowledge is being disputed by stakeholders or the general public. This also reflects the aldermen's primary goal of generating support for the plan at hand. The fact that, in the Netherlands, uniform assessment methods are being used to predict environmental impacts is welcomed by the aldermen, presumably because it contributes to clarity and therefore diminishes public discussion; however, standardizing knowledge generation is in itself not limiting uncertainty.

4.5.4. Different rationalities

Local administrators perceive decision-making as a rational process, whereas in the decision-making literature, it is more often regarded as being bounded-rational, in the sense that not all alternatives are being considered, not all consequences of each alternative are known and the consequences that are known do not bear equal weight to all stakeholders. Environmental experts who advocate protective measures may find it irrational if such measures are not implemented due to high cost; an alderman, however, deals with the reality of a limited budget. Likewise, abandoning a plan that, from an expert's point of view is perfectly sound, but meets with fierce public resistance, to a local administrator is not irrational at all. Thus, there can be different perceptions of what is rational and what constitutes a barrier to rational decision-making (Owens et al., 2006).

4.6. CONCLUSION AND RECOMMENDATIONS

In the context of urban redevelopment, local administrators, by acknowledging that decision-makers and experts have distinct roles and, hence, by keeping distance from the details of planning, including knowledge generation, widen the gap between experts and decision-makers. The science–policy divide, in this context, seems to contain a self-reinforcing mechanism that may well counteract attempts to bridge this gap. Joint knowledge creation and knowledge brokerage are found to not fully reach into the domain of the decision-maker. Rather, our results suggest that, if environmental impacts are being insufficiently considered in urban planning, the most obvious solution is not to supply decision-makers with more or better knowledge about how a plan affects environmental quality, but to have them enhance the weight they attach to this quality.

In the Dutch context, this is all the more important in view of the trend in environmental policy in the Netherlands to allow local governments more room to manoeuvre in deciding about the quality of the environment, even in situations in which compliance with state-issued environmental standards cannot be achieved (Van den Broek, 2012).

The use of scientific knowledge to inform policy and practice has been demonstrated to strongly depend on the contextual differences between countries, including population size, political culture, governance arrangements and broader social values (Nutley et al., 2010; Atkinson and Klausen, 2011). Whether our observations also reflect the situation in other countries is, therefore, a matter of future research.

CHAPTER 5

Compact city development and the challenge of environmental policy integration: A multi-level governance perspective[14]

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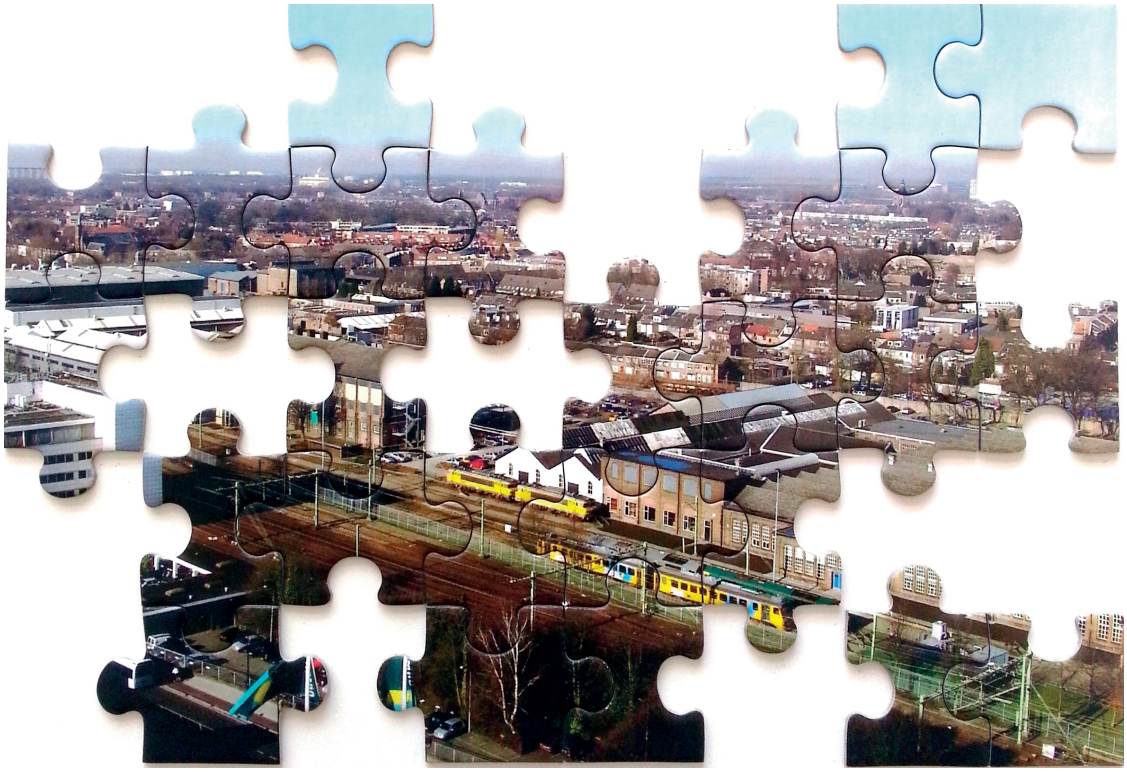

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ABSTRACT

Sustainable urban development entails integration of environmental interests into decision-making at the local level. In order to achieve this, higher tiers of government may compel municipalities to explicitly consider environmental objectives or even prioritize them by demanding compliance with national standards, thus, at least theoretically, restricting local government's room to manoeuvre in balancing all relevant interests. This paper explores the extent to which national standards narrow the range of local options and what this means for sustainable urban development. Adopting a multi-level governance perspective on three cases of inner-city redevelopment, we find that environmental standards are either not problematically restrictive or, if they are, sectoral policy offers ways to circumvent them. From a sustainability perspective, this may lead to undesirable outcomes. A combination of approaches may solve this predicament.

5.1. INTRODUCTION

Ever since the publication of 'Our common future' (WCED, 1987), the concept of sustainable development has attracted the attention of scholars. Researchers, especially in Europe, have amassed a large body of literature on a particular aspect of sustainable development, namely the integration of environmental policy into other policy sectors (Jordan and Lenschow, 2010; Jordan, 2008; Persson, 2004; Nilsson and Persson, 2003). This concept, known as 'environmental policy integration' or EPI, is wholeheartedly accepted at the (supra)national level and there is much political commitment to it, especially in the European Union (EU). However, at lower levels of government, its implementation in everyday decision-making still faces many challenges (Jordan and Lenschow, 2010). As 'Our common future' explicitly mentioned cities as the focus points for sustainable development, it is interesting to look at the implementation of EPI at the municipal level, the outcome of which must be sustainable urban development.

In their study of the urban politics of climate change, Bulkeley and Betsill (2005) drew attention to the fact that local authorities' aspirations for sustainable development cannot be understood in isolation. Instead, using a multi-level governance perspective (Hooghe and Marks, 2001), they demonstrated that local sustainability policy can be greatly affected by the manner in which authority is shared among different, state and non-state, actors and institutions. It appears that this multi-level governance character of EPI can, in part, explain the observed 'implementation gap' (Nilsson et al., 2009, p.1). The growing body of literature on EPI, however, rarely offers analyses of policy implementation at the local level (Watson et al., 2008); insofar as it does address the multi-level governance characteristics of EPI, the literature concentrates mainly on the national and supra-national level (Catenacci and Sgobbi, 2007; Nykvist, 2008). Several recent accounts, however, indicate that the pursuit of sustainability objectives by regional or local authorities can be severely hampered by other governing institutions at different levels of the state (Bulkeley and Betsill, 2005; Alahuhta et al., 2010).

Higher levels of government may also enhance EPI at the local level, and it can be argued (e.g. Newig and Fritsch, 2009; Bradshaw, 2003) that higher authorities can best safeguard relatively weak interests, such as the quality of the environment. Indeed, the EU and many countries outside Europe have adopted a system of quality standards that regulate environmental aspects such as air and water quality and/or energy performance of buildings. Such regulations, in principle, constrain a local authority's room to manoeuvre in making trade-offs between social, economic and ecological interests, which, according to Campbell (1996), comprise the essence of planning for sustainable urban development. In the Netherlands, where there are many land-use claims in urban areas – partly as a consequence of national land-use policy, geared to save green and open space – professionals involved in urban area development have indeed claimed that national

environmental standards unnecessarily complicate and restrict local development (De Zeeuw et al., 2009; Zonneveld et al., 2011).

Adopting a multi-level governance perspective on EPI, this paper addresses the question of how and to what extent local room to manoeuvre is restricted by sectoral regulations from higher tiers of government. We tackle this question by analyzing how environmental interests are balanced with other, social and economic, interests and how, in this process, restrictions from (supra)national government are dealt with. We find that there are four types of interaction between government tiers, depending on the nature of the restrictions and on local ambitions. The paper highlights the multi-level governance dimension of EPI, but also broadens the multi-level governance debate to include synergies and trade-offs between multiple sectors in urban development.

The rest of this article is structured as follows: First, we present an analytical framework, describing the multi-level governance aspect of EPI in cases of urban redevelopment. Second, we look at the role of EPI in the type of urban redevelopment discussed here. Then, after describing the research method used, we give an overview of the indicators of EPI that are relevant in this type of case study and of the national and provincial requirements that are set with respect to each of these indicators. Next, we present the three cases and the ways in which the most relevant aspects of sustainability have been weighed in each case. Finally, we discuss the findings in the light of our analytical framework and present our conclusions.

5.2. ENVIRONMENTAL POLICY INTEGRATION FROM A MULTI-LEVEL GOVERNANCE PERSPECTIVE

EPI 'refers to the integration of environmental aspects and policy objectives into sector policies' (Persson, 2004, p. 1). This entails weighing those consequences as well as measures to prevent or mitigate them against other competing interests. Although many authors (for an overview, see Hamdouch and Depret, 2010) have shown 'win-win' situations to exist, trade-offs between environmental objectives and sectoral goals are inevitable (Jordan, 2008; Lafferty and Hovden, 2003). Adopting a normative perspective, the question has been raised regarding the relative weight of environmental considerations in these trade-offs (Jordan and Lenschow, 2010). Conceptions of EPI appear to vary from 'weak', where environmental consequences are merely *considered* (Schout and Jordan, 2007), to 'strong', where environmental objectives are given 'principled priority'(Lafferty and Hovden, 2003, p. 9). Moreover, from an analytical perspective, questions have been addressed as to where EPI occurs and which factors are conducive to EPI or, conversely, hinder efficient integration of environmental objectives into sector policies. With respect to the former, EPI literature distinguishes between horizontal and vertical environmental

policy integration (Lafferty and Hovden, 2003). Horizontal EPI pertains to an overarching strategy for EPI by some central governmental authority, whereas vertical EPI concerns integration of environmental objectives throughout a particular ministry's sectoral policy. With respect to the latter type of questions, as to what types of measures and strategies may lead to EPI, Persson (2004) distinguishes normative, organizational and procedural factors. Among the normative factors are political commitment, societal backing and fundamental changes in political paradigms. Organizational factors are those pertaining to the architecture of government and non-government institutions. Procedural factors are tools that enable consideration of environmental consequences in decision-making, such as environmental impact analysis (EIA) and strategic environmental analysis (SEA) (Sheate and Partidário, 2010; Nilsson and Dalkmann, 2009), action plans and consultation procedures. Weber and Driessen (2010) essentially use the same categories.

Although little research has been done into the actual outcome of EPI in day-to-day decision-making, several authors identify an 'implementation gap' (Nilsson et al., 2009, p. 1) between political rhetoric at the (supra-)national level and policy outcome 'on the ground'. In Finland for instance, integration of river basin planning and land-use planning was reported at the highest governmental tier, but practical implementation at regional and local levels was deemed to need further development (Alahuhta et al., 2010). In Great Britain, local climate policy was hampered by economic development policy at the regional level (Bulkeley and Betsill, 2005). Conversely, European and national intentions for greening municipal waste policy were severely hindered by local dynamics of the sector in Great Britain (Watson et al., 2008) and Sweden (Nilsson, 2005). In analyzing EPI it is, therefore, necessary to take into account the mutual influence of distinct levels of government (Bulkeley and Betsill, 2005). A particularly useful framework to do so is the concept of multi-level governance, the *"reallocation of authority upward, downward, and sideways from central states"* (Hooghe and Marks, 2003). Hooghe and Marks (2003) distinguish two types of multi-level governance: Type I concerns multiple tiers of government, whereas Type II is about the distribution of authority over different state and non-state actors and institutions. Nykvist (2008) terms this vertical and horizontal integration, respectively. Vertical integration in this sense is, however, not quite the same as the vertical dimension of EPI distinguished by Lafferty and Hovden (2003), which does not explicitly include multiple tiers of governance (Steurer, 2008).

A multi-level governance perspective might help understand how the existence and functioning of multiple tiers of government influences EPI at the local level. Such influence may be more profound when the amount of local autonomy, which varies between dimensions of sustainable development and policy sectors (Bulkeley, 2010), is high to start with.

5.3. EPI IN COMPACT URBAN DEVELOPMENT

Traditionally, local autonomy in the field of urban development is high. Local authorities are best placed to weigh local interests (De Roo, 2000) and therefore resolve the conflicts between economy, environment and social justice (Campbell, 1996). Campbell suggests that planning for sustainable cities amounts to negotiating three interconnected conflicts: between equity and economic growth, between environmental protection and economic growth and between equity and environmental protection. Clearly, solving the latter two conflicts can be regarded as EPI. In Campbell's view, it is in negotiating these conflicts that the road toward a sustainable city is thought to emerge. This would amount to a 'weak' mode of EPI, because it implies that environmental interests could 'lose'. Many countries have, however, adopted a far more 'strong' mode of EPI in that they have, at the national or, in Europe, at the supra-national level, put in place a system of environmental quality standards to be observed in urban planning, thus principally prioritizing environmental interests.

Many scholars and practitioners hold the view that the concept of the 'compact city' can contribute to achieving sustainable urban development. The term 'compact' does not merely refer to building in high densities (dwellings or workplaces) but rather encompasses intensive use of urban space characterized by: a mix of functions (living, working, leisure, amenities) in, indeed, high densities; a relatively small grain; and the proximity of nodes of (public) transport (Neuman, 2005). The 'compact city' concept could be helpful in preventing urban sprawl (Breheny, 1997; Breheny and Archer, 1998), as it has been in the United States' growth management (Janssen-Jansen, 2005). Compactness, however, also entails the risk of deteriorating environmental and spatial quality (Janssen-Jansen, 2005) and of exposing large numbers of people to natural and industrial risks. This has become known as the 'compact city dilemma' (De Roo, 1998). The dilemma could be resolved by either relaxing national standards or by allowing local authorities, under certain conditions, to deviate from those standards (De Roo, 2000; Glasbergen, 2005), so as to negotiate a state of what is perceived locally to be 'sustainable', much as envisaged by Campbell (1996).

How do local authorities solve this type of dilemma? And how much freedom to manoeuvre is left to them by higher tiers of government? To answer these questions, one should investigate how each of the relevant interests plays a role in local decision-making and how national or regional regulations may influence the outcome of balancing these interests.

Assuming that EPI is more problematic in complex situations, we examined three cases of inner-city redevelopment near railways. Their complexity is comparable to that of brownfield redevelopment, which is receiving attention worldwide as a contribution to sustainable urban development (Raco and Henderson, 2006). Characteristic properties

of these urban sites are the coexistence of sources of noise and risk – due to the transportation of dangerous substances and a history of industrial land-use – to which large numbers of people are being exposed. Often, road traffic is intense, aggravating the environmental problems mentioned and adding a powerful source of air pollution.

5.4. METHOD

For our study, we selected cases that would be representative of a particular type of urban development in which compact mixed-use urban infill is realized in the vicinity of a railway station. This so-called 'transit oriented development' has gained popularity worldwide and is increasingly being combined with other elements of sustainable urban development (Cervero and Sullivan, 2011). Thus, cases selected were characterized by: residential and mixed-use functions with a relatively high density; the vicinity of a railway station; high levels of railway noise; some level of risk due to railway transport of dangerous substances; and a high probability of tension between environmental quality and legal standards.

From about a dozen of sites in the Netherlands that fit these criteria, we chose three cases that were well-documented, where land-use plans were recently finalized, in medium-sized cities, where integration appears not to be hindered by the sheer complexity of the administration.

The actual analysis consisted of four steps: Firstly, we derived from scientific literature those indicators of sustainable urban development that are relevant to EPI in the type of case studied here. For each of these indicators, we identified regulations and requirements, set by European, national and provincial governments. Next, drawing on the respective land use plans and the environmental impact studies that are legally required to underpin such a plan, we compared the expected outcome regarding each of the indicators with requirements from higher levels of government. Thirdly, we interviewed stakeholders about the way in which any frictions between these outcomes and restrictions imposed by higher tiers of government were solved in order to make the plan comply. Finally, we concluded whether or not these restrictions significantly hampered the intended developments.

Document research was based on publicly available plans and environmental impact studies. In each case, four interviews were conducted with the alderman responsible for the project, the municipality's project leader, the project's environmental advisor and a representative of the developing company. These interviews were semi-structured. First, respondents were asked in what way 'sustainability' was made operational in each particular case. Next, for each operational aspect, those interviewed were asked in which way and to what extent they felt helped or hampered by provincial, national or even European

government. The relevant indicators (section 5.5) were used as a checklist during the interview. The interviews were held between 29 June and 30 September 2011 and lasted for about one hour. All twelve interviews were electronically recorded, typed up and slightly edited, after which transcripts were sent back to the interviewees for comment.

5.5. INDICATORS OF SUSTAINABLE URBAN DEVELOPMENT

What are the indicators of urban sustainability and which of those are indicative of EPI? Several authors have suggested sets of indicators (Shane and Graedel, 2000; Shmelev and Shmeleva, 2009), ranging from air quality, energy consumption and resource use to liveability, health and preservation of cultural heritage. The European Commission's guidelines on integrated environmental management (European Communities, 2007) list a somewhat similar, although not exhaustive, set, which adds local governance and land-use planning. Finally, many Dutch municipalities use a location's sustainability profile consisting of 24 indicators, including the use of resources; local environmental quality; nuisance from noise and odour; safety and security; quality of amenities; access to public transport; green space; urban and residential quality; social cohesion; work; diversity; and IT infrastructure in the area (Nielsen and Jensen, 2010).

Clearly, not all of these indicators are helpful in studying EPI. Neither are all of them relevant to the type of development studied here. From the suggestions above, we selected only those that are related to environmental interests and therefore indicative of EPI. Furthermore, we only included in our analysis those that are directly influenced by the redevelopment itself. We propose the following set of indicators: energy efficiency and clean energy production; building materials and waste; water management; urban transport; quality of air and soil; noise; risk; and green space.

Energy efficiency and clean energy production are obvious indicators mentioned by many scholars studying urban sustainability and are directly affected by urban design. A second obvious set is building materials and waste, also mentioned in all of the literature cited above. In our view, however, these are restricted to the development phase itself – hence the explicit term '*building* materials'. Water management, here, is about water *quantity*: allocation of space for infiltration and storage of rain-water put a direct claim on land-use; the collection of sewage and the quality of surface and ground water are regulated on the scale of the water system as a whole and therefore are not of direct concern here. Since our objects of study are in close proximity to railway stations, it would be trivial to assess the dimension 'urban transport' by measuring distance to public transport. Instead, we look at urban design that favours transport by bike and on foot, discourages local car traffic and stimulates the use of rental cars instead of private car ownership. Other indicators that are frequently mentioned in literature are those for soil

and air pollution, noise and industrial risks. These are deemed relevant because of busy road and rail traffic and former or possibly remaining industrial activities. The amount and quality of green and open space is a further obvious indicator, referred to by many of the authors mentioned above. Density and the mixing of functions are a characteristic of the objects of study and therefore not discriminating. Biodiversity, which in itself is an important aspect of sustainable development, is deemed irrelevant in the case of inner-city redevelopment projects.

5.6. REGULATIONS AND REQUIREMENTS

For each of the sustainability indicators identified in section 5.5, we now turn to the restrictions imposed by higher, i.e. European, national and regional, tiers of government. These are summarized in Table 5.1.

Energy efficiency and clean energy production

The EU Energy Performance of Buildings Directive (European Communities, 2010) has been implemented in national legislation for new buildings, setting a minimum requirement for energy performance (EPC), which will be tightened over time (BZK, 2011).

No requirements exist on the use of energy from renewable sources; the EU (European Communities, 2009) merely requires national action plans stimulating renewable energy sources. Besides, national government can accelerate sustainable energy projects through the Crisis and Recuperation Act (Tweede Kamer, 2010).

Building materials and waste

The European Directive on Waste (European Communities, 2006), does not specifically cover building materials. Dutch building regulations demand that emission of greenhouse gasses (during use) and depletion of resources are quantified (BZK, 2011), but no requirements are set.

Water management

At the European level, water management is governed through the Water Framework Directive (European Communities, 2000). At the national level, implementation resulted in a set of water quality standards and the obligations for municipalities, during the preparation of land-use plans, to identify the effects on water flow and quality and to consult the regional Water Board on measures to mitigate these effects.

Urban transport

There are no requirements for urban transport at the European or national level.

Table 5.1. Municipalities' room to manoeuvre regarding relevant sustainability aspects

	Regulations	Tilburg	Woerden	Zutphen
Energy efficiency and clean energy production	National EPC standard for new buildings. Experiments with GSHPs* enabled by CRA*. Provincial subsidy for sustainable energy.	PPP* sets EPC* lower than national requirement. Land-use plan enables GSHPs. PPP initiates local sustainable energy supply.	EPC as nationally required. Land-use plan enables GSHPs.	EPC lower than national requirement through CRA. Land-use plan enables GSHPs. Local sustainable energy supply commissioned.
Building materials and waste	No requirements.	PPP sets high targets for GPR* scores.	No explicit targets. Use of GPR is encouraged. GPR-score is high.	No explicit targets. Developer takes voluntary measures.
Water management	Water quality standards and obligation to consult regional water authorities.	Comply with national requirements.	Comply with national requirements.	Comply with national requirements.
Air quality	Air quality standards and possibility to temporarily circumvent these through national action program.	Comply with national requirements. Prevention of street canyons. Limited increase near sensitive forms of land-use.	Comply with national requirements.	Comply with national requirements.
Soil quality	Soil quality standards. National and provincial subsidies.	Comply with national requirements. Remediation and experiments with GSHPs facilitated through CRA.	Comply with national requirements.	Comply with national requirements.
Noise	Ambient noise level standards and possibility to give exemption. Standards do not apply when certain constructive measures are taken at building level.	Comply with national requirements, including exemption and constructive measures at building level.	Comply with national requirements, including exemption and constructive measures at building level.	Comply with national requirements, including exemption. Support from Ministry in re-establishing industrial noise limits.
Risk	Standard for individual risk. Orientation value for societal risk.	Comply with national requirement for individual risk. Strong lobby for national measures to reduce societal risk, but still above orientation value.	Comply with national requirements. Societal risk accepted in view of national transport ceilings and local measures.	Comply with national requirements. Societal risk accepted in view of national transport ceilings and local measures.
Urban transport	No requirements. Guidelines for stimulating transport by bike and foot.	New underpasses. Follow national guidelines. Stimulate rental cars.	Follow national guidelines.	New underpasses. Follow national guidelines.
Green space	Target value for green space.	Green public space. No quantitative targets.	Green public and private space. No quantitative targets.	Green public space. No quantitative targets.

* EPC = energy performance coefficient; CRA = Crisis and Recuperation Act; GPR = Gemeentelijke Praktijkrichtlijn (Municipal Practical Guideline), a method to assess sustainability of buildings – see text; GSHPs = ground source heat pumps; PPP = public-private partnership

Air quality

The EU Directive on ambient air quality and cleaner air for Europe (European Communities, 2008) has been implemented in national legislation, requiring municipalities to assess a development's contribution to ambient concentrations of certain air pollutants. European standards must be observed, although, temporarily, exceptions have been made possible.

Soil quality

The European Commission has put forward a proposal for a framework Directive (European Commission, 2006). The Dutch national legal framework consists of the Soil Protection Act and concomitant regulations, including standards for a range of pollutants. Whether or not remediation is in order depends on the degree of contamination and the soil's function. The province is the competent authority in cases of soil pollution or degradation, determining the need of remediation and the standard to which remediation must bring the soil.

Noise

The European Environmental Noise Directive (European Commission, 2002) aims at comparable methods for measuring noise in all member states and at informing the population about noise levels in their environment, but does not actually set noise standards. The Dutch Noise Abatement Act, however, does provide such standards, specified for particular types of noise. The legal framework contains a targeted noise level maximum and a range of exceptions, mostly for inner-city locations in the vicinity of railways and highways. Since the law was found to be inflexible in intensively used urban areas, local government was allowed to deviate from national standards, taking the so-called City and Environment approach in which nuisance by noise must be compensated by other qualities of the environment (Weber and Driessen, 2010). As a last resort, constructional measures can be taken to limit exposure to noise inside the buildings; these include the so-called 'deaf façade' – which has no windows or doors that can be opened – and a design situating living rooms and bedrooms on the quiet side of the building.

Risk

There is a strict norm for the probability of death due to a calamity involving use and transport of dangerous substances, which must be followed in decision-making on urban plans. Moreover, there is a guidance value for societal risk[15]; when exceeding this value, local government is required to account for the risk in relation to the societal benefits of

15. i.e. the probability that a group of people is killed as a direct consequence of a calamity, as a function of the size of that group.

the proposed development and the measures taken to reduce the risk and abate possible effects. In order to put an end to recurring conflicts between safety and urban development, national government has established transportation ceilings for most of the transport routes, including those influencing the developments studied here.

Green space

National spatial policy aims to guarantee a basic level of spatial quality (VROM, 2006), which includes issues covered by legislation on nature and environment. With respect to the amount of green space, a target value for new developments (of 75 m^2 per dwelling) is set.

5.7. CASE STUDIES

5.7.1. Tilburg

In Tilburg, with just over 180,000 inhabitants (CBS, 2008), an elongated strip of land along the railway adjacent to the city centre, is now being redeveloped into an area of metropolitan character. Plans for this so-called 'Spoorzone' (railway zone) feature transformation of the formerly industrial site into a high density mix of functions: offices and apartment buildings, some of them high-rise, as well as higher education, leisure and a conference venue. From the start, ambitions for quality and sustainability have been high. Tilburg municipality acquired the central part of the Spoorzone at considerable cost and, in a public-private partnership (PPP) with a real estate developer, must now fit several functions into a patch of ground that is highly burdened by the railway. EPI, in this case, amounts to realizing an attractive, carbon-neutral city district with commercially viable property, while complying with national environmental standards.

Accomplishment of Tilburg's high ambitions for sustainable energy, building materials and urban quality, reflected in high targets for sustainability score GPR[16], is left fully to the discretion of the PPP. Other dimensions of sustainability require Tilburg to comply with national standards, as can be seen in Table 5.1, depicting the municipality's room to manoeuvre. Balancing high densities, which are consistent with metropolitan characteristics and necessary for commercial viability, with acceptable levels of societal risk and railway noise is posing a particular challenge. National transport policy, contributing to sustainable development from its own perspective, aims to intensify rail transport, both of passengers and goods. The expected increase in noise levels would complicate the projection of housing directly along the railway, as would the increase of societal risk caused by

16. GPR (gemeentelijke praktijkrichtlijn = municipal practical guideline) is a method for assessing the level of sustainability of buildings.

rail transport of dangerous substances. Planning for office space directly along the railway could reduce noise levels in the remaining area and would reduce societal risk, but meets with poor market expectations. The volume of shops, leisure and amenities is simply not sufficient to fill out the portion of land that is most heavily burdened by noise. A key to solving the noise problem would be to create a university campus, which is desirable to both the PPP and the university, but would again influence societal risk. Furthermore, this option depends on the university selling its current buildings at a reasonable price.

In view of the importance of rail transport of dangerous goods to societal risk, Tilburg and other cities along the railway have organized an intensive lobby for lowering transport intensities; this has resulted in transport ceiling values on which the national government, the province and the municipalities involved have now agreed. After completion of the Spoorzone development, however, societal risk will still exceed the guidance value by a factor of more than five. Tilburg municipality balances this risk by taking extra construction measures and incorporating safety features in the urban design. A considerable part of the dwellings realized are exposed to noise levels above the maximum exemption value and requires constructive measures to ensure adequate levels inside.

Those interviewed indicate that soil remediation is facilitated by allowing an area based approach (instead of a case based one). However, the volume of soil removed will be minimized as, according to national requirements, the soil would have to be treated before disposal or re-use, incurring considerable cost. This, of course, restricts building design.

5.7.2. Woerden

The former garrison city of Woerden has a population of about 33,000 (CBS, 2008). Along the railway, a city-owned strip of land called Snellerpoort was initially intended for building offices, partly to shield the existing residential area from railway noise. However, due to undesirably high traffic projections, the plan was abandoned. Instead, starting in 2007, when the market for office space had dwindled, a new land-use plan was made, providing space for compact urban dwellings, mixed with a small proportion of other functions. In its intended form, the Snellerpoort plan could comply with national requirements on railway noise only by introducing a large, uninterrupted building block parallel to the railway tracks, entailing, however, an increase in societal risk, albeit below the guidance value.

The city council only recently realized that comparable initiatives had been simultaneously launched elsewhere along the railway, thus providing too many apartments for the local market. The Snellerpoort plan was again halted. A former military complex, across the railway and situated farther away from it, is currently being developed after a European procurement procedure. The original program goals included high ambitions regarding energy performance, GPR-score and noise. However, in the course of detailing

and implementation, many goals were dropped, likely due to the unexpectedly high cost of soil remediation, retaining only the low energy performance coefficient. Interviews in this case suggest that the province's requirements for soil remediation are too strict and that more of the original sustainability ambitions could have been accomplished if a longer period of time would have been allowed to accomplish the intended level of soil quality. The municipality's room to manoeuvre is being perceived as limited, although Table 5.1 shows that it is comparable to that of Tilburg.

5.7.3. Zutphen

Zutphen has about 43,000 inhabitants (CBS, 2008) and is situated along the river IJssel. Across the railway, which runs along the historic city centre, a large industrial area was established in the 1930s, originally hosting relatively heavy types of industry. In more recent times, some industrial companies have moved out of the area to make room for amenities such as a cinema, large-scale retail and an indoor children's playground. Part of the area is now newly parcelled out for commerce and industry, whereas the most southern part, 'Noorderhaven', situated between the railway, the remaining industry and the river, is reallocated for residential and mixed use. The plan entails medium-rise offices along the railway (as a shield against railway noise), as well as reduction of industrial noise. Part of an old harbour, now filled, will be restored and two new underpasses will connect the new quarter with the city centre, just across the railway.

Analysis of the land-use plan and underlying impact assessments reveals that only national noise regulations pose serious restrictions. Interviewees termed all other environmental issues 'business as usual'. Noise can, within national regulations, be dealt with in the urban design: closed building blocks and a row of office buildings facing the railway. Industrial noise is being reduced and zoning is re-established so as not to overlap Noorderhaven. Furthermore, using silencing building materials and setting a low speed limit will limit road traffic noise. Interviews revealed that development is being hampered by uncertainty regarding the plans of national authorities on the frequency of future passenger and freight trains. To a much lesser extent, the effect of the national plans on the risk caused by transport of dangerous substances by rail also posed uncertainty.

Zutphen has the ambition for the whole of the area to be CO_2-neutral. For Noorderhaven, specifically, an energy performance amounting to 75% of the value demanded by Dutch building regulations was laid down in the Crisis and Recuperation Act. The municipality has commissioned energy supply of Noorderhaven to a private consortium. The land-use plan provides for the use of ground source heat pumps. National regulations regarding air, water and soil quality do not pose serious restrictions on Zutphen's autonomy to develop Noorderhaven, as is shown in Table 5.1.

5.7.4. Overall findings

Most interviewees underlined that they considered primarily the inner-city redevelopment character of their project to contribute to sustainability. The second most important aspect of sustainability was considered to be energy. These respondents proved to be well aware of the tensions between compact redevelopment and environmental quality. Regulations on noise and risk do pose restrictions that can, however, be dealt with in the urban design in a 'business as usual' manner. This workability is a result of policy change with regard to those aspects of sustainability that the past has shown to be problematic: either national standards have been relaxed or authority for discretionary implementation has been devolved to municipalities (De Roo, 2000; Miller and De Roo, 2004). For example:

- Prior to 1997, Dutch soil quality standards were aimed at achieving natural background values; since 1997, a certain amount of pollution is accepted, varying with the planned land-use (Boekhold, 2008).
- In 1989, a limit value was defined for societal risk, whereas in the late 1990s the limit was transformed into a guidance value (De Roo, 2004).
- Air quality near roads is no longer assessed at the kerbside, but at a point that is representative for a stretch of space along the road, maximally ten meters from the side of the road. Furthermore, if air quality standards will be exceeded as a result of a development, compensation in other areas or temporary exceptions are allowed.
- Until 2007, exemption values for noise had to be established by the province upon request, whereas a municipality can now itself set the value (Weber et al., 2011).

In both Tilburg and Zutphen, environmental assessment was performed, but did not perceivably lead to weighing environmental interests with social and economic interests in decision-making. Rather, assessment seems to be a summation of sectoral impact studies, the main purpose of which is to ascertain that intentions are indeed feasible. Surprisingly, no use has been made of instruments that have been developed for supporting integration of environmental policy in the early stages of spatial planning (Simeonova and Van der Valk, 2010; Simeonova, 2006; Runhaar et al., 2009; Weber and Driessen, 2010).

Instead, prices of and demand for real estate appear to greatly determine the outcome of negotiations within Campbell's (1996) triangle. If in the Tilburg case, for instance, financial considerations preclude the university trading its current property for a new campus in the Spoorzone area, either more dwellings will be built which will be exposed to undesirable levels of noise and risk or less real estate will be realized, possibly causing a considerable financial loss. By the same token, in the Woerden case the plan was halted altogether as a result of market expectations in the real estate sector. This dependency on the property market is also reflected in the explicit wish to maintain flexibility in land-use plans, leaving space for the developers to adapt the actual layouts – and thus the number of dwellings – to housing demand.

In all cases, uncertainty about restrictions was deemed more troublesome than the actual restrictions themselves. Determined at the national level, rail transport intensities have long been uncertain, as well as the outcome of societal risk assessments.

5.8. CONCLUSIONS AND DISCUSSION

The aim of this paper was to explore the manner and extent to which sectoral regulations from higher tiers of government restrict a municipality's room to manoeuvre in local decision-making, especially in complex urban conditions, known as 'compact city'. For clarity, our analysis is limited to the multi-level aspects of governance (Type I). Including multi-actor aspects at the local level, obviously, would render a far more complex image. We find that there are at least four distinct types of interaction between tiers:

1. Compliance. For some types of environmental impact, standards are established that must be strictly observed, giving those aspects 'principled priority' (Lafferty and Hovden, 2003) to the extent of that minimum level. Clearly, this limits the number of options available, but contrary to our initial assumption (see sections 5.1 and 5.2), not problematically; compliance with these standards is practiced. In addition, we find that local governments feel supported by these standards in their negotiations with other stakeholders.
2. Consideration. For other types of environmental impact, regulations are – or have been made – less strict or can be circumvented. These impacts, clearly, are being *considered*, but do not essentially alter the plans.
3. Ambition. For some types of environmental impact, municipalities may formulate ambitions beyond standards – if any – issued by higher levels of government. Ambitions may be inspired by higher goals, such as reducing a city's carbon footprint, or by win-win options, such as energy savings. Sectoral regulations from higher tiers of government may facilitate the achievement of such ambitions.
4. Interference. Apart from trying to influence municipal policies and plans, higher tiers of government are engaged in balancing social, economic and environmental interests of their own accord and at a higher spatial scale, the outcome of which may conflict with local considerations (Bulkeley and Betsill, 2005; Nilsson et al., 2009; Watson et al., 2008).

Thus, a national environmental quality standard, as a means of EPI in the 'strong' normative sense, is principally treated as a boundary condition at the local level, creating a compact city dilemma. If requirements are relaxed, allowing local government more freedom to solve the dilemma, the resulting room to manoeuvre appears to be used to support interests other than those of the environment. As a consequence, potentially unhealthy and dangerous situations are being accepted. This was found previously in the

case of noise (Weber and Driessen, 2010) and risk (Ale, 2005b). Whereas it could be argued (PBL, 2011) that non-negotiable, centrally established, norms should be abandoned in favour of an integral balancing of the quality of the living environment at the local level, the evidence presented here suggests that this is unlikely to produce truly sustainable results. A combination of 1) centrally established norms, safeguarding a minimal environmental quality and 2) procedures to assess what level of quality above this bare minimum can be achieved and at what cost, could overcome the pitfalls of relying solely on either approach.

Adopting a multi-level governance perspective to EPI reveals distinct differences among tiers of government in the normative, organizational and procedural factors distinguished by Persson (2004). We found political and administrative support for national noise regulations, for instance, to be quite low at the local level. This is not to say that noise is not considered; obviously, national standards must be met. That being so, though, noise is considered to contribute to a rather vague conception of 'quality' of the living environment. Thus, instead of making an explicit trade-off between noise levels and other interests, starting from a clear noise level objective, balancing interests is done implicitly.

Likewise, tools and procedures, issued at the national level to specifically facilitate explicit trade-offs locally (such as the City and Environment approach mentioned in section 5.6) or to formulate local ambitions for environmental quality in the early stages of planning, in practice do not live up to the expectations (see also Runhaar et al., 2009). Also, the merely marginal way in which environmental assessment is used here – and elsewhere (Bina, 2008) – also indicates that between distinct levels of government, substantial differences exist in appreciation of support tools for decision making. One could argue that this lack of EPI is precisely the *result* of national standards, as they are being perceived to be boundary conditions. In that case, however, it is hard to understand why, in the cases examined, no use has been made of tools that specifically create room to manoeuvre in situations where standards cannot be met. These observations confirm earlier findings that procedural measures are not very successful in bringing about EPI (Nilsson et al., 2009).

In the literature, EPI is mostly treated as a multi-sector issue revolving around balancing interests of the sectors concerned. Adopting a multi-level governance perspective reveals that, for different reasons, the outcome at any level may well be at odds with objectives at other levels. Therefore, an analysis that considers multi-level as well as multi-sector relations may help explain why EPI in plans and decisions 'on the ground' remains below expectations. Acknowledging these multi-level relations may benefit both scientific analysis and practice.

CHAPTER 6

Steering urban environmental quality in a multi-level governance context. How can devolution be the solution to pollution?[17]

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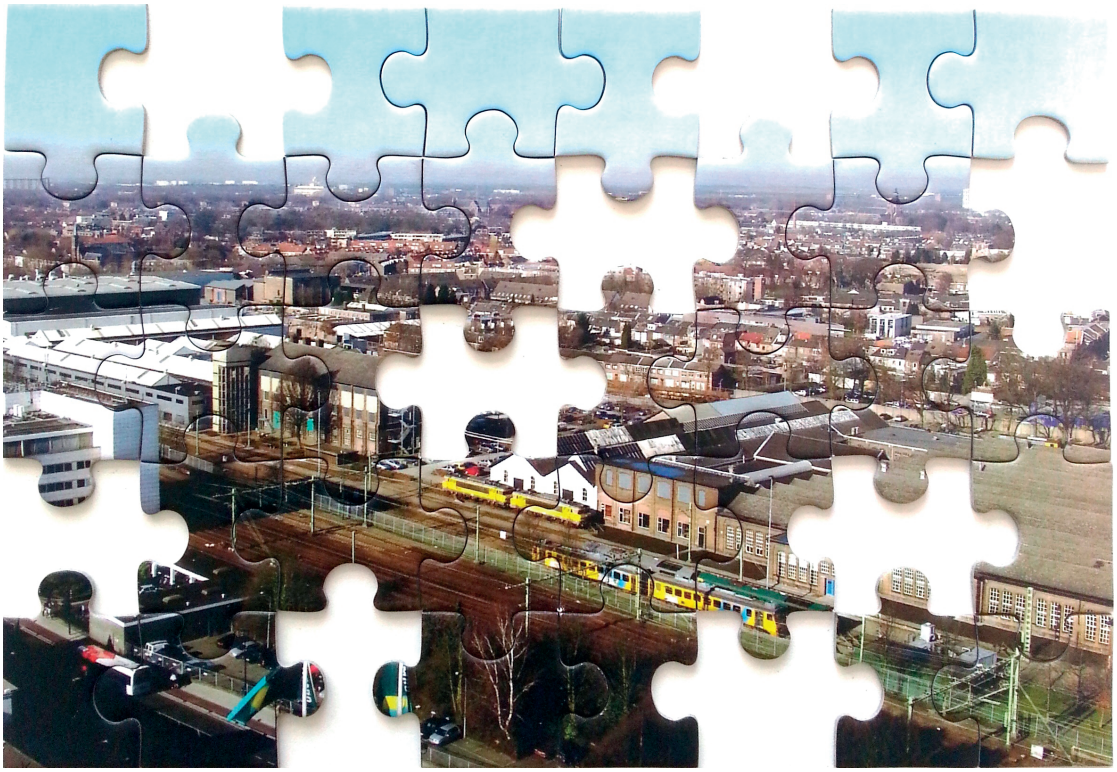

17. This chapter was published in Land Use Policy (2016;50,268-76).

ABSTRACT

Devolution is advocated as a solution to scale mismatches in urban environmental governance. However, urban environmental quality is a multi-scalar issue: its various aspects – noise, soil, odour, air, water et cetera – are influenced by processes at multiple spatial and temporal scales. Decisions by municipal authorities that benefit local environmental quality may, therefore, conflict with higher-level environmental objectives. Managing the effects of urban development on each of these various aspects, then, is not only a matter of attributing authority to the 'right' jurisdictional levels; rather, it is about organizing effective interplay among these levels. This paper compares two fundamentally different ways in which such interplay has been institutionalised in the Netherlands. Two examples illustrate these approaches and show that they may lead to different results. One approach is to devolve the authority to decide about the desired environmental quality upon the municipal level. The second approach is to have local authorities and polluters comply with centrally issued standards and, meanwhile, give them more leeway to negotiate the necessary emission reductions. Whereas the former offers the desired degree of flexibility, the latter guarantees that objectives are achieved. It is from the trade-off between flexibility and legal certainty that the choice for either of these approaches results. This paper contributes to the scientific debate on managing urban environmental quality in a multi-level governance context by demonstrating how the two approaches work out in practice and what their advantages and disadvantages are. The paper very preliminary judges the two approaches and suggests a third one combining the advantages of both.

6.1. INTRODUCTION

Urban environmental quality results from bio-geochemical processes involving all sorts of polluting agents and occurring at multiple spatial scale levels, ranging from the local (e.g. odour; noise) to the global (e.g. ozone depletion; climate change). It is broadly recognised that governing each of these environmental quality aspects requires governance at the corresponding administrative level (Cumming et al., 2006; Cash et al., 2006; Newig and Fritsch, 2009). This entails devolving authority from the central state to more appropriate levels of governance. These can be supra-national bodies, such as the European Union or lower tiers of government (e.g. provinces or municipalities), but also governing bodies specifically tailored to fit a certain spatial scale, such as river basins in the European Water Framework Directive. Generally, in decentralised states, these arrangements are made in accordance with the subsidiarity principle, which states that "*decisions within a political system should be taken at the lowest level consistent with effective action*" (Jordan and Jeppesen, 2000, p. 66). This principle can be traced back to political theories from the second half of the 19th century, in relation to efficiency of government action, but has gained a more specific meaning in the context of the European Union (EU), where it pertains to the allocation of national and supranational responsibilities (Jordan and Jeppesen, 2000).

It thus depends upon the issue – or, more exactly, on the geographical scale of the bio-geochemical and social processes that underlie the issue – at what administrative level decisions are taken. This, however, does not mean that, for any particular environmental problem, there is only one optimal administrative level where decision-making should take place. Kastens and Newig, for instance, demonstrate how the European Water Framework Directive is implemented in national legislation, arguing "*that 'implementation' not only means carrying out orders from above in a technical sense, but also involves important elements of political bargaining, much decision power being delegated to regional and even local scales*" (2007, p. 243). Young (2006) found that scale-dependent interplay between government institutions may take various forms, including dominance (of one institution over another), separation (i.e. firm delineation of each government level's competency) and negotiated agreement (resulting in co-management by the administrative levels involved).

Devolution has the benefit of bringing the level of decision-making down, when appropriate, to the regional and local levels that are better informed about the specific details of the local situation, can more flexibly adapt to them and can more readily ensure participation of stakeholders (Cohen and McCarthy, 2015; Newig and Fritsch, 2009). Participation, in turn, can enhance the environmental quality that results from the decision at hand and can facilitate implementation (Drazkiewicz et al., 2015; Newig and Koontz, 2014). Thus, devolution and participation of non-state – i.e. civil society and business – actors lead

to a multi-level governance landscape, in which lower tiers of government, rather than replacing higher levels of the state, execute the authority that was devolved upon them, in deliberation with civil society and business actors, all within certain limits and under certain conditions set by higher tiers of government (Hooghe and Marks, 2003; Steurer, 2013).

Several authors, however, contend that failures in such a multi-level governance system lead to an 'implementation gap' between (supra)national goals and outcomes at lower levels (cf. Pressman and Wildavsky, 1984). In the case of the Irish policy on climate change, McGloughlin and Sweeney (2011) indicate that such a gap exists and that, in the absence of statutory requirements for local authorities, the local level is not the most efficient. Flynn (2000) reviewed the performance of local European authorities regarding several aspects of environmental policy, and concluded that decentralisation generally fails to bring improvements. In the United States' forestry policy, Koontz (1999) found that, at the federal level, participants favour environmental interests, whereas at the lower level of individual states, they favour economic interests. Cohen and McCarthy (2015), reviewing the literature on decentralisation, also argue that if devolution and decentralisation are taken too far, undesirable governance outcomes may ensue that run counter to objectives at higher spatial or administrative scale levels; their examples include inequitable outcomes of participatory water governance and undermining of democracy and accountability by 'local partnership governance'.

Instead of facilitating decision-making in environmental governance and enhancing consideration of environmental aspects, devolution could thus be expected to result in quite the opposite. The question, then, is: can governance arrangements be shaped in such a way that environmental quality can be optimally promoted at all spatial and temporal scale levels, while still allowing for flexibility at the local level? This question is particularly pressing when a single action or project has – possibly detrimental – effects at multiple scale levels, each being dealt with at distinct administrative levels. Urban (re)development is such an issue – in particular in situations where environmental impacts are high. Noise, for instance, is considered to be a local phenomenon, yet its sources are active on a higher spatial scale and it is regulated by environmental policies on a local, regional and even national administrative scale. The same development may also influence air quality on a regional scale. Cash et al. (2006) term this '*cross scale, cross level dynamics*', indicating that an occurrence at a certain level of one – e.g. administrative – scale influences processes at multiple – higher and/or lower – levels of e.g. a spatial scale. Termeer et al. (2010) argue that these cross-scale and cross-level issues are not only dealt with by increasing the fit between scales but also by improving the links between administrative levels.

Thus, some type of coordination among the respective government tiers is necessary, shaping the way in which devolution is institutionalised. Environmental problems that are typically local in scale, such as noise and odour nuisance, could be solved by making

well-informed trade-offs at the municipal level. However, the environmental quality that would result from such a trade-off may well conflict with norms that, for reasons of efficiency or fairness, are issued by the national state and that cannot be adapted to the particularities of any local development. Clearly, delivering local tailor-made solutions is then being frustrated, because some elements of the issue to be decided about locally – in this case an urban plan – fall within the competence of higher government tiers. In short, local decision-making is being paralyzed. The other way around, leaving deliberations to only local stakeholders introduces the risk of them turning a blind eye to social and environmental issues at larger geographic or temporal scales. The outcome of local deliberations may then run counter to objectives of higher-level authorities.

Based on scientific literature about urban environmental policies (see section 6.2), this paper compares two ways in which interplay between government tiers can be institutionalised and illustrates these, using two distinct cases from the Netherlands. One approach is to devolve the authority to negotiate permissible levels of pollution upon state and non-state actors at the municipal level. The other is to have local authorities and polluters comply with centrally issued standards and facilitate them in negotiating the means needed for this compliance. This paper aims to characterise these two approaches and illustrates their advantages and drawbacks with respect to governing environmental quality in a multi-scalar context. The Dutch situation provides a good example because here, due to the country's high population density and high level of economic activity, it often occurs that sensitive areas are in the vicinity of possibly intrusive activities. To prevent stalemate in urban development, both above-mentioned approaches have been institutionalized.

This paper is further constructed as follows: first, we present and characterise the two institutional approaches. Cases are presented in section 6.3 and subsequently discussed in section 6.4. In the final section, we present our conclusions.

6.2. GOVERNING URBAN ENVIRONMENTAL QUALITY AT MULTIPLE SCALES: TWO APPROACHES

Several authors note that the classical hierarchical steering, entailing detailed, substantive standards that leave lower-level authorities little leeway for flexible implementation, is being replaced by more procedurally focussed policies that have more flexible and open-ended implications on the substantive side (Knill and Lenschow, 2000; De Roo, 2000; Driessen et al., 2012; Newig and Koontz, 2014). Following this distinction and thinking of 'policy' as the mobilization of resources or means to achieve certain goals, we distinguish a 'goals approach' and a 'means approach'. In the former, the authority to set permissible levels of pollution is devolved upon the municipal level; this competence to set quality

standards may be limited by the central state, e.g. through procedural requirements or by imposing a certain quality band width. The latter approach is based on the more traditional policy implementation scheme – where local governance is tasked with carrying out implementation of higher-level policies – but, in addition, facilitates negotiations between local authorities and polluters about the means necessary to, ultimately, comply with higher-level environmental quality standards.

In the following subsections, both approaches are briefly characterised. Driessen et al. (2012) distinguished several modes of environmental governance according to three basic types of features: policy content, institutional features and actor features. For our purpose, namely to characterise the 'goals' and the 'means' approach, policy content can be equated to the perspective on urban environmental quality. Two important institutional features are the type of policy instruments – whether detailed and hierarchical or open-ended and flexible (Knill and Lenschow, 2000) – and the government tiers and non-government actors to which decision-making powers are being attributed. Among the actor features, the interaction among actors is indicative of the procedural focus of either approach. Table 6.1 summarises these characteristics of both approaches.

Table 6.1. Characterization of the 'goals' and the 'means' approaches

		'goals approach'	'means approach'
Policy	**Perspective on urban environmental quality**	Holistic; focus on urban quality of life. Accounting for objective as well as subjective quality aspects.	Reductionist; focus on (supra) national standards. Accounting for objective, quantitative quality aspects.
Polity	**Policy instruments**	Reflexive, i.e. regulating procedures for establishing quality objectives as a last resort, ensuring compensation and participation.	Substantive, i.e. providing environmental quality standards for governments, while allowing delay for compliance and imposing conditions on companies through permits.
	Allocation of responsibility	Devolved upon local state and non-state stakeholders.	Standards issued by higher-level government are implemented by local authorities, within the allowed time frame.
Politics	**Interaction among actors**	Local government, market parties and civil society interact in open planning process, arriving at broadly supported urban environmental quality objective.	Local government negotiates with market parties about necessary measures to meet national standards and may use coercion.

6.2.1. Perspective on urban environmental quality

The literature about urban environmental quality recognises that it is multidimensional and multifaceted (Moore et al., 2006). Depending upon the disciplinary perspective taken, urban environmental quality may comprise merely the 'classical' environmental aspects – soil, water, air, noise and industrial safety – or include aspects that belong to the domain of urban design, such as the vicinity of amenities, the availability of public transport, the amount of open and green space or the 'identity' of the built environment, conveyed by e.g. architectural features and cultural heritage (Van Kamp et al., 2003). From a reductionist point of view, each of those aspects must meet a certain criterion, e.g. an environmental quality standard for water or air (Davis, 2005, 2007) or for the area of green space per dwelling (VROM, 2006). In the literature about urban quality of life, a more holistic approach is taken, in which the quality of the urban environment is explained to some varying extent by individual quality indicators (Lee, 2008; Von Wirth et al., 2014).

Some of these urban environmental quality indicators can be expressed in objective terms, often using some quantitative measure like microgram per cubic meter or decibel. Other quality indicators take into account the perception of these objective conditions; when assessing noise, for instance, it is the degree of annoyance that is relevant, rather than the objectively measured sound level. These indicators are fundamentally subjective in nature and, thus, are highly dependent upon the preferences of the people involved (Howley et al., 2009).

In the 'goals approach', the central concept is urban quality of life, which amounts to a holistic and predominantly subjective approach. The 'means approach', with its focus on individual environmental quality standards, has a more reductionist character.

6.2.2. Policy instruments

States seek to protect weak interests, such as environmental quality, biodiversity and other aspects of sustainable urban development, by law. National environmental standards, however, are meant to be valid in all situations and, therefore, do not provide enough flexibility to adapt the level of protection of the environment to the particular circumstances at the regional or local level (De Roo, 2000). Furthermore, issuing national standards may well provoke evasive behaviour on the part of those regulated. In order to amend these shortcomings, reflexive law (Teubner, 1983) proposes the establishment of legal procedures that assure adequate deliberation amongst stakeholders, rather than issuing substantive norms in advance (Dernbach, 2008; Dorf, 2003; Gaines, 2002).

The 'goals approach' relies on procedural, rather than substantive regulation. It can therefore be characterised as reflexive. In the 'means approach', the focus is on substantive regulation in the form of environmental quality standards.

6.2.3. Allocation of responsibility

Environmental policy has, at least in Europe, shifted from a centralised to a more decentralised and interactive mode of governance (Driessen et al., 2012; Knill and Lenschow, 2000). This is not to say that one mode has completely replaced the other; rather, the new mode has gained prominence, whereas the existing mode still prevails.

The 'goals approach' has several features of decentralised interactive governance, as the responsibility for establishing urban environmental quality objectives has to a large extent been devolved upon lower-level jurisdictions such as municipalities ('dominance' in Young's (2006) terms). Civil society as well as market parties involved can have their say and, theoretically, be part of a newly formed jurisdiction (Cohen and McCarthy, 2015), which Hooghe and Marks (2003) describe as Type II multi-level governance, where authority is distributed among different state and non-state actors.

The 'means approach' more resembles the decentralised state where responsibilities are distributed among a limited number of government tiers according to the principle of subsidiarity. Here, municipalities do not merely implement state policies, like in centralised states. Instead, they can formulate their own local policies in a form of co-management (Young, 2006), within restrictions posed by higher tiers of government. In the 'means approach', these restrictions come in the form of environmental standards formulated at the state (e.g. for noise) or European (e.g. for air quality) level.

6.2.4. Interaction among actors

In the 'goals approach', local government, market parties and civil society interact in an open planning process, to arrive at new urban environmental quality objectives that can count on all stakeholders' support. Such a process of interactive governance requires legitimacy (Driessen et al., 2012; Driessen et al., 2001) which, in theory, is conferred by the legally established process ensuring compensation and participation. The 'means approach' is not, by contrast, a form of 'command and control', at least not entirely. The restrictions posed in the subsidiary government structure bear 'command and control' features, yet these are softened in two ways. First, a period of delay is allowed before strict compliance with standards is called for. Second, municipalities will first negotiate with polluters to have them take emission reduction measures on a voluntary basis, before resorting to coercion. Here, too, legitimacy is important, as is trust (Lange and Gouldson, 2010).

6.3. THE 'GOALS' AND 'MEANS' APPROACH ILLUSTRATED

6.3.1. Negotiating quality versus negotiating emissions

Dutch environmental law has two separate provisions for solving conflicts between local development objectives and national environmental standards. One is the City and Environment (C&E) approach (Eerste Kamer, 2005), a decentralized reflexive approach that allows local stakeholders to set aside regulations by higher tiers of government and to renegotiate *the desired level of quality* locally. The second provision is the Crisis and Recuperation Act (CRA, Tweede Kamer, 2010), that allows local government time and leverage to (re)negotiate *emissions* originating from polluters, either already present in the area or planned.

The C&E approach was specifically developed in the early 2000s to break the stalemate ensuing from the conflict between environmental standards – predominantly those for noise – and compact inner-city urban development. The C&E approach is intended to promote efficient use of space and an optimal quality of the urban environment in highly-burdened mixed-use developments (Boeve and Van Middelkoop, 2010; Van Staalduine and Simons, 1999; Evaluatiecommissie Stad en Milieu, 2004). In cases where, demonstrably, state-issued legal environmental quality standards cannot be met, it offers local administrations the opportunity to define their own quality standards, deviating – within certain limits – from the generic legal framework. Accompanying this relaxation of standards is a procedure regulating deviation, ensuring compensation of quality loss and ensuring participation of all stakeholders. The procedure consists of three steps: first, environmental aspects must be considered from the onset of plan making. Second, in case environmental quality standards are expected to be violated, the urban design must be tailored to prevent non-compliance. Thirdly, and only after it has been demonstrated that neither the usual measures nor tailor-made creative solutions can secure compliance with national environmental quality standards, deviation from these standards is in order. If lower, local environmental quality targets are set, compensation must occur in such a way that the total 'urban quality of life' is optimised. Such an optimum quality is the result of a trade-off among the stakeholders' preferences regarding a whole range of quality aspects. Deviating from national environmental standards requires a formal decision by the municipal government. This so-called 'Step 3 decision' must be underpinned by the municipality's vision on the level of 'urban quality of life' being pursued, the way in which compensation is offered and the way in which all stakeholders have been involved in the deliberations.

The C&E 'Step 3' was intended to be a 'last resort' and, indeed, has been used only sparingly, because in many cases expected violation of standards could eventually be prevented, albeit with considerable effort and with – from an urban development perspective – unsatisfactory outcomes. The Dutch government was therefore advised to make land

use planning more flexible (PBL, 2011) and to introduce the possibility of creating more room for manoeuvre through negotiations with polluters (VROM-raad, 2009). These elements can be recognised in the Crisis and Recuperation Act (CRA), passed in 2009 to facilitate building activities and to stimulate economic recovery after the financial and real estate crisis in 2008. The CRA, *inter alia*, allows the Minister of Infrastructure and Environment to designate an existing urban area or an existing industrial estate as a development area (Verschuuren, 2010). Such a designation entails two important instruments for local government to alleviate pressure on environmental limits. The first gives local government more leverage to curtail emission rights of existing companies in the area in order to free up space for additional emissions. It ensues from the following rationale: if environmental limits, delineated by standards of environmental pollution, are about to be reached or exceeded, the only way to facilitate extra activities that contribute to this pollution is to reduce total emissions. This is not straightforward, since polluters have been allowed a certain amount of pollution by permitting their activities. The second instrument allows local government to temporarily disregard a number[18] of legal restrictions concerning *inter alia* soil, noise, odour and nature (Verschuuren, 2010). Within a period of ten years after the land use plan has become irrevocable, the situation must, however, be back in compliance with all the regulations that is being deviated from.

6.3.2. Case research

To illustrate how either approach works out in practice, we selected two cases in which municipalities either made use of Step 3 of the C&E approach or applied for a development project to be brought under the ruling of the CRA. The number of cases in which either approach was used in a situation of urban (re)development is limited. Only a handful of Step 3 decisions have been made and the CRA is relatively new, so that not many projects that were brought under its ruling show sufficient progress to serve as an illustration. Table 6.2 provides a short characteristic of each of the cases and the type of *problematique* that is addressed.

Table 6.2. Characterization of the cases used in this study

Case	Type	Problem	Instrument	Status
Vlaardingen	Mixed-use waterfront development near industrial zone	Industrial noise above maximally allowed level	C&E approach	Overturned by appeal court
Zaanstad	Residential development near industrial zone	Industrial noise above maximally allowed level Odour above municipal target level	CRA	In plan stage

18. Environmental quality standards that are an implementation of European rule are excluded.

Our case descriptions are based upon desk research into the underpinnings of the 'Step 3 decision' (in the C&E approach case) and the municipality's application to bring a project under the CRA (in the CRA case), on underlying documents (land use plan, master plan) and, in case an appeal was filed, the appeal court rulings. Desk research was complemented by interviews with municipal politicians and project leaders and representatives from regional industry. In the Vlaardingen case, also the developer was interviewed. In total, we held 8 interviews, either conducted face to face or by telephone, in a five-month period (January through May 2015). Interviewees were given a five-point Likert scale, on which they were invited to score their assessment of current environmental quality (noise, air, soil, risk) and of the overall urban environmental quality after completion of the planned development. In order to gain information about their conception of this overall quality, we asked them to comment on their assessment. Furthermore, interviewees were asked to describe the trade-offs during the planning phase. Each interview lasted between half an hour and an hour and a half and was digitally recorded. A summary was prepared in writing and sent to individual interviewees for approval.

6.3.3. Vlaardingen, the 'City and Environment' case

Vlaardingen is situated near the River Meuse. Over time, the historical centre has been cut off from the river bank by an industrial area that recently has become derelict as some plots were abandoned (see Fig. 6.1). The municipality arranged for the few remaining industries to be located on a new industrial estate elsewhere within municipal boundaries, so as to restore the connection between the river and the city centre. The area, that is bounded by the historical harbour, will be redeveloped allowing amenities and high density residential use. Users and residents are expected to have a great view of the river, while enjoying the proximity of the city centre. According to the project manager who was interviewed, this is an unmistakable quality of the area: *"Currently, some 1,000 people live in the area, but no one complains about insufficient quality. People like to live here, because the view of the river is a delight and we will use this as a compensation"*.

The area is surrounded by several industrial complexes, including the Port of Rotterdam's large petrochemical industry and therefore considerable noise and odour nuisance exist (Gemeente Vlaardingen, 2004). It is also prone to incidental flooding, which is expected to be worsened by climate change. It is, however, the last available piece of municipal territory where a new residential area can be developed within the framework of a larger plan to modernize outdated neighbourhoods consisting mainly of galleried flats. Developing the area would not only upgrade it, but also improve Vlaardingen's spatial structure, reducing the current barrier formed by the river dike and the road on top of it.

At some points, exposure to industrial noise is up to 5 dB above Dutch quality standards. During a previous regional remediation programme, emissions of industrial noise had already been cut back, so that further limitation was deemed unfeasible. Yet, as the

area was considered to be attractive, a participative process was initiated to systematically assess environmental threats and opportunities (Gemeente Vlaardingen, 2006). To minimise nuisance, highly impacted residential buildings were designed in such a way that bedrooms were at the side of the building that, at night, was least burdened. A 'Step 3 decision' was necessary (Gemeente Vlaardingen, 2003). In the developer's words: *"People move here because of the view, the dynamic atmosphere and the river, so they do not complain about smell or noise. But when they want to sleep, the bedroom must be quiet. That is not easily realized, but with the C&E-approach the problem can be solved."*

Fig. 6.1. Vlaardingen. Above: derelict industrial buildings. Beneath: existing residential buildings and surrounding industry.

The ambition of Vlaardingen – and other municipalities in the area – on the right bank of the river, to build adequate housing for their residents conflicts with the intentions of the Port of Rotterdam's industries, on the left bank, to expand. At the regional level, municipalities, the industry and the province had jointly established a framework for further local agreements, stating that no new development would lead to further restrictions on industrial noise emissions. Vlaardingen, in accordance with the framework, expressly opted for a 'Step 3 decision' in order to establish permitted noise levels that would not further restrict industrial emissions. Compensation was offered to residents through the abovementioned constructive and architectural measures; other compensatory qualities include the river view, the proximity of the train station, the city centre and other amenities.

Nevertheless, the Rotterdam area industry's organization Deltalinqs and a number of individual companies, fearing that future extension of their activities would be limited by the piecemeal encroachment on the area by apartment buildings, filed an appeal. Although the appeal court was given a favourable advise about the underpinning by its technical advisor, it overturned the 'Step 3 decision' on formal grounds.

There is also friction between national resilience policy and local trade-offs between flood risk and cost. The municipality intended to level up the area, looking ahead 50 years. The national authorities demand considering a longer time frame of 100 years. This, however, would bring extra cost – and change the area in what one interviewee termed a 'fortress'.

6.3.4. Zaanstad

The industrial city of Zaanstad is rapidly urbanising; up to 2030, many thousands of dwellings must be built. In order to not further encroach on the surrounding green and open landscape, development must take place within the existing built-up area. The mainly food-based industries along the river Zaan have large odour and noise contours that overlap large parts of the city area. The municipality, even apart from new developments, aims at reducing industrial odour and noise emissions. Supported by the Ministry for the Environment, experimental methodologies and arrangements were sought to better combine work, environment and quality of life. In discussing those experiments, however, industry proved reluctant to voluntarily give up permitted emission rates. The municipality invested a great deal of effort in keeping on speaking terms with the companies concerned, while, concertedly, increasing enforcement efforts. Designating the area as a 'development area' under the CRA allowed for a period of ten years to reach an acceptable level of urban environmental quality. The municipal authorities need this opportunity to continue negotiations with industry while in the mean time starting building activities.

In a joined effort with the industries involved, Zaanstad initiated research into the means that are necessary to meet the national standards regarding industrial noise. The result showed that compliance is feasible; therefore, a C&E approach is not in order.

Research was also aimed at finding an acceptable level of odour concentration and the necessary means to reach that level. As one interviewee put it: "*Yes, companies have to reduce emissions, but not all at once. That is why we need that extra time: to allow measures to be phased over a ten-year period.*"

To stimulate the necessary inner-city development of residential areas, the municipality strategically acquired the largest part of a small peninsula in the river Zaan, called De Hemmes (see Fig. 6.2), for which a formal land use plan must be developed. Within ten years after the plan will be in vigour, urban environmental quality in the area must comply with the national standards for industrial noise and with the municipal standards for odour, that recently have been developed as a result of the joint research. In case of non-compliance, the municipality has to initiate – and pay for – extra emission reduction measures.

Fig. 6.2. Zaanstad. Above: site and surrounding industry. Beneath: current industrial activity and surrounding industry.

In Table 6.3, the two cases are compared with regard to the characteristics discussed in section 6.5.

Table 6.3. Case study analysis

	Vlaardingen	Zaanstad
Perspective on urban environmental quality	Prevention of sprawl at the expense of enhanced flood risk and acoustic and olfactory quality, but with high level of urban quality.	Prevention of sprawl at a minimally acceptable level of acoustic and olfactory quality and with high level of urban quality.
Policy instruments	To secure deliberation, participation and compensation and to protect interests at higher spatial and temporal scale levels.	To offer more time to build trust between industry and the municipality and to seek and develop emission reduction measures.
Allocation of responsibility	Municipality decides on allowed maximum level of industrial noise.	National state decides on allowed maximum level of industrial noise, municipality is responsible for meeting that level in time. Municipality and industry decide on feasible level of odour nuisance, municipality is responsible for meeting that level in time.
Interaction among actors	Enhanced participation and deliberations with industries involved. Despite regional agreement to respect industrial noise contours, industry is distrustful. Dispute with national government about time frame for flood prevention.	Municipality invests in building trust. State allows delayed compliance with national noise standards and facilitates negotiations with industry about noise and odour.

6.4. DISCUSSION

6.4.1. Perspective on urban environmental quality

Each approach shapes the perspective on urban environmental quality and the underlying discussion about it in a different way. The C&E approach prompts an underpinning of the 'Step 3 decision'. Here, Vlaardingen explicitly refers to an area typology, based on features such as density, distance to a train station, amount and functionality of open space, percentage of homes having direct river view and the number of extra – i.e. on top of legal obligations – measures taken to reduce nuisance. In all municipal utterances about this typology, it is clearly stated that 'noise and odour belong to the area.' This emphasis on noise and odour follows from the first two steps of the C&E procedure, in which attention is per definition focussed on the quality aspect that does not comply with national standards. Furthermore, compensation is expected to be offered first with respect to that same quality aspect and only secondarily with respect to other quality aspects. Dutch noise standards are based on ample scientific research on nuisance and

sleep disturbance (VROM, 1987). In practice, especially the latter proves to be thoroughly considered, in that bedrooms are well shielded against nightly noise. Long-term effects of noise are still not well understood and, though results are not consistent, recent reviews associate noise with negative health impacts (Maschke, 2011; World Health Organization, 2011; Bluhm and Eriksson, 2011; Kempen, 2011; Pirrera et al., 2010; Seidman and Standring, 2010). Although noise levels in the cases examined were only slightly in excess of national standards – in the order of 3 to 5 dB – and were compensated for, we found neither the actual effects of exposure on residents nor the compensation of this loss of quality to rest on any scientific assessment of overall quality in the area (see also Glasbergen, 2005).

In the Zaanstad case, also those environmental impacts are in focus that exceed national standards. Because of the 'means approach' however, discussion is not about the environmental quality per se, but on feasible measures to obtain a quality that meets national standards and on a realistic timescale for implementation of these measures. The case shows that through the 'means approach', economic interests can be accommodated by allowing time to build trust between actors and jointly research the emission reductions necessary to comply with national regulations for industrial noise. This also applies to the abatement of odour nuisance, albeit that odour from industry is not subject to national standards, but is left to the municipality's discretion anyway, amounting to a 'goals approach' even without taking recourse to C&E.

According to the EU's Thematic Strategy on Urban Development (European Communities, 2007) sustainable urban development minimally requires compliance with environmental quality standards (Boeve and Van Middelkoop, 2010). At first sight, allowing local authorities to set aside national environmental standards taking the C&E approach, thus, is not sustainable at all. However, this particular piece of legislation was expressly intended, firstly, to promote economic use of space, reducing urban sprawl, which is generally acknowledged to contribute to sustainable urban development (Næss, 2001) and, secondly, to take an integral approach to urban environmental quality. Implicitly, thus, there is a trade-off between 'compactness', i.e. economic use of space, and urban environmental quality (see also Hofstad, 2012).

The Vlaardingen case demonstrates that the 'goals approach' enhances the municipality's room for manoeuvre by allowing this trade-off to be made merely at the municipal level, yet harming the interests of other parties. These interests can be large, as can be concluded from the fact that industry filed an appeal against the Step 3 decision that formally accepted high levels of noise and smell, because they felt that planning residential buildings in the area was against the agreement framework to respect the industrial noise contours. The appeal court based its ruling on formal grounds, rather than considering the municipality's perspective on urban environmental quality. Unfortunately, therefore, it is unknown whether this particular trade-off between economic use of space and urban environmental quality would stand up in court.

The case supports the view that, as a result of decentralisation and deregulation, in spatial planning "*inadequate weight is given to pollution prevention*" (Miller and Wood, 2007, p 597). Also Hofstad (2012, p. 1) argues that while "*on a discursive level, social, environmental and economic goals are represented in compact city strategies[, i]nstitutionalised practices (…) show that economic goals remain at the core of planning*".

6.4.2. Policy instruments

The Vlaardingen case illustrates the reflexivity (Gaines, 2002) of the legal instrument allowing adaptation of national standards in favour of a more integrated perspective on urban environmental quality. However, such an adaptation is not necessarily in the interest of industry. Rather surprisingly, we found that surrounding industries, in fear of future conflicts with the new residents' interests, argue against the relaxation of standards, intended to facilitate expansion of residential areas in their proximity. This illustrates that legal instruments also play the traditional role to protect citizens against undue use of authority by the government. The Vlaardingen case makes clear that state-issued standards serve to protect not only environmental interests, but also economic interests – i.c. of the regional industry – at higher geographic levels and interests at higher temporal levels – i.c. flood risk in the area.

In Zaandam, the CRA allows time to reach, through deliberation with industry, compliance with national standards for industrial noise. Before establishing the land use plan, though, the municipality must demonstrate that the intended level of quality can indeed be reached in time. Although the CRA also provides coercive means to have companies reduce their emissions, Zaanstad does not wish to take recourse to those means.

6.4.3. Allocation of responsibilities

If devolution is to be carried out according to the subsidiarity principle, stating that decisions are taken at the lowest administrative level consistent with effective action, then clearly the Vlaardingen case is an example of unsuccessful devolution: the local level proves not to be effective vis-à-vis regional interests. Devolution and participation only in part solve the problem of scale mismatches, precisely because urban environmental quality dimensions of a local development are manifest at multiple spatial levels. This is in line with other research that found no significant correlations between governance effectiveness and decision-making scale, nor between policy delivery and institutional fit to ecosystem scale (Newig and Fritsch, 2009). In Sweden, the results of the so-called 'Constructive Dialogue', aimed at collaborative and integrated governance for urban sustainability, were 'disappointing' (Smedby and Neij, 2013) in terms of environmental quality reached.

The 'means approach' leaves responsibility for issuing quality goals with the national level and places responsibility for complying with those regulations with the polluters.

Municipalities, when taking the opportunity to delay compliance in search of feasible emission reductions, are responsible for reaching compliance in time.

6.4.4. Interaction among actors

Both examples show that, in either approach, trust is important. In Vlaardingen, extensive deliberations with industry could ultimately not prevent all parties from filing appeal. Zaanstad invested a great deal of effort in organising deliberations and regular contacts with the industries and in alignment of the municipality's environmental and development strategies.

In Vlaardingen, the harbour industry's lobby organization, playing the public health card, expects provincial government to draw clear borders between zones of industrial activity and areas with sensitive types of land use in the greater Rotterdam area. This illustrates the observation by Bolin et al. (2008) that actors are inclined to take an issue to higher administrative levels if their objections are not accommodated.

In the C&E case, deliberation was about noise and odour, precisely those aspects of environmental quality that have a strongly subjective element. Therefore, a participative approach is particularly in order, which was carried out following the elaborate procedural regulations prescribed. This is quite according to the principles of reflexive law. Yet, concerns of abuse of such a reflexive approach cannot be totally dismissed by our results: the municipality is known to have invested a great deal of money in acquiring land in the area; one way or another revenues must come from these investments. Communications about the new residential area (in area visions and plans) stress that noise standards are exceeded to merely a small extent and a 'quality discourse' (Hofstad, 2012) highlights the unique features of the place: view, the character of the area, amenities, proximity of public transport and the city centre, and the like.

Meadowcroft (2007) argues that participation of actors who have no democratic constituency – like, in our cases, industry – introduce the question of legitimacy and that, therefore, there is always a role for the state. Aspects of that role could be clear guidelines for municipalities with regards to goals and means, hierarchical regulation of polluters and better alignment of policies among government sectors (Hanssen et al., 2013). The Zaanstad example, where the national government not only issued standards, but also facilitated experiments, is a case in point.

6.5. CONCLUSION

Devolution aims to bring decision-making about urban environmental quality to the most appropriate administrative level to avoid scale mismatch (Cohen and McCarthy, 2015). Coordination problems occur when the effects of an environmental impact are

manifest at a different spatial scale level than its cause (Termeer et al., 2010; Cash et al., 2006; Cohen and McCarthy, 2015). All the more so when an activity has multiple environmental impacts that are manifest at different spatial scale levels. The need for coordination shapes the way devolution is organised. The scientific literature on this subject, however, does not go into detail about the ways in which this can be done.

Based on scientific literature, this paper demonstrates that two distinct approaches can be taken: either devolve responsibility for *setting* urban environmental quality goals in an open planning process or provide municipalities with the leverage to negotiate necessary emission reductions to *comply with* quality goals that come in the form of state-issued environmental standards. The paper uses two case studies to illustrate both approaches and shows that each has advantages as well as drawbacks.

Allowing local governments to set urban environmental quality goals causes greater flexibility, but may frustrate objectives of state and non-state actors at higher spatial levels, because other goals at the local level are prioritised. Furthermore, trade-offs are likely to be made at the expense of urban environmental quality (Miller and Wood, 2007). In a comparable way, devolution has been found to cause implementation problems elsewhere (McGloughlin and Sweeney, 2011; Flynn, 2000), in part because such a flexible approach goes with the neoliberal tide (Lord and Tewdwr-Jones, 2014).

Giving municipalities more leverage to negotiate with polluters as well as more leeway in terms of time to comply with centrally issued standards guarantees the – eventual – compliance with these standards. This does not have the disadvantages of the former approach or only for a limited period of time. In practice, it appears to involve a large effort in building trust with those regulated. However, it is argued that such a legal system is insufficiently flexible to pursue resilience and sustainable development (e.g. Garmestani and Benson, 2013).

Table 6.4 lists the benefits and disadvantages of both approaches. Can we conclude from that whether one approach is better than the other? Or can both approaches be combined into a third one that offers the 'means' approach's achievement of environmental quality objectives as well as the desired degree of flexibility that characterises the 'goals approach'?

Because this paper merely explores the two approaches, illustrating them with only two practical applications, the empirical basis for answering this question is not solid enough to provide 'hard' evidence, but suggests that follow-up research might be fruitful. More research is needed into how either approach works out in practice; this calls for a, possibly international, comparative case study. But even then, the answer is likely to depend upon one's perspective: from an environmental quality viewpoint, the main criterion for judging both approaches is the level of urban environmental quality that ensues.

The 'means approach', then, is clearly preferable. Urban planners and local administrators, on the other hand, must make trade-offs among a variety of interests, only one

Table 6.4. Benefits and disadvantages of the 'goals' and the 'means' approaches

	'goals approach'	'means approach'
Perspective on urban environmental quality	Benefit: local government can make its own trade-offs. Disadvantages: trade-offs of incommensurate variables is difficult; other goals may be pursued at the expense of environmental quality.	Benefit: national environmental quality standards are eventually met. Disadvantage: local priorities cannot be reflected in local trade-offs involving urban environmental quality.
Policy instruments	Benefit: adds flexibility to the classical instrument of environmental quality standards. Disadvantage: introduces uncertainty about environmental quality for third parties and at higher spatial scale levels.	Benefit: adds flexibility to the implementation, while maintaining substantive environmental quality goals. Disadvantage: possibility of coercion may cause distrust among those regulated.
Allocation of responsibility	Benefit: decision-making is brought down to the municipal level, facilitating participation, implementation and use of local knowledge. Disadvantage: outcome may have impact on higher spatial scale levels (where other tiers of government have authority).	Benefit: environmental quality at all spatial scale levels remains controlled by national government. Disadvantage: local government is merely implementing nationally issued policies.
Interaction among actors	Benefit: local actors have a say in creating a shared perspective on urban environmental quality. Disadvantages: deliberations are no guaranty for consent of all parties; inclusion of non-elected parties may undermine legitimacy of decisions; process may interfere with higher authorities' policies.	Benefits: those regulated can carefully plan measures for emission reduction; relies on persuasion of those regulated, but backed up by the possibility of using the big stick. Disadvantage: much effort must be spent on building trust between regulator and regulated.

of which is urban environmental quality; they require flexibility to do so. If one of both approaches is to be chosen, then in any particular practical case it must be decided which is valued most, flexibility or a certain outcome in terms of quality.

Theoretically, a useful combination of elements from both approaches could be to create leeway in setting urban environmental quality objectives by establishing a generally desirable level of quality somewhat *above* the national standards. In this way, deliberations about quality at the municipal level can take place, involving trade-offs that best suit local conditions, while moving away from the dichotomy caused by having a single – centrally set – environmental quality standard. Rather, the resulting level of quality falls within a certain band width, the lower level of which is equal to the (supra)national or provincial standard for a particular dimension of urban environmental quality. The upper level is an ambition, i.e. a value that is ideally reached in a certain type of area, to be characterised by the occurrence, intensity and spatial vicinity of intrusive and sensitive functions. In this

way, room for manoeuvre is created in local negotiations about the actual desired level of quality in a particular case and about the means necessary to obtain it. The outcome could be a level of quality that is lower than the desirable level, but still higher than the national standard, which then functions as an absolute minimum value. The quality margin could be greater in areas with many sensitive functions and smaller in places where few such functions are present. This 'third approach' combines the benefits of the 'goals approach' – increased flexibility, involvement of local actors and use of local knowledge in decision-making, integrated perspective on urban environmental quality, and facilitated implementation – with those of the 'means approach' – a guaranteed minimum level of environmental quality and flexibility in implementation. The pitfall of this theoretical approach might be that in practice this 'band-with' does not exist and all actors use the minimum value as a standard. More empirical research then has to show to what extent this pitfall will become reality and – more importantly – under what conditions.

The approaches presented here can be of interest to urban and environmental planners who choose to redevelop environmentally highly burdened sites into high-density, mixed-use areas and find their plans thwarted by state-issued environmental standards.

Acknowledgements

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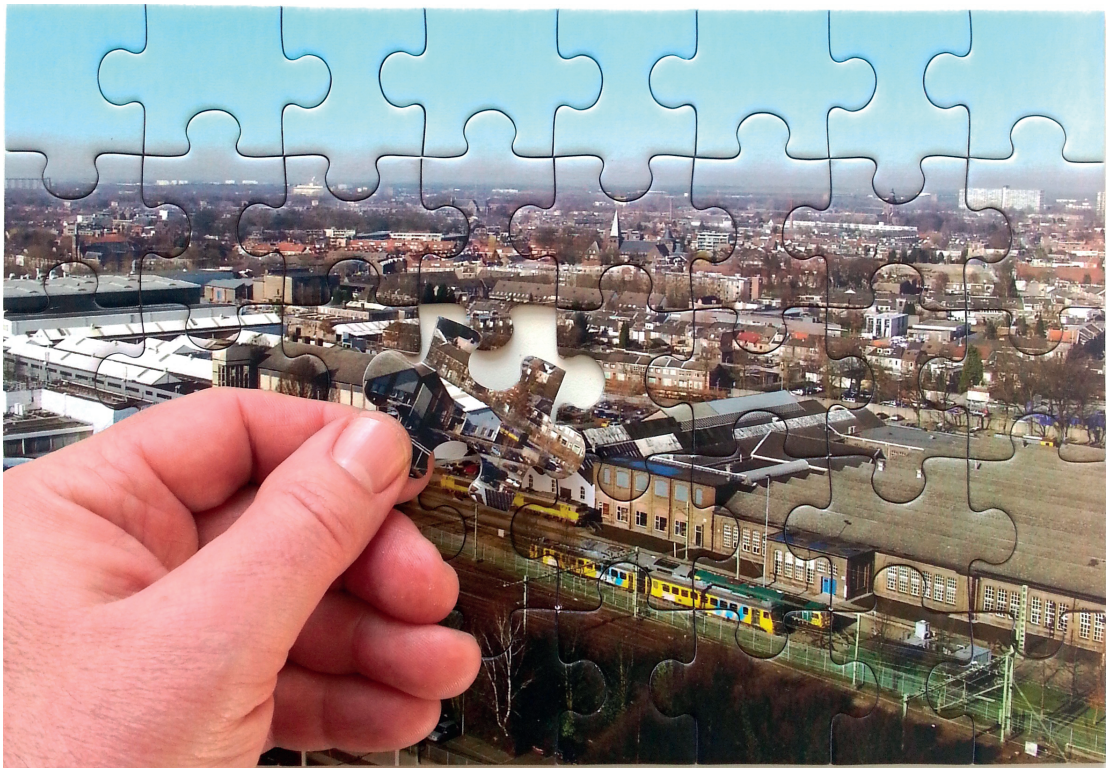
CHAPTER 7

Conclusions



7.1. INTRODUCTION

In the previous chapters, we studied the challenge of sustainable urban development through the theoretical lens of environmental policy integration, or EPI. We defined sustainable urban development as the pursuit of urban space of high quality, without compromising the conditions for this process to continue (Fischer and Amekudzi, 2011; WCED, 1987), a process entailing integral consideration of economic, social and ecological interests. Applying the EPI lens, we focussed on the extent to which *environmental* interests are being integrated into the decision-making about urban plans. In particular, we were interested in planning of compact inner-city redevelopment, a type of situation where space is limited and competing claims are manifold. These competing claims result from interests and activities of a large variety of actors within and around the area concerned, operating in multiple and only partly overlapping decision-making arenas. It was our central premise that, in such a multi-actor setting, economic and social interests are likely to prevail over environmental interests, resulting in a lower level of environmental quality than could be expected (Miller and Wood, 2007). In Chapter 1, we referred to several studies that revealed the existence of different types of barriers that, indeed, hinder or even prevent integration of environmental interests in urban plans. Notwithstanding many projects that were, in several ways, successful, over the course of our research – and before – we watched local governments and their urban planners struggle to attain a level of urban environmental quality that is optimal for all concerned in all of its many facets. What makes the achievement of sustainable urban development in complex situations such 'a hell of a job'?

The central question in this dissertation is, therefore: what factors can explain the rather mixed results of integration of urban environmental quality into decision-making in inner-city redevelopment planning and what strategies for further improvement can be derived from the results of this investigation?

The literatures about EPI and environmental assessment – which is a prominent instrument for achieving EPI – have identified several factors that are conducive to or may inhibit successful EPI (Runhaar et al., 2014). An important factor is the political weight that is given to environmental interests in comparison to other sectoral interests (e.g. Watson et al., 2008; Richardson, 2005). Related indicators are political leadership and commitment (Stead and Meijers, 2009). Institutional and organizational factors are also often mentioned to influence EPI (e.g. Stead and Meijers, 2009; Bulkeley and Betsill, 2005; Weber and Driessen, 2010). Furthermore, Stead and Meijers (2009) mention economic and interpersonal factors.

The theoretical lens of EPI permits a systematic inquiry into the way in which these factors influence sustainable urban development. It provides three different analytical perspectives that can be taken to analyse the integration of environmental interests in

the planning of urban redevelopment on which this research focuses. First, the *substantive* perspective focuses on the actual concept of what is being integrated. Second, the *process* perspective deals with the ways in which environmental quality considerations are treated in the decision-making processes concerned. And third, the *institutional* perspective directs our view towards the multiple administrative levels involved in governing a multi-scalar phenomenon such as urban environmental quality.

These perspectives, adopted one of them at a time, allowed us to identify *five factors* that explain the extent of integration of urban environmental quality considerations into planning decisions about compact inner-city redevelopment. The first factor is the conception of urban environmental quality in terms of 'what', 'for whom' and 'at what time'. The second is the bounded-rational character of decision-making. The third is the way in which expert knowledge about environmental impacts is used within the urban planning process. A fourth factor is restriction of local authorities by policies of higher government tiers. The fifth factor is the way in which devolution upon lower government tiers is shaped in order to allow them sufficient room for manoeuvre, while still maintaining environmental quality standards. In the preceding chapters, these five explanatory factors have been further elaborated.

We do not pretend that these five factors are the alpha and the omega of explaining the success of EPI in urban planning. For simplicity, we aggregated multiple viewpoints, resulting in the three overall perspectives presented here. Matters of power, for instance (Richardson, 2005), are not considered as a distinct perspective, but aggregated with other aspects of bounded rationality in decision-making into the process perspective we took. In the institutional perspective, we concentrated on vertical relations of multi-level governance, rather than on the 'horizontal' relations between government and non-government actors, that in our elaboration of the three perspectives belong to the process perspective.

In this concluding chapter, a more holistic perspective is taken to reflect on our findings in the light of both literature and practice. By combining perspectives, we attempt to see the complicated picture of sustainable urban planning in a more comprehensive way, yielding better understanding of the factors that determine its success in terms of integration of environmental quality. Admittedly, this focus on sustainability is different from the traditional view that urban planning is successful if it optimally integrates all relevant interests.

First, in section 7.2, we look back on our findings to further characterise the challenge of sustainable urban development. The resulting picture is rather more complicated than the one from which we started in Chapter 1. The intricate relations between urban environmental quality aspects and across spatial and administrative scale levels require an integrated perspective. Therefore, section 7.3 presents a reflection of our findings against the scientific literature, combining the three perspectives we took in our analyses.

In section 7.4, then, we consider what these theoretical insights mean for professional practice. The latter reflection is then used to depict, in Box II, a different and somewhat more optimistic scenario for the 'Quality Street' case presented in Chapter 1: 'Quality Street revisited'.

7.2. THE 'QUALITATIVE MULTIPLICITY' OF SUSTAINABLE URBAN DEVELOPMENT

In Chapter 1, we built on Campbell (1996) to characterise sustainable urban development as a process of balancing economic, social and environmental interests. At the time, we did not further develop the notion that this is, essentially, a political matter. Campbell argues that finding such a balance is about solving three types of conflict, which he schematizes along the sides of a triangle formed by the economic, social and environmental interests (see Fig. 7.1): the '*property conflict*' between equity and economic growth; the '*resource conflict*' between environmental protection and economic growth; and the '*development conflict*' between equity and environmental protection, solving which amounts to solving both the property and resource conflicts at the same time.

For Campbell, the planner's role in this process is to "*manage and resolve conflict and to promote creative technical, architectural, and institutional solutions*" (Campbell, 1996, p. 305), aided by political and economical mechanisms. In Campbell's view, the planner must act as a translator, "*assisting each group to understand the priorities and reasoning of the others*" (ibid). The result (if any; according to Campbell, interests may clash entirely) is either a compromise or a 'win-win' solution.

The political character of achieving urban sustainable development is highlighted by Van Asselt et al. (2015), who argue that, in EPI, some "*goal conflicts involving economic and social objectives (...) involve fundamental value tradeoffs and/or a significant redistribution of resources*" (p. 390). Storbjörk (2009) distinguishes a consensus (or 'win-win') as well as a conflict (or trade-off) perspective on EPI in regional development. Political will is reported by several authors to be an important prerequisite for sustainable (urban) development (Yin et al., 2015; Van Asselt et al., 2015). In principle, the result of such a process can be envisaged by any point within the 'planning triangle' (Fig. 7.1), meeting economic, social and environmental interests, each to a different extent.

In the literature, several observations have been made to Campbell's view. Mössner (2015, p. 1) argues that "*consensus-building appears as a political strategy whose aim is to depoliticize sustainable urban development and to relocate political decisions made in this context outside societal debate*". Because of a moral consensus that urban development must be sustainable, the actual conflict-solving occurs within the manifold decision-making arenas, largely out of sight of public debate. This consensus-building approach

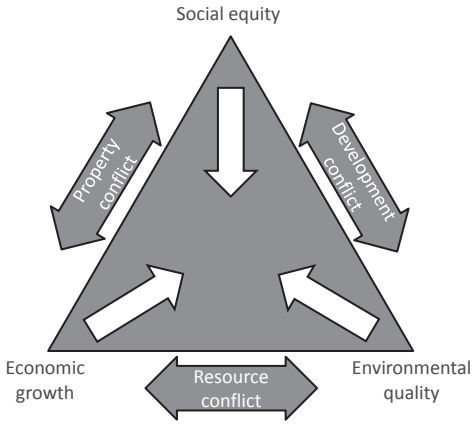


Fig. 7.1. Conflicts in achieving sustainable development (after Campbell, 1996).

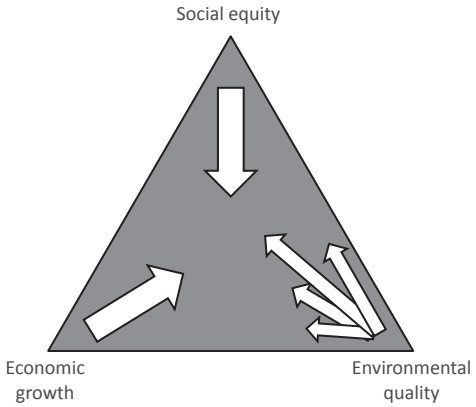


Fig. 7.2. There is not one, but many different environmental interests to be considered, that each can have a different weight or degree of priority.

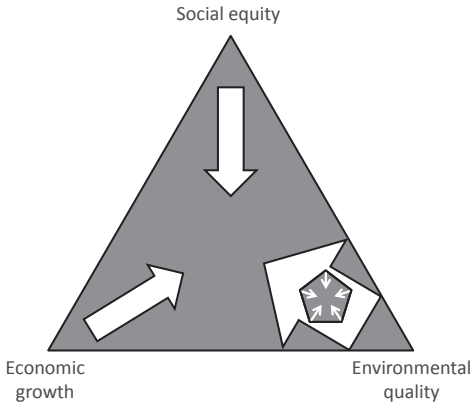


Fig. 7.3. Integration of aspects of urban environmental quality as well as of economic, social and environmental interests.

is reflected by many contributions in the literature. Fahy and Ó Cinnéide (2006), for instance, refer to sustainable urban development as a participatory process in which citizens discuss important determinants of urban environmental quality – and, broader, quality of life. Oldenhuizing et al. (2013) argue that such a process serves as a tool to promote learning for sustainable urban development. But even if balancing interests is depoliticised, the result may still be any point within the 'planning triangle'.

By contrast, the so-called normative approach (Lafferty and Hovden, 2003) of EPI states that principled priority should be given to environmental interests over that of other sectoral policies. As we have seen in Chapter 1, this normative stance differs from the analytical approach of EPI that can be used to study sustainable (urban) development. This 'strong' conception of EPI originates from a strict interpretation of the Brundtland (1987) definition of sustainable development. The EPI literature acknowledges also more 'weak' conceptions of EPI, aiming at coordination and harmonization of environmental policy and sectoral policies (Runhaar et al., 2009). From this perspective, the result of an integral trade-off among economic, social and environmental interests cannot fall anywhere within the 'planning triangle', since part of the area would amount to insufficient priority for the environment.

For analytical reasons, Chapter 1 conceptualised EPI as the integration of a *unified* environmental interest into other – economic and social – policies. In the course of our investigations we found that, when applied to planning practice and the pursuit of urban environmental quality, the diagram of Fig 7.1 is too much simplified. In fact urban environmental quality, pictured here as a single environmental interest, appears to consist of multiple quality dimensions. This also applies to economic and social interests, but for simplicity, we will not make that distinction here. Now, if urban environmental quality is multidimensional, then EPI, too, is fragmented. There is fragmentation in terms of policies. Noise policy, for example, may relate differently to industrial policy than does odour policy. There is fragmentation in terms of spatial scale and administrative levels, as aspects of urban environmental quality are manifest at distinct spatial scale levels and are being governed at the appropriate administrative level. And there is fragmentation in terms of actors, because the actors involved – those who cause pollution, those who are affected by it and those who steer it – are often different for each aspect of urban environmental quality. We shall term this the '*qualitative multiplicity*' of sustainable urban development.

As a result of this qualitative multiplicity, the degree of 'principled priority' given to various aspects also differs. This is depicted in Fig. 7.2, in which the environmental quality interests are represented by several arrows rather than one, and protrude into the 'planning triangle' to varying degrees.

Perhaps the most prominent example is the compact city, where sustainable use of space and energy-efficient modes of transport conflict with traffic noise nuisance and

health complaints from air pollution. In addition, the preceding chapters bore witness to a variety of similar conflicts: between railway noise nuisance and industrial safety, between odour nuisance and a magnificent view of the river, or between a variety of city amenities and an elevated level of noise and societal risk.

In addition, then, to integrating urban environmental quality into other sectoral policies, there appears to be a need for integrating the elements that constitute it. Much like in a Russian matryoshka doll, inside the 'planning triangle' there is another triangle, or rather polygon, representing the balancing process of the individual urban environmental quality factors. This can be seen in Fig. 7.3, where five different aspects of urban environmental quality are balanced and at the same time are weighed against economic and social interests.

These individual factors are related to different kinds of needs of the people involved, i.e. the residents and users of the space concerned. Therefore, they have subjective as well as objective determinants, which can only in part be expressed in numerical values of e.g. pollutant concentrations. Furthermore, peoples' needs and preferences change across time.

Thus, taking the substantive perspective, we have shown that sustainable urban planning is not only a matter of whether – or of the degree in which – environmental quality is being considered in the planning process, but also of precisely which urban environmental quality factors, to what extent, by whom and from what temporal perspective. In addition, these considerations should account for aspects of urban environmental quality at different spatial scale levels. In the following section, reflecting upon this qualitative multiplicity from the institutional and process perspectives, we will discuss how, theoretically, planners can deal with this.

7.3. THEORETICAL REFLECTIONS

7.3.1. Intertwining of explanatory factors

The multi-dimensional character of urban environmental quality causes the other explanatory factors to intertwine. This complex of factors, then, can only be analysed taking a holistic perspective, i.e. a combination of the three perspectives that led us to identify the individual explanatory factors. In this subsection, we elaborate on this.

Urban environmental quality involves processes at different spatial scale levels. A single activity, like in our case a planned compact inner-city redevelopment, typically influences – and is itself influenced by – bio-geochemical and social processes at multiple spatial scales (Cumming et al., 2006). The need to steer those processes invokes policy responses at multiple administrative levels (Cash et al., 2006; Cumming, 2013; Termeer et al., 2010). These, in turn, affect local room for manoeuvre for making site-specific

trade-offs between interests. For EPI to be successful, these multiple interests at various scale levels should be taken into account in decision-making. The question then arises how these interests can be included in the decision-making process. Likewise, when considering all relevant processes at various spatial and temporal scales, EPI is influenced by the extent to which decision-makers meet the challenge of processing and using an ever growing amount of expert knowledge. Thus, the five explanatory factors we identified so far are intricately intertwined. We will examine these interrelationships more closely.

We found existing EPI research to either consider 'environmental policy' in a general way (e.g. Jordan and Lenschow, 2010; Yin et al., 2015), or focus on a single environmental issue, such as climate change (e.g. Bulkeley and Betsill, 2005; Bulkeley, 2010; Betsill and Bulkeley, 2006), energy (e.g. Söderberg, 2011; Nilsson and Persson, 2003), waste (e.g. Nilsson et al., 2009; Watson et al., 2008), noise (Weber and Driessen, 2010), or water management (Alahuhta et al., 2010). These individual issues typically involve processes at a distinct spatial scale level (Cumming et al., 2006), ranging from global, in the case of climate change, to local, in that of noise. Water management involves the scale of a river basin, whereas waste management is often a regional issue. All of these processes somehow influence or are influenced by urban (re)development. In the preceding chapters, we have come across several examples: regional industry policy or national public transport policies may cause noise nuisance at the local level. National climate adaptation policy imposes flood safety requirements to newly built urban areas. International agreements on the reduction of fossil fuel use are transposed into national regulations for the energy performance of buildings. At the same time, planning an urban area puts restrictions on the scale of intrusive activities around it. Conversely, a newly built urban area itself has environmental impacts caused by its industrial activity, traffic, use of energy and materials, et cetera.

Successful EPI would have to account for all of these processes and policies. This, however, is beyond the scope of local decision-makers. In fact, governing these processes should – and usually does – take place at the corresponding administrative level (Cash et al., 2006). Therefore, coordination of policies and ensuing activities is necessary (Termeer et al., 2010). In decentralised states, coordination is guided by the subsidiarity principle according to which higher tiers of government do not take on responsibilities that, according to the spatial scale level involved, can also be executed by lower administrative levels. As we have argued in Chapter 5, these restrictions limit municipalities' room for manoeuvre in setting locally balanced targets for urban environmental quality. Admittedly, one of the conclusions of this chapter was that these restrictions do not necessarily preclude the planned development. This, however, can be attributed in part to the fact that, in the Netherlands, these restrictions have been relaxed over time. Yet, in environmentally highly burdened areas the allocation of competences among levels of government that was outlined here, may paralyse local decision-making. As an alternative, then,

the authority to set urban environmental quality objectives could be completely devolved upon the municipal level, optimally making use of the subsidiarity principle. Referring specifically to urban planning, Weber and Driessen (2010) argue that procedural and organisational change involving devolution of norm setting to the local level, in combination with an area-specific perspective and stakeholder participation, was conducive to integration of noise policy into urban planning in the Netherlands. Comparable findings were reported by Simeonova and Van der Valk (2010), also in the Dutch context, but looking at urban environmental quality from a wider perspective than just noise.

Incorporation of such 'new' (i.e. to the municipality's remit) objectives, however, is value-laden (e.g. Holden, 2012; Richardson, 2005). As a consequence, local sectoral interests can easily be prioritised over weaker interests, such as environmental quality (Runhaar et al., 2014), or interests that are beyond the scope of local decision-makers, such as climate change. In sum, three explanations of successful – or unsuccessful – EPI are closely interrelated: the dimensions involved in our conception of urban environmental quality, the extent to which the connected multi-scalar processes require governance at higher administrative levels, and the extent to which higher-level governance puts restrictions to local decision-making. These are the three variables that were identified taking the substantive and the institutional perspective.

There is also a relationship with the two variables we encountered when adopting the process perspective. First, recognising that local urban environmental quality involves steering multi-scalar processes, entails inclusion of – government and non-government – actors involved in governing these processes. Obviously, this enhances the complexity of the decision-making network, adding new actors or even new decision-making arenas. On the other hand, new opportunities to connect or reframe issues may appear, thus opening decision windows that were not present before. The success of EPI then depends on the planners' ability to create these decision windows. Second, taking all of these processes into account in decision-making involves expert knowledge about their effects on environmental quality, about possible measures to address these effects and about the policy instruments to implement these measures. As was suggested in Chapter 4, municipal politicians decide about urban plans more or less intuitively, balancing all interests in order to have optimal political and public support for the ensuing plan, rather than looking for the best possible environmental quality. It is likely that urban environmental quality aspects outside the local scope bear less weight in decision-making, unless administrative approval from higher government tiers is obligatory.

From the finding that the explanatory variables are closely intertwined, we conclude that combining the three perspectives adopted in this research leads to better understanding of the complexity of EPI in urban planning. The main driver of this complexity, in our analysis, is the multi-dimensionality of urban environmental quality. Particularly if the 'problematic' dimensions – i.e. those quality aspects that are close to or exceeding

standards – involve processes at spatial scale levels higher than the local. In the next section, we will see what this means for planning practice.

7.3.2. Flexibility, 'strong' EPI and 'weak' EPI

Sustainable urban development and (environmental) policy integration in a stricter sense are often associated with making trade-offs (e.g. Runhaar et al., 2009; Nilsson et al., 2009). Making such trade-offs requires some degree of flexibility (Runhaar et al., 2009), or room to manoeuvre within the 'planning triangle' of Fig 7.3. In a 'strong' normative conception of EPI, that is associated with 'hard' rather than 'soft' environmental regulations, a *legally guaranteed level of environmental quality* is set by the central state, in the form of environmental quality standards. These standards, theoretically, restrict flexibility at lower administrative tiers. Unsurprisingly, municipalities and professionals have argued for enhancement of planning flexibility, allowing local authorities to set locally balanced objectives (e.g. De Zeeuw et al., 2009; VNG, 2015). The authority to establish environmental policy goals is then, to some extent, devolved from the central state upon the municipal level (cf. De Roo, 2000). This approach to sustainable urban planning, characterised by its aim for flexibility by having lower government tiers set their own objectives amounts to a 'weaker' form of EPI that relies on convincing, balancing interests and self-regulation (Driessen et al., 2012). As flexibility enables an outcome that can be situated anywhere within the 'planning triangle', it results in urban development that is less sustainable rather than more. The Dutch Council for the Environment (VROM-raad, 2009), therefore, argued for firmness in upholding environmental standards, while freeing up room for manoeuvre by addressing the sources of pollution.

We suggest two ways in which, theoretically, the flexible approach, or 'weak' EPI, may be reconciled with the more 'strong' form of EPI associated with strict environmental standards. One is to create awareness about environmental issues that are less manifest at the local level and to have these interests firmly represented in the decision-making process. The other is to find flexibility in time, in line with the suggestions by the Dutch Council for the Environment, through temporarily allowing a certain degree of non-compliance with environmental quality standards.

Previously, we discussed two reasons why flexibility at the local level leads to questionable levels of urban environmental quality: one is that local decision-makers are insensitive to interests –environmental as well as economic or social – that play out at higher levels (e.g. Bulkeley and Betsill, 2005). The second is that, without the protection of uniform urban environmental quality standards, environmental interests prove to be too weak to compete with economic and social interests in the decision-making process

(Runhaar et al., 2014)[19]. In the case of noise, for instance, Weber and Driessen (2010) demonstrate that flexibility in urban planning is prioritized over environmental quality. Thus, when devolving authority to decide about the level of urban environmental quality to municipalities, it is important to have higher-level interests represented in the decision-making arena. Furthermore, central government could raise awareness among local decision-makers about the importance of urban environmental quality at all spatial scale levels.

In complex cases where urban environmental quality is – or is likely to become – insufficient compared to standards, a rational choice could be to temporarily permit – and monitor – the situation, thus buying time to deal with it conclusively. Either by allowing autonomous developments such as reorganisation of an industry branch, or by enforcing the implementation of cleaner production methods through permitting. A drawback, here, is that, whatever arrangements are made, they can easily be overtaken by events, such as local political change or unforeseen financial implications.

Summarising, the EPI-based, holistic perspective, taken over the course of this research, adds three important insights to the existing literature. First, it reveals the qualitative multiplicity of sustainable urban development in terms of urban environmental quality aspects and related spatial and administrative scale levels. Second, building on diverse bodies of literature, it identifies five factors that explain why EPI in urban planning is sometimes problematic. These five factors behave in concert, making it impossible to address one of them without also influencing at least some of the other factors. And third, adopting the normative approach of EPI, it nuances the call for flexibility in dealing with environmental quality standards. In the next section we will discuss what this means for planning practice, which is typically confronted with this integrated perspective.

7.4. PRACTICAL CONSIDERATIONS

Whether or not to devolve authority to set urban environmental quality objectives is a matter of political choice. In complex cases of compact inner-city redevelopment, rigid environmental quality standards are sometimes found to be all too restrictive for urban planning. Devolution can then be a useful approach if the quality aspects that 'matter' – in the sense that they are close to or over some legal limit – involve mainly local processes. If, however, local urban development involves higher-level spatial scales, devolution expectedly leads to insufficient attention to those quality aspects or to coordination problems between the local administrative level and the appropriate higher ones. What is needed

19. This is because disadvantages are experienced by multiple societal groups, dispersed in space and time – see the discussion about fragmentation in section 7.2.

to be able to take advantage of such an approach locally, without risking loss of urban environmental quality from a wider point of view? We suggest that three conditions must be met: adequate governance capacity, planning support and the presence of a knowledge infrastructure.

7.4.1. Governance capacity

The flexible approach to sustainable urban development allows municipalities to deviate from centrally issued environmental quality standards, striking a local balance among multiple quality aspects. This amounts to an institutional change. In our theoretical reflections, we found that the explanatory factors that were identified taking each of the three perspectives are interrelated. Change in a factor taking one perspective is related to concomitant changes in the factors seen when taking one of the other perspectives. Successful integration of urban environmental quality requires a *modus operandi* that is congruent when adopting all three perspectives.

Adopting the process perspective, *networking capacity* appears to be paramount. An obvious issue is how the decision-making process will be designed and what actors – at what relevant levels – will be included in each stage of the planning process. This requires a careful design of the network of decision-making arenas. Process design can be done in such a way that it allows for participation of and interaction among stakeholders. This, in turn, is important for the creation of 'decision windows' (Nilsson and Dalkmann, 2009), by facilitating stakeholders to jointly reframe the issues related to urban environmental quality (Teisman, 2000; Van Bueren et al., 2003). Furthermore, 'decision windows' can be created by actively connecting issues at various spatial and administrative scale levels through the agency of a policy entrepreneur (cf. Kingdon, 1995). In addition, within each of these arenas, policy entrepreneurs must be present who are able to connect issues – often at distinct spatial and administrative scales.

A community-based approach may also help in bridging the science–policy divide (McNie, 2007; Yearley, 2006). However, it is obvious that interests that are impacted at higher spatial scales must also be taken on board, e.g. by including representatives of these higher-level interests (see also: Bradshaw, 2003; Newig and Fritsch, 2009).

From the process perspective, political support is also important. The aim is to increase the relative weight of the environmental quality relative to other interests. Here, too, a policy entrepreneur may connect urban environmental quality to other issues that are prominently on the public agenda. However, win-win only goes so far. At some stage, difficult trade-offs are necessary. Local politicians may be inclined to avoid these, since they are dependent upon the voters' favour in local elections.

As a motto for this dissertation we chose a quote from William Shakespeare's play Coriolanus: '*what is the city but the people*'? This does not merely refer to the importance of urban environmental quality to the city's inhabitants, nor solely to the subjective aspects

of quality, that prompt for participation of the residents and users in planning. More importantly, the play can be read as an indictment of democracy (Goy-Blanquet, 2006), in that politicians are cheered at or booed – and in Coriolanus' case even banished – on the whim of the people. Thus, any consistent policy is rendered impossible. If we project this image of democracy on the pursuit of sustainable urban development, perhaps we do need a Coriolanus-like 'policy entrepreneur' to make us realize that we cannot have our cake and eat it as well but that, instead, inconvenient choices are inevitable.

7.4.2. Planning support to deal with qualitative multiplicity

Taking the substantive perspective, local authorities, especially smaller ones, are likely to need some guidance as to how to optimally deal with the complex issue of urban environmental quality. Such guidance could cover operationalisation of subjective urban environmental quality indicators, making trade-offs among quality dimensions and balancing short-term and long-term interests on all relevant spatial scale levels.

Particularly, guidance tools are required that help manage the qualitative multiplicity of sustainable urban development. An obvious tool is an urban environmental quality proxy. Notwithstanding the multi-dimensional and largely subjective character of urban environmental quality, most people have a notion of what a 'good' environment is, much like they recognise a good play when they see one. They do not need to unravel its quality to find that it is well written, well acted, or that the set design is impressive. Literary or theatre critics, however, may well scrutinise more closely and probe into the director's conception of the play, into its meaning or language, before they write a criticism for a newspaper. For the general public, however, the critics' star rating is an accepted clue to the play's overall quality. In the same vein, one can imagine a typology of urban qualities that are specific for a certain type of area. These area types each have different urban environmental quality targets, assigned by experts. A target is a comprehensive set of urban environmental quality indicators, the reference values of which can differ according to the sensitivity of the area and the type of activities planned to take place in it. Intensively used mixed-function city centres, for example, can have higher levels of noise and air pollution compared to much quieter, greener and cleaner residential areas. In the Netherlands, some municipalities have used such methods (Runhaar et al., 2009; Simeonova and Van der Valk, 2010; VNG and IPO, 2004). Reference values can have a certain band width, the lower level of which is equal to the (supra)national or provincial standard for a particular dimension of urban environmental quality, if any is in effect. The upper level is an ambition, i.e. a value that is ideally reached in a certain type of area, to be characterised by the occurrence, intensity and spatial vicinity of intrusive and sensitive functions. In this way, decision-making about the urban plan can focus on urban environmental quality ambitions that are well above minimum standards.

Again, there are relations with the other perspectives. Regarding the institutional arrangements, the question is how much leeway is given to municipalities to set ambitions for environmental quality aspects that relate to processes at higher spatial scale levels. With respect to the process, local stakeholders could be involved in more precisely defining the targets within the band width proposed by the experts. Implicit or explicit trade-offs between quality dimensions could play a role here, too.

7.4.3. Knowledge infrastructure for planning and monitoring

All of this implies that planners at the local level have ample knowledge of urban environmental quality and the processes that influence it at all relevant spatial scale levels. This involves information about the nature and intensity of intrusive activities; data on emissions and immisions in air, water and soil; knowledge of exposure-effect relations; information about permits that are issued for industrial and agricultural activities; as well as knowledge about the best available means to abate pollution. It also involves expertise to make sense of this information. Typically, information and expertise are distributed among many different actors: industry, municipal departments, higher-level authorities, national environmental agencies, local stakeholders and so on. A dedicated knowledge infrastructure can store this information, make it available and provide the expertise for analysis, scenario studies and monitoring. Not to serve as an 'evidence base' for planning, but to inform the – still bounded rational – process that planning is (Davoudi, 2015). Again, networking capacities (see sub-section 7.4.1) are required for management and maintenance of knowledge. Sustainable urban planning then becomes a networked learning process.

Thus, adopting a more holistic perspective, urban planners, decision-makers and their advisors can take courses of action that are more conducive to EPI and yield a higher level of urban environmental quality. The 'Quality Street' case introduced in Chapter 1 could well end up being a success story, as depicted in Box II.

7.5. FINAL REMARKS

In daily urban planning practice, at least two distinct perspectives on integration of environmental quality interests can be distinguished. One is what could be described as the 'planner's perspective', characterised by a preference for coordination and harmonization of environmental policy and sectoral policies (Runhaar et al., 2009). The other, by contrast, gives principled priority to environmental considerations over other interests. This view originates from a strict interpretation of the Brundtland (1987) definition of sustainable development and is associated with 'hard' rather than 'soft' environmental regulations (Nilsson et al., 2009). It may be termed the 'environmentalist's perspective', characterised by a preference for legally guaranteed minimum levels of environmental

quality. In practice, both perspectives exist within the professional community. The question, then is, how to reconcile the two. Building on Campbell's (1996) remark about the urban planner's role as a translator, part of the answer lies in building awareness among all professionals concerned about the issues relating to urban environmental quality. Perhaps the theoretical concept of 'qualitative multiplicity', that emerged from our research, may serve as a tool to help create that awareness.

Box II. 'Quality Street' revisited

Chapter 1 introduced a fictitious case in which a certain city desired to accommodate population growth and an increase in economic activity. In accordance with national planning guidance, it planned to transform a derelict part of an industrial estate into a mix-function, highly urbanised area, to be called 'Quality Street'. The combination of high density and a mix of functions, including intrusive activities, was expected to cause environmental problems: soil pollution, noise, risk from dangerous substances, odour nuisance and a questionable air quality. No doubt, the plan offers some other highly valued qualities, like a great river view and a variety of urban amenities at close range.

The municipality, however, cannot simply offset noise and odour nuisance against the undeniable other qualities of the area, as the various dimensions of urban environmental quality cannot be randomly traded off. Furthermore, the municipality is bound by regulations and environmental quality standards that are issued by higher-level authorities. National standards for industrial noise frustrate the intended development: the houses situated at the water front can only be made to comply with these standards under the condition that the windows facing the river cannot be opened. This is deemed undesirable.

Meanwhile, in the update of the municipality's environmental policy plan, the environmental department decides to dedicate a new chapter to the relation between environment and well-being. The policy plan is well received by the municipal council and council members start asking questions about the situation in 'Quality Street'. The council passes a motion stating that the new plan must aim for a healthy and sustainable environment. The motion explicitly calls for a participatory approach.

The environmental department appoints an experienced advisor who initiates the process: representatives from a wide variety of societal groups are invited to participate. In lively discussions a local profile of environmental quality aspects is proposed, with an ambition for ambient noise that is somewhat beyond the national standards and only slightly below what is deemed suitable for this type of residential area.

The increased political weight of environmental arguments provides the municipal authorities with some leverage to start negotiations with one of the remaining industrial companies, that causes most of the noise in the area. During those negotiations, some noise reduction measures are identified, but the company takes the stance that any noise reduction would limit future expansion of its activities. Furthermore, reduction measures are very costly and it would be unreasonable to expect the company to take them at its own expense. The plans appeared to end in a stalemate.

Luckily, the 'Quality Street' plan could be realised through an unexpected new development: provincial government, aiming to stimulate industrial activity in the highly populated region, created a fund to eliminate bottlenecks in expanding industry. This opened a window of opportunity: the municipality negotiated successfully to obtain subsidies that allow the company to implement noise reduction measures beyond the demands of the current environmental permits, enough to meet the municipal council's ambition.

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Abbreviations

ANSEA	Analytical Strategical Environmental Assessment
BZK	Binnenlandse Zaken en Koninkrijksrelaties (Dutch Ministry of the Interior)
C&E	City and Environment
CBS	Centraal Bureau voor de Statistiek (Dutch Statistical Bureau)
CRA	Crisis and Recuperation Act
dB	Decibel
EC	European Communities
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EPI	Environmental Policy Integration
EPC	Energy Performance Coefficient
EU	European Union
GPR	Gemeentelijke Praktijkrichtlijn (Municipal Practical Guideline)
GSHP	ground source heat pump
L_{den}	Day Evening Night Sound Level
LPG	Liquefied Petroleum Gas
PBL	Planbureau voor de Leefomgeving (Dutch Environmental Planning Bureau)
PM10	Particulate matter smaller than 10 μm
PPP	Public-Private Partnership
SEA	Strategic Environmental Assessment
UMTS	Universal Mobile Telecommunications System
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
WCED	World Commission on Environment and Development
WHO	World Health Organisation

Appendix A: List of interviewees

Ed Anker, alderman Zwolle (Urban planning and other fields)
Alfred Arbouw, alderman Breda (Urban development, Public housing)
Pim van den Berg, alderman Amersfoort (Economy, Environment/sustainability and other fields)
Natascha van den Bolt, process manager Municipality of Zaanstad
Harrie Bosch, former alderman Utrecht (Urban planning and development)
René Daemen, area manager Rivierzone Municipality of Vlaardingen
Freek Deuss, advisor sustainability, Municipality of Utrecht
Marije Eleveld, alderwoman Ede (Urban planning, Wellbeing, Public housing)
Loek Franken, project manager Spoorzone Central area, Tilburg
Frank Freling, senior advisor urban planning, Municipality of Woerden
Margreet van Gastel, alderwoman Arnhem (Urban planning, Environment/sustainability and other fields)
Gerdo van Grootheest, alderman Maastricht (Urban planning, Environment/sustainability, Public housing, Wellbeing)
Jan van Groos, alderman Waalwijk (Area development, Environment and other fields)
Ruud Guyt, alderman Sittard-Geleen (Housing, Sustainability/environment, Sports)
Arno Hallie, Credo, project developer Spoorzone Tilburg
Jeroen Hatenboer, alderman Enschede (Urban planning, Public housing and other fields)
Alwin Hietbrink-de Vre, alderman Bergen (Urban planning, Environment and other fields)
Wout Jansen, alderman Lelystad (Urban management, Sustainability, Environment and other fields)
Coen Jaspers, Heijmans / Proper Stok, project developer De Mars, Zutphen
Lon Jooren-van der Boor, alderwoman Hilversum (Urban planning and other fields)
Marco Kastelein, alderman Gouda (Urban planning and other fields)
Richard Koek, Rijnboutt, urban designer Rivierzone Vlaardingen
Ron König, alderman Rheden (Urban planning, Education)
Edwin Koning, area manager Noorderhaven Spoorzone, project bureau De Mars, Zutphen
Lucien Kuijsters, project manager Spoorzone, Tilburg
Martin van der Laan, OMA-Amsterdam, project developer Rivierzone Vlaardingen
Rik de Lange, alderman Zutphen (De Mars / City management and urban planning)
Joke Leenders, alderwoman Zeist (Sustainability, Physical environment and other fields)
Jeroen van Lier, Vorm, project developer Defensie-eiland Woerden

Arjen van Loon, Arcadis, project bureau De Mars, Zutphen
Marieke Moorman, alderwoman Tilburg (Spoorzone / Education)
Han de Rijk, environmental advisor Milieudienst Noord-west Utrecht
Herald Roelevink, Dolte advisors, member project group Veemarkt
Karin Sam Sin, area manager North-East, Municipality of Utrecht
Martin Schreurs alderman Woerden (Urban planning, Real estate, Urban renewal, Public housing)
Joop Smits, Port of Rotterdam
Frans Stienen, alderman Helmond (Urban development/renewal, Public housing and other fields)
Dennis Straat, alderman Zaanstad (Urban planning and other fields)
Nathan Stukker, alderman Apeldoorn (Urban planning, Public housing and other fields)
Marco Swart, alderman Deventer (Urban planning, Public housing and other fields)
Robert Tieman, Deltalinqs, policy advisor Environment
Hans Versluijs, alderman Vlaardingen (Urban planning, Public housing)
Hans de Wind, external project manager Veemarkt, Utrecht
Leen de Wit, project manager Veemarkt, Utrecht
Eveline Zeeman, juridical adiser urban planning, Municipality of Zaanstad

Appendix B: Interview questions Chapter 3

For convenience, only the Utrecht (Veemarkt) questionnaire is reproduced here.
The objective of this interview is to find answers to the following questions:

- What moments or events can be pinpointed in which environmental interests and sustainability, more precisely the objectives to be 'leading in sustainability' and to have an energy performance coefficient of 0.3 rather than 0.6, started to play a (bigger) role in decision-making about the project?

- What factors or persons have played a crucial role in this?

- What circumstances have been the cause for maintaining – or abandoning – the focus on environmental interests and sustainability (particularly the energy performance coefficient of 0.3)?

- Which of the actors came up with the decisive initiative and how did the other actors involved react to that?

- What (partial) decisions can be pinpointed within the decision-making process? What is or was the significance of these (partial) decisions?

Appendix C: Interview questions Chapter 4

In order to investigate what knowledge you deem necessary to take adequate decisions when making plans for inner-city redevelopment and how you process this knowledge, we present to you a number of statements. During the interview by telephone we will go through these statements. If you wish, you can elaborate on the statements. Depending upon your reactions to the statements we present some additional questions.

STATEMENTS

In the statements, 'expert knowledge' always refers to technical-scientific knowledge, e.g. energy consumption of buildings, results of model calculations regarding air quality, water management and noise, soil remediation et cetera.
For each of the statements below, please indicate to what extent you agree or disagree, using the following scale:

Totally agree – Agree – Neither agree nor disagree – Disagree – Totally disagree – Don't know

1. I absolutely need expert knowledge about the environment in order to arrive at a satisfactory decision on urban redevelopment.

2. The role of expert knowledge about the environment in spatial plans is that it is convincingly demonstrated that the plan meets legal environmental quality standards.

3. Results of (model) calculations used to assess environmental impacts of plans are not useful for decision-making about a spatial plan.

4. I sometimes have (model) calculations of environmental impacts repeated with more favourable assumptions if I cannot sufficiently substantiate my decision with the original results.

5. Environmental impact assessment is indispensable for sound decision-making about inner-city redevelopment.

6. In decision-making about a plan, I not only need an expert assessment of the environmental impacts of that decision, but also knowledge that enables me to better understand the problem.

7. Thermal storage is a technique of which adverse effects to the environment are sufficiently known.

8. In my decision, I weigh knowledge about health effects of the proposed development, even if all environmental standards are met.

9. In making a decision about a plan, knowledge introduced by stakeholders is as important as that presented by experts.

10. Claims to accommodate excess storm and flood water are surrounded with too much uncertainty to fully uphold them in spatial plans.

11. In my decision, I account for the fact that there may be gaps in the available knowledge on environmental impacts of the proposed development.

12. Expert advice about environmental aspects of a spatial plan is too equivocal to base a good decision upon.

13. In making a decision on a spatial plan I would rather have no knowledge about environmental impacts at all than incomplete and uncertain knowledge.

14. In the planning process, environmental experts insufficiently adjust to my own line of thinking as a decision-maker.

15. As long as legal requirements for environmental quality are met, knowledge about possibilities to further enhance that quality do not play a role in my considerations.

16. As a decision-maker, I need different knowledge from that which is offered by experts.

17. I feel that experts perceive the environmental aspects of spatial planning differently from myself as decision-maker.

18. It is not uncommon that decision-making about an inner-city redevelopment for social, economic or political reasons has a different outcome than if I were to decide on the basis of merely expert advice about the environmental impacts.

19. In planning urban redevelopment various alternatives are considered at an early stage; they are compared based on, among other things, expert knowledge.

20. Often an urban redevelopment is due to circumstances and previous decisions, without a preconceived plan.

21. Available alternatives to a spatial plan are usually weighed on the basis of rational arguments.

22. Planning for urban redevelopment is a fairly linear process in time, in which one always builds on previous decisions.

23. In planning urban redevelopment it often happens that previous decisions have to be reconsidered.

24. There is sufficient knowledge available about climate change and its effects to be able to consider them thoroughly in spatial plans.

25. In their designs, urban designers sufficiently account for the environmental impact of their plans.

26. Environmental experts often offer advice on minimizing environmental impacts that is difficult to fit into the plans under construction.

27. If all expert knowledge about environmental impacts of a plan were available in a database and could be inter-actively presented using maps and diagrams, it would be easier for me to decide about the plan.

28. If expert knowledge would be available to the urban designers from the onset, the quality of plans for urban redevelopment would improve.

29. I can better reach a decision if I am involved in the research to be carried out by the experts from the onset.

30. The fact that, in the Netherlands, methods for measuring and modelling of environmental impacts of spatial plans is highly standardized and regulated makes it easier for me to ground decision-making about a plan on such expert knowledge.

POSSIBLE FOLLOW-UP QUESTIONS

31. If, in the future, you will be allowed to make more trade-offs of your own considering environmental quality in urban planning, what knowledge (about sustainability and urban environmental quality) doe you need for that?

32. If expert knowledge is not very useful, why is that?

33. How do you deal with uncertainty in expert knowledge?

34. Where do you find the expert knowledge you deem necessary?

35. Do you arrange knowledge co-creation sessions (where users and providers of expert knowledge are joined, experts as well as stakeholders)?

36. How do you provide for knowledge management for yourself and your organisation and its members?

BACKGROUND QUESTIONS

37. What is your age category?
    Younger than 35 – 35-45 years – 45-55 years – older than 55 years

38. What is the highest level of education you received?
    Intermediate vocational education – Higher vocational education – University (Master) – PhD

39. Do you have any experience in scientific research?

40. Do you have any experience with policy advise?

41. In what branch have you mostly been employed next to your work as an alderman?
    - ☐ agriculture
    - ☐ industry
    - ☐ commercial services
    - ☐ non-profit services
    - ☐ government
    - ☐ different

Here ends our questionnaire. thank you very much for your cooperation.

Appendix D: Interview questions Chapter 5

1. How have sustainable urban development and urban environmental quality been operationalised within the project?

2. What disciplines or professional roles were necessary for this and how have they been involved?

3. What relations (support or dependence) with higher-tier governments are of importance in this project?

4. Are these relations supportive or do they hinder the planned development? In what way? Can you specify for each of the relevant aspects of urban environmental quality?

5. How have perceived difficulties in these relations – if any – been solved? Are there any unresolved issues? Can they be solved within existing governance arrangements?

6. What other actors, beside your own organization, are involved in the planning process and what are their roles?

7. What trade-offs have been considered during the planning process to ensure that the plan is feasible for all stakeholders?

8. How and to what extent have conflicts of interest or parallel interests played a role in these considerations?

9. Has it proven to be possible to solve any conflicts of interest. If so, does this take new governance arrangements?

10. Can market developments or unforeseen costs lead to downward adjustment of the ambitions regarding sustainable urban development and urban environmental quality?

11. What knowledge is (or appears to be) necessary for good decision-making? With whom resides this knowledge and how is it made available within the project?

Appendix E: Interview questions Chapter 6

For convenience, only the Vlaardingen (Rivierzone) questionnaire is reproduced here.

1. What was the motivation to start the development of the area?

2. What are the most important actors? What are their interests? Who own the property in the area?

3. Underlying documents (notably 'mer-beoordeling' and 'Integrale Milieunota') mention a number of important bottlenecks for good urban environmental quality. Please indicate, on a 7-point scale, how you rate each of these aspects of urban environmental quality in the area and to what extent deviation from legal requirements has taken place during the planning process.

A. industrial noise (Botlek-Pernis/Rivierzone);

Quality: bad |----------|----------|----------|----------|----------|----------| good

Deviation: no |----------|----------|----------|----------|----------|----------| strongly

B. industrial safety (Botlek-Pernis/Fluvial transport I Rivierzone);

Quality: bad |----------|----------|----------|----------|----------|----------| good

Deviation: no |----------|----------|----------|----------|----------|----------| strongly

C. odour nuisance (Botlek-Pernis/Rivierzone);

Quality: bad |----------|----------|----------|----------|----------|----------| good

Deviation: no |----------|----------|----------|----------|----------|----------| strongly

D. air quality (Botlek-Pernis/local roads);

Quality: bad |----------|----------|----------|----------|----------|----------| good

Deviation: no |----------|----------|----------|----------|----------|----------| strongly

E. traffic noise (local roads);

Quality: bad |----------|----------|----------|----------|----------|----------| good

Deviation: no |----------|----------|----------|----------|----------|----------| strongly

F. soil quality (Rivierzone locations)

Quality: bad |----------|----------|----------|----------|----------|----------| good

Deviation: no |----------|----------|----------|----------|----------|----------| strongly

4. Why could these problems not be solved within the limits of current environmental regulations and was a Step 3-decision deemed necessary?

5. How was this Step 3-decision taken, also in relation to the previous administrative agreement among industry, regional authorities and municipalities? What actors were involved and how?

6. What was the role of expert environmental knowledge in taking the Step 3-decision?

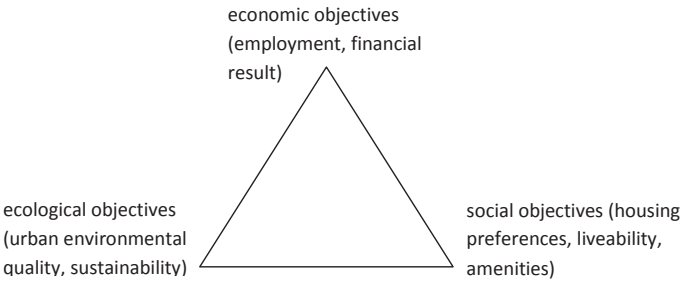
7. How do you rate the urban environmental quality – in a broad sense – in the area if development would have taken place according to the intentions of the Step 3-decision?

Quality: bad |----------|----------|----------|----------|----------|----------| good

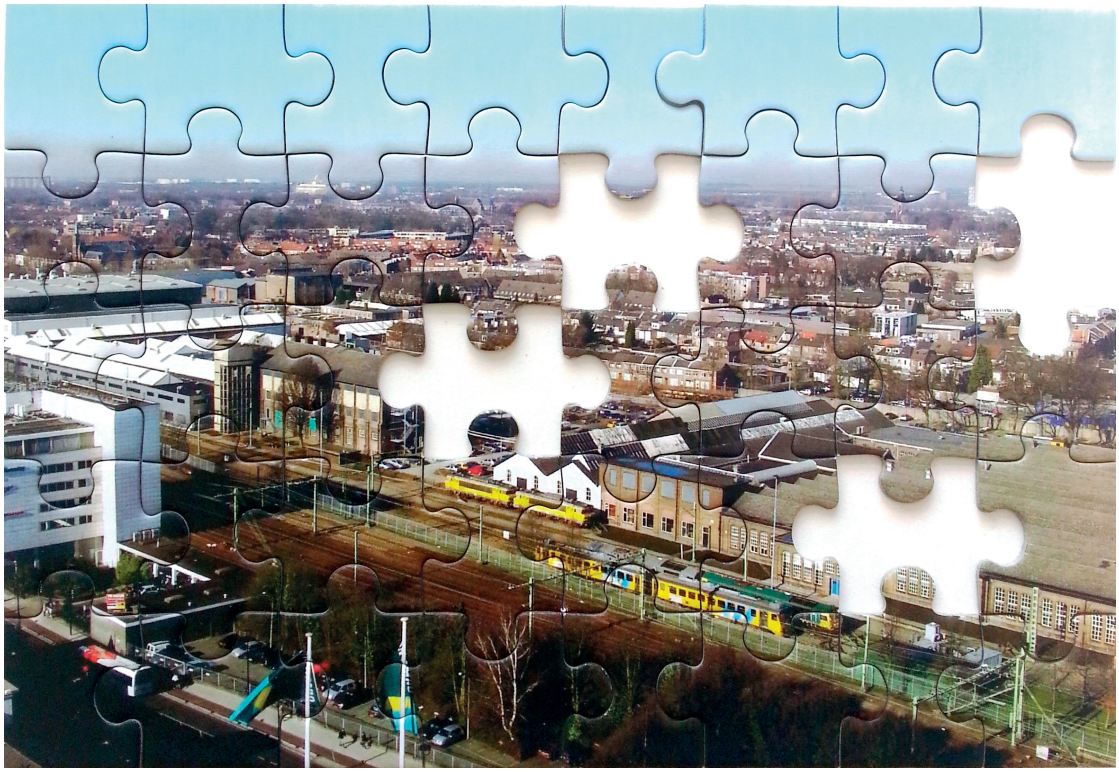
8. What were – as far as you can tell – the reasons for the plan's opponents to file an appeal against the Step 3-decision?

9. What opportunities for development of the area do you see without the Step 3-decision?

10. To what extent do you think a balance has been struck among economic, social and ecological objectives for the area? Please indicate in the triangle below.



Summary



INTRODUCTION: OBJECTIVE AND RESEARCH QUESTION

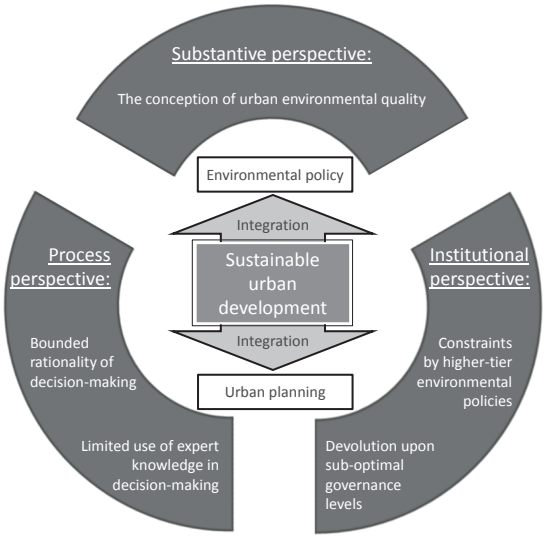
Urban environmental quality is an essential feature of sustainable urban development. Today, over half of the world's population lives in urban areas, and urbanisation is increasing. Many city dwellers are exposed to environmental quality levels that are unsafe by World Health Organisation standards. In planning urban development, environmental quality issues must therefore be considered.

There is a considerable body of literature about environmental policy integration. It has revealed that, although integration of environmental interests in other sector policies does occur at higher levels of government, there appear to be several types of barriers to integration when implementation of these policies at lower levels is in order.

In the context of planning sustainable urban development, the scientific literature has, so far, not conclusively shown why this is the case. The objective of this dissertation, therefore, is twofold. First, it aims to contribute to the scientific body of knowledge about environmental policy integration (EPI) by identifying and explaining factors that influence the success of EPI in urban planning. Second, through these analyses it aims to deliver new insights for urban planners, local politicians and environmental consultants about the nature and importance of urban environmental quality in sustainable urban development and about the processes and institutional arrangements for its governance. The study focuses on situations where the competition between environmental quality and other – social and economic – interests is most severe: high-density, mixed-use, inner-city redevelopments in areas that are heavily burdened by environmental impacts.

The research question, then, is: what factors explain the limited integration of urban environmental quality into decision-making processes in inner-city redevelopment planning and what effective strategies for further improvement can be derived from the results of this investigation?

The following research strategy was employed: the concept of environmental policy integration was used as a theoretical lens. This body of literature provides three perspectives on the central research question: a *substantive*, a *process* and an *institutional* perspective. Consecutively adopting these perspectives, five more detailed research questions were formulated. Then, starting from the literature about environmental policy integration, but also building on other literatures, e.g. about quality of life, we theorised about possible factors that could explain the extent of integration of urban environmental quality into compact inner-city redevelopment planning. This is diagrammatically represented in the following figure:



The five factors identified were further explored in five sub-projects, each of which is the subject of one of the chapters of this dissertation. The sub-projects share a common structure: first a theoretical framework is developed on the basis of a literature study, and the resulting insights are then illustrated by exploring a limited number of practical cases.

RESULTS: FIVE EXPLANATORY FACTORS

The literature review presented in Chapter 2 makes clear that urban environmental quality is multidimensional, to a large extent subjective and time-dependent. This follows from its generally accepted definition as the extent to which the urban environment satisfies the needs of human beings, ecosystems and artefacts. On theoretical grounds, the dimensions of urban environmental quality are expected to be organised in a hierarchy, in which higher level dimensions are appreciated only when and if qualities pertaining to more basic levels are sufficiently present. These properties of urban environmental quality complicate integration of all quality aspects in urban planning in several ways: first, in decision-making about urban plans, environmental quality aspects are often treated as separate entities rather than as inextricable parts of a broader conception of urban environmental quality. The literature review, however, revealed evidence of *interactions* among different aspects of urban environmental quality. This suggests that urban environmental quality is not a zero-sum game: loss of quality in one – particularly one of the more basic – dimension cannot straightforwardly be compensated for by adding extra quality in another dimension. Second, the issue of how urban environmental quality ensues from its various dimensions and their interactions is largely subjective. Therefore,

trade-offs concerning 'quality' can only be made by the people involved. As each aspect of urban environmental quality results from processes at multiple spatial scale levels, actors' interests at all of these levels must be taken into account in a participatory process that can, therefore, become increasingly complex. Thirdly, the time-dependent character of urban environmental quality preferences prompts for an adaptive mode of planning.

A second explanatory factor we surmised to be the bounded-rational character of the decision-making process itself. In Chapter 3, we combined studies of networked decision-making about urban development with the concept of 'decision windows', opportunities for environmental interests to enter the decision-making process. Doing so, we demonstrated that 'decision windows' are indeed useful to understand successful integration of environmental interests in an urban redevelopment context. In addition, we encountered several strategies to invoke such 'decision windows', one of which is letting stakeholders reframe the issues at hand.

Scientists often feel their expert knowledge is underused in decision-making. The field of urban development is no exception. The apparent science–policy divide was expected to be a further explanatory factor for the extent to which EPI in urban planning is (un)successful. Several explanations for this science–policy gap have been proposed, most of which stem from research taking the scientists' point of view. Therefore, Chapter 4 reverses the perspective and tries to clarify how politicians – in this case municipal aldermen responsible for urban development – perceive and use expert knowledge about the environmental quality implications of urban plans. We found that trade-offs concerning 'quality' are, to a large extent, made implicitly and intuitively. Local politicians use expert knowledge primarily to obtain a balance of all interests at stake, thus arriving at a decision that can count on political and public support. They do not perceive a problematic gap between themselves and (environmental) experts, but wilfully keep a distance from the generation of expert knowledge in order to provide as much room for manoeuvre as possible for striking the intended balance of interests.

A fourth factor explaining the extent of EPI was thought to be the degree of flexibility that urban planners and designers must have in order to reconcile the interests of a great number of stakeholders, all within spatial, social and economic constraints. Planning compact, mixed-function, inner-city redevelopment is complex. Many professionals contend that environmental requirements are unnecessarily adding to this complexity. In contrast, scholars argue that the problem is not primarily environmental constraints themselves, but planners' ability to creatively resolve them. As many of the perceived constraints result from environmental standards that are issued by (supra)national governments, the question addressed in Chapter 5 is how much room for manoeuvre decision-makers at the municipal level have to weigh environmental interests together with all other interests involved. In a study of several cases we found that, although the number of options available is being reduced by higher-tier environmental requirements,

local decision-makers can achieve an urban plan that is feasible and acceptable to all actors involved. In part, this is because standards have been relaxed in the past and because use can be made of exemption rules and possibilities to circumvent or set aside existing regulations. Importantly, not only can environmental policies from higher administrative tiers lead to urban planning constraints, but also policies that cause new – or increase existing – environmental impacts may severely hamper local urban (re)development.

The fifth explanatory factor results from the fact that various dimensions of urban environmental quality relate to physical and bio-geochemical as well as social processes that take place at distinct spatial scale levels. Each of these aspects is governed at an appropriate – i.e. spatially congruent – administrative level. Thus, the level of decision-making is brought down, when appropriate, from the central state to the regional and local levels that are better informed about the local situation, can more flexibly adapt to it and can more readily ensure participation of stakeholders. A multi-level governance landscape ensues, in which lower tiers of government execute the authority that was devolved upon them, in deliberation with other stakeholders, all within the limits set by higher tiers of government. Chapter 6 demonstrates how failures in this multi-level governance system may lead to an 'implementation gap' between (supra)national goals and outcomes at lower levels. Within the context of urban redevelopment, however, it appears to be possible to organise a subsidiary form of governance in such a way that environmental quality can be optimally guaranteed at all spatial and temporal scale levels, while still allowing for flexibility at the local level.

CONCLUSIONS

In the concluding chapter of this dissertation we take a more holistic perspective, looking back both at the issue of sustainable urban development and at the way in which the explanatory factors, in concert, influence the extent to which urban environmental quality considerations are integrated in decision-making about urban plans. Finally, using environmental policy integration not merely as an analytical, but also as a normative approach, we reflect on the significance of these findings for planning practice.

With respect to the former, we find that the conception of sustainable urban development as integrating economic, social and environmental interests is far too simple. First, because urban environmental quality itself consists of multiple dimensions that must be integrated. Second, because these dimensions involve processes at multiple spatial and administrative scale levels. Third, because urban environmental quality dimensions, in as far as they are subjective, rest on personal preferences of the many people involved in and affected by urban development, preferences that also vary across time. We term this '*qualitative multiplicity*'.

Five explanatory factors for the success – or lack thereof – of integration of urban environmental quality into urban planning are discussed in the respective chapters and illustrated by means of case studies of compact inner-city redevelopment. In retrospect, we find that these factors are closely intertwined. We conclude that combining the three perspectives adopted in this research leads to better understanding of the complexity of environmental policy integration in urban planning. The main driver of this complexity, in our analysis, is the 'multiplicity' of urban environmental quality, particularly if those quality aspects that are problematically close to environmental quality standards involve processes at spatial scale levels higher than the local.

In cases of compact inner-city redevelopment, rigid environmental quality standards are sometimes found to be all too restrictive for urban planning. Devolution of the authority to set urban environmental quality objectives can then be a useful approach if the problematic quality aspects involve mainly local processes. If, however, higher-level spatial scales are involved, devolution expectedly leads to insufficient attention to all relevant aspects of urban environmental quality or to coordination problems between the local administrative level and the appropriate higher ones. Our analyses suggest that at least three conditions must be met in order to take advantage of such an approach locally, without risking loss of urban environmental quality from a wider perspective. A first prerequisite is adequate governance capacity to initiate and manage a multi-actor participatory process and to include in it all relevant stakeholders and interests. This implies networking capacities and abilities to invoke 'decision windows' by helping actors to connect and reframe policy issues. It also implies the ability to raise political support. Second, for local-level decision-making, clear guidance is in order as to how to deal with qualitative multiplicity. Such guidance can take the form of a set of simple area-dependent proxies for the complex concept of urban environmental quality, in combination with procedural regulations that clearly describe municipalities' room for manoeuvre and insure optimal participation of all relevant actors. The third condition is that a knowledge infrastructure is in place that makes all relevant information for the management of urban environmental quality available to decision-makers and their advisers.

The holistic perspective, taken over the course of this research, adds three important insights to the existing literature. First, it reveals the qualitative multiplicity of sustainable urban development in terms of urban environmental quality aspects and related spatial and administrative scale levels. Second, it identifies five factors that explain why integration of environmental interests in urban planning is sometimes problematic. These five factors behave in concert, making it impossible to address one of them without also influencing at least some of the other factors. And third, adopting the normative approach of environmental policy integration, it nuances the call for flexibility in dealing with environmental quality standards.

SAMENVATTING

INLEIDING: DOEL EN ONDERZOEKSVRAAG

De kwaliteit van de stedelijke leefomgeving is een essentieel aspect van duurzame stedelijke ontwikkeling. Vandaag de dag leeft meer dan de helft van de wereldbevolking in stedelijk gebied en de verstedelijking neemt nog verder toe. Veel stadsbewoners leven in een omgeving waar de milieukwaliteit onvoldoende is naar de maatstaven van de Wereldgezondheidsorganisatie. Daarom dienen bij het maken van plannen voor stedelijke ontwikkeling milieukwaliteitsaspecten in de overwegingen te worden betrokken.

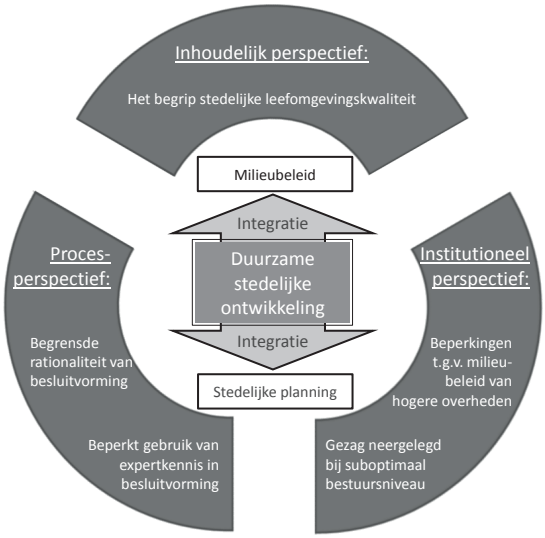
Er is veel literatuur over de integratie van milieubeleid. Daaruit blijkt dat, hoewel er op hogere bestuursniveaus wel degelijk integratie van milieubelangen in andere beleidssectoren optreedt, verschillende soorten barrières integratie in de weg staan als het aankomt op het uitvoeren van dat sectorale beleid op lagere niveaus.

In de context van duurzame stedelijke ontwikkeling heeft de wetenschappelijke literatuur tot dusverre nog niet overtuigend verklaard waarom dit het geval is. Het doel van dit proefschrift is dan ook tweeledig: in de eerste plaats beoogt het bij te dragen aan de wetenschappelijke kennis over de integratie van milieubeleid in andere sectoren door het vinden van verklarende factoren die het welslagen van die integratie in stedelijke ruimtelijke planning beïnvloeden. In de tweede plaats beoogt het door deze analyses aan de praktijk – planologen, lokale politici en bestuurders, milieuadviseurs – nieuwe inzichten te verschaffen in de aard en het belang van leefomgevingskwaliteit voor duurzame stedelijke ontwikkeling en in de processen en institutionele arrangementen die nodig zijn voor het sturen daarvan. De studie gaat vooral over die gevallen waar hevige concurrentie optreedt tussen omgevingskwaliteit en andere – sociale en economische – belangen: gemengde binnenstedelijke herontwikkeling in hoge dichtheden op plekken waar de milieubelasting hoog is.

De onderzoeksvraag is dan: welke factoren verklaren de beperkte integratie van stedelijke leefomgevingskwaliteit in de besluitvorming over plannen voor binnenstedelijke herontwikkeling en welke strategieën voor verdere verbetering van die integratie kunnen daaruit worden afgeleid?

De onderzoeksstrategie was als volgt: integratie van milieubeleid (in het Engels: *environmental policy integration*) is een wetenschappelijk goed onderbouwd concept dat gebruikt is als theoretische lens. De literatuur over dit onderwerp verschaft drie perspectieven op de centrale onderzoeksvraag: een *inhoudelijk* perspectief, een *proces*perspectief en een *institutioneel* perspectief. Door vanuit deze perspectieven, één voor één, naar de centrale onderzoeksvraag te kijken konden vijf deelvragen worden geformuleerd. Vervolgens werd, gebruik makend van de literatuur over *environmental policy integration*, maar

ook van andere literatuur, bijvoorbeeld over kwaliteit van leven, getheoretiseerd over mogelijke factoren die de mate van integratie van leefomgevingskwaliteit in de planning van compacte binnenstedelijke herontwikkeling verklaren. In de onderstaande figuur is dat schematisch weergegeven.



De vijf verklarende factoren zijn verder verkend in evenzoveel deelprojecten van het onderzoek. Deze deelprojecten zijn elk het onderwerp van één van de hoofdstukken 2 t/m 6 van dit proefschrift. De deelprojecten hebben een gemeenschappelijke structuur: eerst wordt een theoretisch kader opgebouwd op basis van literatuuronderzoek en de verkregen inzichten worden vervolgens geïllustreerd door de verkenning van een beperkt aantal praktijkcases.

RESULTATEN: VIJF VERKLARENDE FACTOREN

Hoofdstuk 2 presenteert een literatuurstudie waaruit blijkt dat stedelijke leefomgevingskwaliteit meerdimensionaal is, in hoge mate subjectief en tijdgebonden. Dit volgt uit de algemeen aanvaarde definitie van leefomgevingskwaliteit als de mate waarin de stedelijke omgeving tegemoet komt aan de behoeften van mensen, ecosystemen en artefacten. Theoretisch zijn de dimensies van stedelijke leefomgevingskwaliteit hiërarchisch geordend en wel op zo'n manier dat de hogere dimensies pas aan de orde komen als en wanneer aan de vereisten van de kwaliteitsdimensies aan de basis van de hiërarchie in voldoende mate is voldaan. Deze eigenschappen compliceren de integratie van al die kwaliteitsaspecten in stedelijke planning op verscheidene manieren: in de eerste plaats worden kwaliteitsaspecten in de besluitvorming over stedelijke plannen veelal als aparte entiteiten

behandeld, in plaats van als onlosmakelijke delen van een breder kwaliteitsbegrip. Uit het literatuuronderzoek bleek echter dat sprake kan zijn van interacties tussen verschillende kwaliteitsaspecten van de leefomgeving. Dit suggereert dat leefomgevingskwaliteit niet een '*zero sum game*' is: verlies van kwaliteit in één dimensie – in het bijzonder een meer basale – kan niet zonder meer worden gecompenseerd door extra kwaliteit te bewerkstelligen in een andere dimensie. Ten tweede is de manier waarop leefomgevingskwaliteit resulteert uit de verschillende kwaliteitsdimensies en de interacties daartussen grotendeels subjectief. Als gevolg daarvan kunnen afwegingen met betrekking tot kwaliteit in ruime zin alleen worden gemaakt door de mensen die het betreft. Omdat ieder aspect van leefomgevingskwaliteit wordt beïnvloed door processen op verschillende ruimtelijke schaalniveaus, moeten de belangen van die mensen op al deze niveaus worden meegewogen in een participatief proces dat om die reden steeds ingewikkelder wordt. Ten derde vraagt het tijdgebonden karakter van leefomgevingskwaliteit om een aanpasbare manier van planning.

De begrensd rationele aard van de besluitvorming zelf vormt vermoedelijk een tweede verklarende factor. In Hoofdstuk 3 wordt onderzoek naar besluitvorming in netwerken gecombineerd met het concept van '*decision windows*'; dit zijn mogelijkheden die zich kunnen voordoen om milieubelangen deel te laten uitmaken van de overwegingen in het besluitvormingsproces. Aangetoond werd dat deze '*decision windows*' inderdaad nuttig zijn voor een beter begrip van geslaagde integratie van milieukwaliteit in de context van plannen voor stedelijke herontwikkeling. Daarenboven werden verschillende strategieën gevonden om zulke '*decision windows*' op te roepen. Eén daarvan is de betreffende stakeholders in de gelegenheid te stellen om de kwesties die spelen te '*reframen*', d.w.z. zo te herformuleren dat een gemeenschappelijk gedragen visie daarop ontstaat.

Wetenschappers vinden dikwijls dat de kennis die zij inbrengen in de besluitvorming onvoldoende wordt gebruikt. Op het terrein van stedelijke ontwikkeling geldt dat evenzeer. De schijnbare kloof tussen wetenschap en beleid zou een derde verklarende factor kunnen zijn voor het wel of niet slagen van integratie van milieubeleid in ruimtelijke plannen. Er zijn verschillende verklaringen voorgesteld voor deze kloof. De meeste daarvan komen voort uit het perspectief van de wetenschapper zelf. In Hoofdstuk 4 is daarom juist sprake van een perspectiefwisseling doordat wordt gepoogd te verhelderen hoe bestuurders – in dit geval wethouders verantwoordelijk voor stedelijke ontwikkeling – kennis over de implicaties van ruimtelijke plannen voor de leefomgevingskwaliteit ervaren en gebruiken. Daarbij werd gevonden dat afwegingen met betrekking tot de kwaliteit van de leefomgeving voor een belangrijk deel impliciet en intuïtief worden gemaakt. Lokale bestuurders gebruiken kennis van experts vooral om tot een afweging te komen van alle belangen die op het spel staan, om zo tot een beslissing te komen die politieke en publieke steun geniet. Deze bestuurders ervaren geen problematische kloof tussen henzelf en (milieu)deskundigen, maar houden bewust een zekere afstand tot het proces

waarin die deskundigen hun kennis genereren, om zoveel mogelijk manoeuvreerruimte te houden bij het vinden van de gezochte balans van belangen.

Een vierde verklarende factor voor de mate van integratie van milieu in ruimtelijke planning is de flexibiliteit die planologen en stedenbouwkundigen nodig hebben om de belangen van een groot aantal betrokkenen met elkaar te verzoenen, allemaal binnen ruimtelijke, sociale en economische randvoorwaarden. Planning van compacte, gemengde binnenstedelijke herontwikkeling is complex. Veel mensen uit de praktijk beweren dat milieueisen nodeloos bijdragen aan die complexiteit. Daartegenover stellen wetenschappers juist dat het gevoelde probleem niet in de eerste plaats wordt veroorzaakt door die milieueisen, maar door onvoldoende vermogen om de gestelde beperkingen creatief op te lossen. Omdat veel van die beperkingen voortkomen uit milieubeleid van hogere overheden wordt in Hoofdstuk 5 de vraag beantwoord hoeveel manoeuvreerruimte gemeenten hebben om milieubelangen samen met alle andere belangen af te wegen. In een drietal casestudies werd gevonden dat, hoewel het aantal opties wel degelijk wordt ingeperkt door beleid van hogere overheden, lokale overheden toch tot een voor alle betrokkenen acceptabel en haalbaar plan kunnen komen. Voor een deel is dit een gevolg van het feit dat milieunormen in het verleden zijn versoepeld en omdat de Nederlandse milieuwetgeving uitzonderingen kent, evenals wegen om beperkingen te omzeilen of zelfs onder voorwaarden opzij te zetten. Het is belangrijk om te beseffen dat het hierbij niet alleen gaat om *milieu*beleid van die hogere overheden, maar ook om ander beleid dat op zichzelf een negatieve invloed kan hebben op de lokale milieukwaliteit.

De vijfde verklarende factor komt voort uit het feit dat verschillende dimensies van de stedelijke leefomgevingskwaliteit zijn verbonden met zowel fysische en bio- en geochemische processen als sociale processen die verlopen op verschillende, aanwijsbare, ruimtelijke schaalniveaus. Besturing van deze processen vindt plaats op het meest aangewezen – dat wil zeggen: ruimtelijk congruente – bestuurlijke niveau. Daarom wordt, zoveel mogelijk, de beslissingsbevoegdheid neergelegd op de geschikte lagere niveaus dan de centrale overheid. Op het regionale en lokale niveau is men beter op de hoogte van de situatie ter plaatse, kan men zich daaraan gemakkelijker aanpassen en kan participatie van belanghebbenden beter worden verzekerd. Zo ontstaat een meerlagig bestuurlijk landschap, waarin de lagere echelons het gezag uitoefenen dat bij hen is neergelegd, in goed overleg met belanghebbenden en binnen de grenzen, gesteld door hogere overheden. Hoofdstuk 6 laat zien hoe tekortkomingen in dit meerlagige systeem kunnen leiden tot een 'uitvoeringskloof' tussen doelen van de nationale overheid (en daarboven) en de resultaten op lagere niveaus. In de context van stedelijke herontwikkeling blijkt het echter mogelijk om een subsidiaire vorm van bestuur te organiseren op zo'n manier dat milieukwaliteit kan worden gegarandeerd op alle ruimtelijke schaalniveaus, terwijl toch op lokaal niveau de nodige flexibiliteit wordt geboden.

CONCLUSIES

In het concluderende hoofdstuk van dit proefschrift wordt vanuit een holistisch perspectief teruggekeken op zowel het onderwerp duurzame stedelijke ontwikkeling als op de manier waarop de vijf verklarende factoren gezamenlijk invloed uitoefenen op de mate waarin stedelijke leefomgevingskwaliteit wordt geïntegreerd in ruimtelijke plannen. Ten slotte wordt in dat hoofdstuk gereflecteerd op het belang van de onderzoeksresultaten voor de praktijk van de ruimtelijke planning, waarbij *environmental policy integration* niet alleen als een analytische, maar ook als een normatieve benadering wordt gebruikt.

Wat het eerste betreft: het is al te simplistisch om duurzame stedelijke ontwikkeling op te vatten als de integratie van economische, sociale en milieubelangen. In de eerste plaats omdat stedelijke leefomgevingskwaliteit zelf verscheidene dimensies kent die geïntegreerd moeten worden. In de tweede plaats omdat in elk van die dimensies processen een rol spelen die zich op verschillende ruimtelijke en bestuurlijke schaalniveaus af kunnen spelen. En ten derde omdat de onderscheiden dimensies van stedelijke leefomgevingskwaliteit, voor zover die subjectief zijn, bepaald worden door de voorkeuren van de vele personen die betrokkenen zijn bij en beïnvloed worden door stedelijke ontwikkeling. Voorkeuren die ook nog eens variëren in de tijd. Daarvoor wordt hier de term '*kwalitatieve meervoudigheid*' gebruikt.

De hoofdstukken 2 t/m 6 van dit proefschrift bespreken vijf verklarende factoren voor het al of niet welslagen van integratie van stedelijke omgevingskwaliteit in ruimtelijke plannen, factoren die worden geïllustreerd aan de hand van case studies. Bij nadere beschouwing blijken deze factoren eng met elkaar vervlochten te zijn. Daaruit kan worden geconcludeerd dat het combineren van de drie perspectieven die gedurende dit onderzoek zijn gehanteerd leidt tot een beter begrip van de complexiteit van die integratie. Uit de in dit proefschrift beschreven analyse volgt dat die complexiteit vooral wordt veroorzaakt door de 'meervoudigheid' van stedelijke leefomgevingskwaliteit. Dit is met name het geval wanneer de kwaliteitsaspecten die dicht in de buurt komen van de normen verband houden met processen op hogere schaalniveaus dan het lokale.

Natuurlijk komt het voor dat starre milieukwaliteitseisen in de weg staan aan plannen voor compacte binnenstedelijke herontwikkeling. Het kan een goede benadering zijn om de bevoegdheid tot het vaststellen van milieukwaliteitsdoelstellingen neer te leggen bij het lokale bestuur als de kwaliteitsaspecten die tot problemen leiden vooral lokaal van aard zijn. Als zij daarentegen verband houden met processen op hogere ruimtelijke schaalniveaus leidt zo'n subsidiaire benadering er waarschijnlijk toe dat niet aan alle relevante aspecten van stedelijke leefomgevingskwaliteit voldoende aandacht wordt besteed. Ook kunnen er problemen optreden in de afstemming tussen het lokale bestuur en de betrokken hogere niveaus. Uit de hier gepresenteerde analyse kan worden afgeleid dat aan ten minste drie voorwaarden moet worden voldaan om op lokaal niveau van

zo'n benadering te profiteren, zonder het risico te lopen van verlies van leefomgevingskwaliteit vanuit breder perspectief, dat wil zeggen: in de dimensies die juist met hogere schaalniveaus verband houden. Een eerste vereiste is voldoende bestuurlijk vermogen om een participatief proces op gang te brengen en te onderhouden waarin alle relevante betrokkenen en hun belangen vertegenwoordigd zijn. Daar zijn netwerkvaardigheden voor nodig alsmede de kunst om '*decision windows*' te creëren door de partijen in staat te stellen om hun belangen en doelstellingen te herformuleren tot een gezamenlijke probleem- en doelstelling. Ook het verkrijgen van politieke steun voor de plannen behoort hiertoe. Ten tweede zouden er richtlijnen moeten zijn hoe om te gaan met kwalitatieve meervoudigheid in de lokale besluitvorming. Zulke richtlijnen zouden de vorm kunnen aannemen van gebiedsgerichte milieukwaliteitsprofielen, in combinatie met procedurele regels die de manoeuvreerruimte van het lokale bestuur beschrijven en zekerheid geven dat alle relevante belanghebbenden in de besluitvorming worden betrokken. De derde voorwaarde is dat er een kennisinfrastructuur aanwezig is die voor de beslissers en hun adviseurs alle informatie toegankelijk maakt die nodig is voor het beheersen van de kwaliteit van de stedelijke leefomgeving.

Het holistische perspectief dat in dit onderzoek is ontwikkeld voegt drie belangrijke inzichten toe aan de bestaande wetenschappelijke literatuur over dit onderwerp. In de eerste plaats toont het de kwalitatieve meervoudigheid van duurzame stedelijke ontwikkeling in termen van kwaliteitsaspecten van de stedelijke leefomgeving en de daaraan verbonden ruimtelijke en bestuurlijke schaalniveaus. Ten tweede levert het vijf factoren op die verklaren waarom integratie van milieubelangen in stedelijke plannen soms problematisch is. Deze vijf factoren treden gezamenlijk op, waardoor het onmogelijk is om één factor te veranderen zonder daardoor één of meer van de andere te beïnvloeden. En ten derde nuanceert de normatieve benadering van *environmental policy integration* de roep om meer flexibiliteit in het omgaan met milieukwaliteitseisen.

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The photograph in Fig. 1.2 and the one used in the jigsaw puzzle on the cover and the chapter pages are reproduced by courtesy of Gemeente Tilburg. The photograph in Fig. 1.3 is by Bas van der Veen, who volunteered to take pictures in Noorderhaven.

Curriculum Vitae

Marinus (Rien) van Stigt (1957) obtained his Masters' degree in biochemistry in 1982 (Utrecht University). Shortly after, he started lecturing chemistry at what is now the Institute of Chemistry and Life Sciences of Utrecht University of Applied Sciences. Here, he developed and taught a bachelor course in environmental chemistry.

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In 2011, he started a PhD research project – of which this dissertation is the final product – at the institute's Research Centre, in cooperation with the Faculty of Geosciences, Utrecht University.