SUSTAINABLE URBAN AREAS
11

Sustainable neighbourhood transformation

Vincent Gruis
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1 Introduction

Henk Visscher, Vincent Gruis and Reinout Kleinhans

1.1 Scope and aims of the book

Urban renewal via the large-scale restructuring of post-war neighbourhoods will form a major challenge throughout Europe in the decades ahead. The neighbourhoods in question were constructed in the aftermath of World War II amid major housing shortages, decimated infrastructures and a scarcity of good-quality building materials. At present, the ageing housing stock and the accompanying social problems are posing serious threats to liveability in certain neighbourhoods (for overviews, see Murie *et al*., 2003; Turkington *et al*., 2004). The problems are usually multi-layered depending on the policy and the national and local context. Different kinds of interventions are required to prolong the physical, social and economic lifespan of these neighbourhoods. Restructuring programmes are needed to raise the quality of the housing stock and bring about a 'better social mix' in the population. They would also present opportunities for improving the energy efficiency of the housing stock – absolutely crucial if CO_2 emissions are to be cut to the levels agreed under the Kyoto Treaty. However, the demolition, renovation and construction of housing also have a substantial impact on the environment, not least because they consume energy and use up scarce resources. In short, making post-war neighbourhoods sustainable is a massive challenge in terms of both results and processes.

Current urban restructuring programmes in the Netherlands tend to focus primarily on the demolition and replacement of existing housing stock. Many social landlords undertake extensive demolition programmes, particularly on the less popular post-war social housing estates. Large swathes of the social rented housing stock in these neighbourhoods are earmarked for demolition only to be replaced by new, more upmarket owner-occupied dwellings. The motivation behind these strategies is often tied in with efforts to bring about a better social mix between 'poor' and 'better-off' households, to improve the general quality of the housing stock, to create a financially viable restructuring programme, and to raise levels of home-ownership.

In general, the aim of demolition and replacement strategies is to improve various aspects of sustainability in urban neighbourhoods. This explains why they are encouraged by national and local governments; however, they do pose some scientifically and socially relevant questions: What is a sustainable neighbourhood? How are or how should neighbourhoods be transformed to increase their sustainability? Are demolition and replacement strategies the most effective and efficient way to achieve this objective? These questions are not easy to answer, largely because sustainability is a multi-faceted concept which does not easily translate into concrete definitions and measures. Indeed,

sustainability can be viewed from a number perspectives: For example:

- An economic perspective focusing on the market position and the value of the neighbourhoods. Will these be improved by interventions?
- A social perspective, focusing on the levels of social cohesion, social capital and residential stability in the neighbourhoods.
- An environmental perspective, focusing on the energy efficiency and the use of materials in restructuring strategies.

The different perspectives deliver different criteria for a successful approach to the restructuring of neighbourhoods. A strategy which is effective from one perspective might be ineffective from another.

In this book, we examine the effects of demolition and replacement strategies on sustainability in neighbourhoods from different perspectives. It deals with research conducted at the Delft Research Centre for Sustainable Urban Areas (DRC SUA) at Delft University of Technology. DRC SUA accommodates ten of the university's research programmes, all geared to accumulating knowledge for the development of Sustainable Urban Areas. The contributions in this book all evaluate the implications of restructuring strategies in the Netherlands, with specific emphasis on demolition and replacement. They do so, however, from very different perspectives. Together, they provide a broad representation, a sampling of the various approaches that can be applied to assess the role of demolition and renewal strategies in the realisation of sustainable neighbourhoods.

Below, in Section 1.2, we take a brief look at the wider (international) context. Studies show that neighbourhood regeneration – especially in the form of demolition and replacement – is an important issue all over Europe. Section 1.3 presents the Dutch context, the background to all the research projects reported in this book. Section 1.4 describes sustainability as understood at DRC SUA and introduces the conceptual framework which the authors applied when writing their reports. The last section (1.5) provides an outline of the various chapters.

1.2 International developments

Sustainability has entered the discourse on urban and neighbourhood regeneration policy all over Europe. Though sustainability is rooted in environmental policy, it is certainly not limited to environmental or economic issues. Area-based urban renewal programmes in several European countries share the common goal of strengthening the capacity of distressed neighbourhoods to become both 'sustainable' and 'self-governing' (Cole and Etherington, 2005). Great Britain, for example, recently devoted a policy paper to 'sustainable communities' (see ODPM, 2003). And Sweden has a Ministry for Sustainable Devel-

opment, which focuses clearly on the social as well as the environmental and the economic dimensions of sustainability. The Netherlands is therefore no exception in applying sustainability to neighbourhood dynamics and policies.

The housing stock makes a substantial contribution to environmental sustainability. The Kyoto Protocol sets high reduction targets for CO_2 emissions. The industrialised countries have agreed to cut their CO_2 emissions by 5.2 per cent between 2008 and 2012 compared with the 1990 level. In the European Union, buildings account for 40 per cent of the total energy consumption and 30 per cent of all CO_2 emissions. About two-thirds of this energy consumption takes place in the housing sector. According to estimates, the construction industry generates approximately 40 per cent of all man-made waste, the equivalent of some 180 M.tons in Europe every year. The World Watch Institute has warned that, if this trend continues, the global community will run out of building materials by approximately 2030. The need to cut CO_2 emissions in the building sector prompted the European Parliament to introduce the Energy Performance of Buildings Directive (EPBD) in 2003. Under Article 7 of this directive all dwellings which are sold or transferred to a new tenant must have an energy certificate which contains information on the energy consumption of the dwelling and recommendations for improvement. This EPBD has to be operational in the whole EU by 2007. The expectation is that it will raise awareness of the amount of energy consumed by dwellings and lead to voluntary improvements. However, studies paint a pessimistic picture of the effects of the EPBD if it is not combined with mandatory requirements and/or financial incentives (Sunikka, 2006).

Defining and – especially – measuring sustainability is, in itself, a challenge. Paradoxically, this is partly the legacy of the massive attention that has been paid to the concept. The pursuit of sustainability is usually taken for granted in urban policies. Consequently, it is often wrongly defined or people conveniently assume that further elaboration is not necessary. Like many other concepts, it falls victim to a tendency among policymakers in particular to brush up plans or policy documents in order to enhance their appeal and make them sound modern. As a result, debates on sustainability become even more nebulous. This book attempts to overcome at least this shortcoming by providing a conceptual framework for sustainability. All six chapters between the introduction and the conclusion will position themselves within this framework and clearly define the angle of approach to their research topic.

1.3 Developments in the Netherlands

Since the 1960s, the demolition and replacement of housing has been a key issue in urban renewal policies in the Netherlands. However, the demolition strategies developed in character and size in the second half of the 20th cen-

tury against shifting political backgrounds. This section presents a short historical overview of urban renewal policy and explains the current policy in the Netherlands, paying particular attention to the role of demolition and replacement. It places the issues in context for the international reader and sets out the perspectives on demolition and replacement in Dutch policy on urban renewal.

The historical development of urban renewal policy

During the (early) post-war period, the Dutch government responded to the housing shortages by pursuing a policy that focused on new housing schemes and urban expansion. In the 1960s, the development of existing urban areas was added to the policy agenda. In this early period, urban renewal policy was dominated by a strategy of 'clearance and reconstruction'. Dwellings in neighbourhoods located near and in the city centre were demolished and replaced by either larger, more upmarket dwellings or central economic services.

In the 1970s, partly as a reaction to the 'liberal' policy of the previous decade, the 'traditional' urban renewal policy was introduced in the Netherlands. The purpose of traditional urban renewal is to maintain, repair and reinforce housing in existing urban areas. Consequently, large-scale demolition plans were abandoned and succeeded by refurbishment strategies, combined with small-scale replacement and new housing developments in open spaces. Under the credo 'building for the neighbourhood', the creation and maintenance of opportunities for low-income households became a major spearhead in urban renewal policy during this period.

In the late 1970s and the 1980s, the traditional urban renewal policy was consolidated, but the emphasis on building for the neighbourhood shifted towards 'building for the city'. This meant that a balance had to be struck between the role of urban renewal in housing production for low-income (sitting) households on the one hand and in the creation of neighbourhoods to attract middle- and higher-income households to the city on the other. As a result, maintenance and renewal lost some of their priority over demolition and replacement. This trend continued in the 1980s, when urban renewal policies gained a wider economic meaning. Demolition and replacement strategies were now accepted, even for dwellings of technically good quality, in order to improve the climate for economically stronger functions and groups (Vermeijden, 1997).

In the 1990s, 'traditional' urban renewal was succeeded by 'new' urban renewal, which was laid down in the Urban Renewal Memorandum of 1997. Despite clearly visible improvements in the quality of the physical environment, the Urban Renewal Memorandum concluded that negative social and economic developments were still taking place in cities and threatening the sustainability of the results of earlier (physical) improvements. The Memorandum therefore argued for a more comprehensive approach, combining social,

economic and physical elements. New urban renewal would (still) focus primarily on the physical environment, but it would take more account of social and economic aspects. Urban renewal acquired a much wider focus, encompassing the economic and social fortification of cities as well. Moreover, a distinction was introduced between 'finishing' traditional urban renewal in pre-war neighbourhoods and an ongoing effort to restructure the housing stock, also on post-war estates with a poor socio-economic position on the housing market.

Current urban restructuring policy

The current urban restructuring policy in the Netherlands is an exponent of the new urban renewal policy that was introduced in the 1990s. From now on, demolition and renewal must be seen largely in relation to urban restructuring. The Urban Renewal Memorandum (Tommel, 1997) applies the adjective 'restructuring' to measures aimed at timely and preventive intervention in neighbourhoods characterised by one-sided housing stock and a poor image. Decentralisation has now turned urban restructuring into a local policy issue that needs to be addressed by municipalities in partnership with local parties. That said, central government still influences the local policies in various ways. One key element in the central government's restructuring policy is the so-called '56-neighbourhood approach', which was introduced by former Housing Minister Henk Kamp as part of the Restructuring Action Programme (2002). This action programme consists of a comprehensive package of measures aimed at speeding up the restructuring process. These measures apply to all urban areas in the Netherlands, but with 56 neighbourhoods designated for specific attention. These 56 neighbourhoods were nominated by the 30 large cities and selected by the Ministry of Housing, mainly on the basis of the level of social problems in proportion to the need for (physical) restructuring (*Dossier 56-wijkenaanpak*, see www.vrom.nl). Restructuring programmes are being carried out in these neighbourhoods, but there is a further agenda. In fact, according to a recent analysis by the Central Housing Fund (CFV), the 56 neighbourhoods were selected primarily because it was thought that they would form a good basis for successful policies and act as 'role models' for other neighbourhoods. The 56 neighbourhoods are not the weakest neighbourhoods in terms of socio-economic structure. Most of the dwellings in neighbourhoods that need restructuring are owned by the Dutch housing associations, and to them, the 56 neighbourhoods are not those which are most in need of investment (CFV, 2005).

Housing associations play a key role in Dutch restructuring policy, not just because they own so much of the housing stock, but because they have the financial resources to (re)invest in the neighbourhoods. A recent CFV survey indicated that around 10 per cent of their stock will have to be restructured in the next ten years – almost 80 per cent of which was built after the war (CFV, 2004).

Neighbourhood restructuring programmes can be funded from the Urban Renewal Investment Fund (ISV). The ISV money is, however, not only intended for restructuring the housing stock. Local government may use it at its own discretion for physical projects related to housing, spatial development, the environment, urban economy and large-scale green space. The total ISV budget for 2005-2009 is 1.5 billion euros, 465 million of which are expected to be channelled into restructuring (Dossier Investeringsbudget Stedelijke Vernieuwing, see www.vrom.nl). A provisional estimate by Gruis (2006, based on data from the CFV, 2005) suggests that housing associations expect to spend about 3 billion euros on restructuring in the same period.

In tandem with the 56-neighbourhood approach, the Dutch government is trying to raise the pace of restructuring by establishing a benchmark which ranks housing associations according to new developments, demolition and sales. The best performances are recorded by housing associations with high scores for building, demolition and sales. The benchmark has been greeted with deep scepticism by the housing associations because of, amongst others, its simplicity and the fact that it ignores local housing needs (e.g. Sinnige, 2006). Nevertheless, housing associations have increased the demolition of their housing stock from 0.2 per cent of in 1992 to approximately 0.5 per cent in 2006 and expect to reach about 1 per cent in the near future. In Chapter 2, Van der Flier and Thomsen provide a detailed quantitative overview of demolitions in the Netherlands. They conclude that the number of demolished dwellings in the Netherlands is relatively high compared with other European countries. This is a somewhat remarkable observation considering that Dutch housing stock and neighbourhoods are not known to be in a poor state compared with other countries. Moreover, the Dutch housing market is still characterised by a general housing shortage (well acknowledged by the Housing Minister), which places the relatively high rate of demolition in a somewhat awkward perspective.

Policy debate: physical versus social perspective

Kleinhans (2005) has identified six recurrent objectives in urban restructuring policy in the Netherlands:

- To improve the market position of neighbourhoods dominated by social rented housing.
- To reduce the concentration and segregation of economically disadvantaged households.
- To increase opportunities for choice on the housing market and create housing.
- To create more career opportunities within the neighbourhood.
- To reinforce the economic basis of public and economic services.
- To increase the general liveability of the neighbourhood (see also Kruythoff, 2003).

Restructuring programmes are carried out to improve the market position and liveability of post-war neighbourhoods in particular. This may be perceived as a preventive policy as well as a curative policy. From a business-economic point of view, restructuring can be regarded as a form of prevention, as the dwellings in the neighbourhoods are not vacant. Restructuring must prevent vacancies from occurring in a slack housing market in the future. From a socio-political perspective, restructuring can be seen as curative, because the neighbourhoods do not meet pre-defined socio-political standards. Broadly speaking, the objective is the same in both cases: to consolidate or improve the market position of neighbourhoods in relation to the socio-economic mix of their inhabitants. In general, the theory behind the restructuring policy is that improvement and differentiation in the housing stock will help to combat the concentration of low-income households. This, in turn, will help to spread urban problems (or, more accurately, the people that cause them) and nuisance and deprivation more thinly among the inhabitants (Gruis, 2006). Kleinhans (2005) has found empirical evidence which suggests that restructuring can have beneficial social implications. The people who have to move out (because of the restructuring programme) often manage to improve their housing situation. Secondly, both the remaining and new inhabitants are happy that the problems are less concentrated. Having said that, Kleinhans points out that there is little empirical evidence to back other positive social effects ascribed to restructuring; for example, there is nothing to support the assumption that the introduction of middle- and high-income households will create role models and generate social interaction between different groups of people.

Another crucial discussion topic is the investment that is required to tackle problem neighbourhoods. Restructuring programmes are costly and usually involve substantial investments with negative financial returns. Furthermore, the relocation of households intensifies the – already heavy – pressure on the social rented market. It is therefore no surprise that the question of alternatives to large-scale restructuring in the shape of a 'social strategy' is often raised. An explorative analysis by Gruis (2006) indicates that a social strategy could provide a feasible alternative in some situations, consisting of for example:

- investments in neighbourhood 'liveability' without large-scale restructuring, by keeping the neighbourhood clean and safe and improving the public space and facilities;
- direct investment in the social ties between households and the neighbourhood, by stimulating interaction between households, increasing their rights to their dwellings and their neighbourhood, and improving social cohesion through allocation policy (e.g. by using co-opting systems in allocations);
- investing in the reputation of neighbourhoods (marketing, branding) by

communicating the strengths and publicly celebrating successes through various media;
- directly influencing the socio-economic position of the households through allocation and empowerment policies (e.g. by stimulating the neighbourhood economy, starting educational programmes and organising day-care facilities).

The social strategy could work particularly well in neighbourhoods where the main problem is not poor housing quality, but physical improvements will still be necessary in many neighbourhoods because the dwellings themselves have lost their appeal to most people.

1.4 Perspectives on sustainable neighbourhood transformation

The origin of the discourse around the concept of sustainability can be traced back twenty years. The Brundtland Report (Our Common Future) of 1987 defines 'sustainability' as "learning to care for the needs of the present generation without compromising the ability of future generations everywhere to meet their own needs". This definition formed the starting point for more structured and large-scale thinking on sustainability. The Netherlands responded to the Brundtland Report with successive versions of the National Environmental Policy Plan and by participating in UN conferences in Rio de Janeiro (1992, Agenda 21) and Johannesburg (2002). In 2003 the lessons were translated into an action plan entitled 'Sustainable Development: Sustainable Commitment'. The Dutch government defines sustainable development as an economic, socio-cultural and ecological development in which the current generation is able to satisfy its own needs without preventing future generations from doing the same. The sustainable development policy of the Dutch government faces three main challenges in the years ahead:
- It must guarantee the potential for economic growth against the background of a multi-cultural society, individualisation and an ageing population.
- It must maintain social cohesion against the background of a multi-cultural society, individualisation and an ageing population.
- It must ease the pressure on the environment and wildlife and make an honest contribution to the conservation of the global eco-system by helping to create a stable climate, rich bio-diversity etc.

Although the concept 'neighbourhood' does not appear in these challenges, the first two challenges connect not only to the societal and national level, but also lower scale levels. Especially a concept such as social cohesion is of-

ten associated with neighbourhood problems and policies. However, the role of sustainability in a context of neighbourhood and neighbourhood transformation needs more clarification.

There is nothing new about the sustainable transformation of neighbourhoods. The subject has already been touched on in several projects, EU-funded and otherwise. Projects worth mentioning include 'High-rise housing in Europe' (Turkington *et al.*, 2004) and RESTATE (Van Kempen *et al.*, see http://restate.geo.uu.nl). RESTATE is an acronym for Restructuring Large-Scale Housing Estates in European Cities: good practices and new visions for sustainable neighbourhoods and cities. Despite the title, however, the term 'sustainability' is used very inconsistently in the different case study reports. It is expatiated in ecological, environmental, economic, social and technical terms solely at the discretion of the researcher. There is no sign of any joint conceptual framework for dealing with the notion of sustainability. RESTATE does however clearly underline the importance of neighbourhood transformation and restructuring policies all over Europe.

The same can be said of 'High-rise housing in Europe' (see Turkington *et al.*, 2004). Turkington, Van Kempen and Wassenberg (2004) trace the development of large housing estates all over Europe, starting from their construction several decades ago and ending with their current state and problems. They also describe the diverging patterns in large housing estates in different countries and stress the need for restructuring. Though the term 'sustainability' hardly appears in the report, it features prominently, but never explicitly, in the final chapter, where the authors describe some of the choices and dilemmas that face policymakers when deciding the fate of large housing estates:

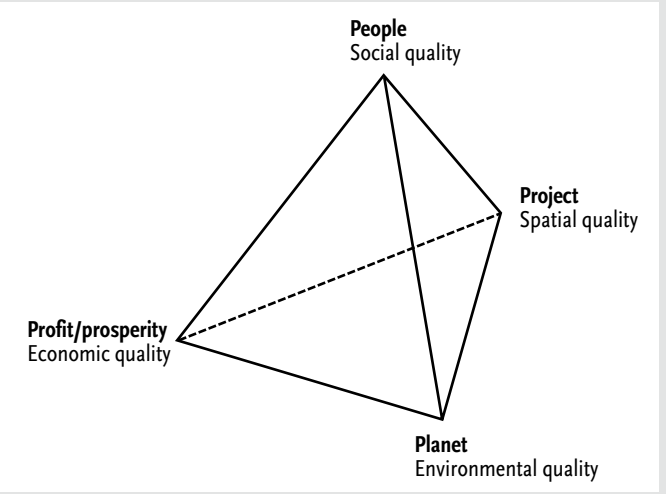
- To retain or demolish?
- To focus on the estate or a wider area?
- To focus on the present or a future use?
- To retain or change the market position?
- To leave alone or to make changes?

These dilemmas, especially the first and third, are crucial to the issue of sustainability and neighbourhood transformation. The first (retain or demolish) relates directly to the main purpose of our book, i.e. to ascertain the effects of demolition and replacement strategies on neighbourhood sustainability from different perspectives. But even when the starting point is clear (demolition and replacement), the other four dilemmas are still unresolved. A different kind of framework is needed.

DRC SUA subscribes to the theoretical framework and further development of the Ecopolis Strategy (Duijvestein, 2004). The Ecopolis Strategy identifies four main perspectives:

- planet or flows (linked to environmental quality);
- people or players (linked to social or process quality);

Figure 1.1 Conceptual framework for sustainability



Source: Duijvestein, 2004

- profit or prosperity (linked to economic quality);
- project or areas (linked to spatial quality).

This results in a tetrahedron in which the perspectives and qualities are linked (see Figure 1.1).

Planet (environmental quality)
Ecological sustainability hinges on the minimisation of environmental pollution from the production of building components, construction activities and the use of buildings. These effects can be classified on a visibility scale. At global level, the key issues are the exhaustion of natural resources, the greenhouse effect and the depletion of the ozone layer. At regional level, they are smog formation, acidification, and eco-toxicity in water and riverbeds. At local level, they are local environmental effects such as eco-toxicity in the soil, human toxicity, manure pollution, noise exposure, and air pollution (e.g. odour, CO_2 concentration) (Klunder, 2005). One crucial principle in the design of sustainable buildings is that the flow of materials and energy be limited. Re-use of materials not only saves energy but conserves resources, prevents harmful emissions and reduces the eco-toxicity from production processes. By applying the soil balance principle transport energy can be saved and waste suppressed. Limiting the energy flow helps to conserve natural resources (fuel) and lowers CO_2 and other emissions. SenterNovem, the Dutch agency for energy and the environment, concentrates primarily on this type of sustainable development. The living and working environment is assumed to account for a substantial proportion of the national energy consumption. Accordingly, a school of thought has emerged which advocates extending the lifetime of buildings and neighbourhoods, but this would depend on the adaptability and resilience of dwellings (flexibility). A large part of the environmental problem is caused by emissions entering the air, soil and water. Often, when people speak of emis-

sions, they mean emissions into the air, which are to blame for the depletion of the ozone layer and the greenhouse effect. This perspective formed the basis of the Kyoto Treaty. Another specific perspective is indoor environment and health, where the focus is on the here and now, the main objective being to reduce the harmful effects on human health caused by (emissions from) building materials, poor ventilation, poor indoor and outdoor air quality and humidity problems. An important role is also played by questions such as noise exposure and air pollution, where cause and effect usually spill beyond the local context. A neighbourhood is ecologically sustainable when there is enough flora and water to give nature ample scope for development. This process is sometimes referred to as biodiversity; what it means is that new building or reorganisation projects must respect the ecological main structure by, for example, the insertion of blue or green corridors. Issues such as the quality and quantity of flora (diversity of the species) are addressed here. The ultimate aim is to raise the quality of the living environment and improve the leisure facilities in the vicinity (and reduce travel).

Energy-saving measures may be good for sustainability when it comes to construction, but they can erode the historical value of monuments. In the cultural-historical perspective, sustainable development is based on the conviction that architectural and civic values need to be conserved. The argument that surplus space is not sustainable has been disproved. It is now known that surplus dimensioning of space, storeys and installations is actually a prerequisite for sustainability. Monuments have survived precisely because of the surplus dimensioning. Hence, they are flexible.

Project (spatial quality)
Spatial quality is a core concept in Dutch spatial planning policy. It is divided into consumptive, experiential and future value. A sustainable urban area is suitable for many functions: it is generally appreciated and considered pleasing, and it is flexible enough to adapt to changing circumstances. The *Fifth Memorandum on Spatial Development* (which was never ratified) sets out seven criteria for spatial quality; one of these is sustainability. One way of making the most of the available space is to introduce multiple use in height, depth and/or time. Mixed functions and differentiation promote efficient use of the space and shorten travel distances. At the same time, facilities such as collective underground parking lots improve traffic safety and leave more surface space for children to play etc.

Profit/prosperity (economic quality)
A neighbourhood is sustainable from an economic perspective when its potential is fully exploited. This may relate to homes (no empty dwellings) or facilities (shops, schools) or public transport (sufficient support base). Housing associations, for example, think more in the longer term and apply feasibili-

ty and funding as the guiding principle (Didde, 2002). This perspective can also stretch to a sustainable neighbourhood economy and the prevention of poverty. Government indicators include unemployment levels and GDP per resident.

People (social quality)
Increasing attention is also being paid to social welfare. The resident and – more importantly – his appreciation of the performance and the market position of the neighbourhood play a key role here. The adjective 'sustainable' is applied when aspects such as social cohesion, liveability, residential stability, safety, care of the elderly and education are good or are improving. This can enhance satisfaction and neighbourhood ties and prompt the residents to invest (more) time and energy in their home and their living environment. This perspective extends to the debate on demolition/new building versus renovation/renewal. A common argument to retain the present housing stock is that, besides increasing environmental pollution, demolition and new building lead to the demise of social and cultural values. However, in other situations residents actually push for interventions which enable them to continue living in the neighbourhood and will prevent it from becoming a halfway halt.

Sustainable decision-making and design is another perspective. The basic idea is that policy and design decisions relating to sustainability need a special approach because of the complexity of the domain and the network of players who are involved. Collective decisions and collective action are needed (Dryzek, 1997; Emmit, 1997; Van Bueren *et al.*, 2002 and 2003). Recurrent themes are 'involvement' or 'institutionalisation'. Institutionalisation entails the embedment of sustainability in the thoughts and actions of all players in society. It means, amongst others, that the concept of sustainability should be anchored in public policy (transition, embedment and implementation).

Integrated approach towards sustainability
Through time, these different perspectives have won varying degrees of favour among researchers and policymakers. Opdam *et al.* (2000) have traced the development through three generations. The first generation dates to the late 1980s, when people all over the world became anxious and upset about the dire state of the environment. This was the seedbed that the report *Our Common Future* landed in. The second generation was primarily quantitative and technological. It was expressed at global level by linking sustainable development with the measurement of emissions of SO_2, CO_2, sulphur, dioxin and other substances. In 1992 worldwide agreement was reached in Kyoto on reducing harmful emissions. The quantitative calculation models were accompanied by the debut of the compensation principle. The third generation leaves calculation behind and tries to link the environment with values and social stability. NovioConsult and Storm CS (Opdam *et al.*, 2000) describe it as follows: "The third generation wants to simplify the everyday life cycle

of people, the daily clinch between time and distance. It aspires to neighbourhoods where time and distance are the spearhead of the design. The neighbourhood must also be able to adapt to the life phase of the residents and changes in lifestyle. Buildings become more sustainable as a result, but what matters most is that the social quality of daily life is accorded central place. This is where the leap to sustainability is made."

Van Hal (2002) claims that Sustainable Building Policy is currently in a state of transition. The push from the government must give way to the pull from the market. Sustainability must become so natural to customers (citizens) and suppliers (businesses) that other developments or products are no longer in demand. The third generation can also be discerned in national policy. In the NSDO report (National Strategy for Sustainable Development, 2002) the government aims to establish cohesion between economic, socio-cultural and ecological factors. On the basis of five themes (population, climate, water, biodiversity and knowledge) the report traces the Dutch government's progress along the path to sustainable development in recent years and sets out the targets and challenges in the longer term. At the same time, it formulates some departure points for framing further strategy. According to the Ministry of Housing, Spatial Planning and the Environment (VROM, 2002), sustainable development requires cohesion between economic, social and ecological factors. The economic factors concern not only economic growth, employment, productivity, investment and suchlike but other matters as well, such as the capital goods supply, infrastructure and human capital (knowledge). Maintenance or enlargement of the potential for economic development is one of the hallmarks of sustainable development. The socio-cultural factors refer not only to population, training, and cultural expression but also – and more importantly – to social cohesion and the ability of socially active people to contribute to these elements and to cultural diversity. The ecological aspects concern not only the emission of pollutants, changes in the composition of species, and the yield from natural resources, but also the level of bio-diversity (all forms of life, including the gene stock), the supply of fertile land and clean water, air and soil. Therefore, according to the government, sustainable development – as described in the third generation – is a question of striking a continuous balance between these different factors. The Scientific Council for Government Policy (WRR, 2002) says that the government's view of sustainable development is too broad. It implies that these perspectives need to be systematically assessed in all decision-making processes. Sustainable development will then cover the entire range of government policy. The WRR foresees the meaning of sustainable development coming more and more adrift from its original ecological roots and is therefore urging the government to abide by sustainable development as a value in the sense of the Brundtland Report: a value that will articulate and strengthen these environmental preferences and the accompanying long-term thinking. In recent years interna-

tional research has been investigating tools and methods that will enable an integrated approach to this complex system. Experts are stressing that societal and ecological issues have such a strong reciprocal influence that they cannot be addressed in isolation (Kay and Regier, 2000; Boyle *et al*., 2001).

1.5 Outline of the book

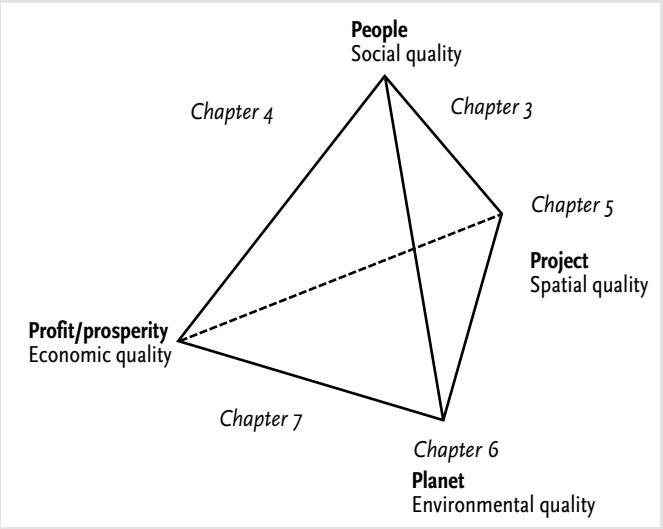
As mentioned before, sustainability can be interpreted in many ways. This book contains a collection of various research projects conducted at the Delft Research Centre for Sustainable Urban Areas (DRC SUA). Before we present an overview of the themes covered by each chapter, we will explain what DRC SUA understands by the concept of 'sustainability'. The core ambition of the DRC SUA research programme is to gain a clearer understanding of social and technological dynamics in urban areas and their spatial implications, and to steer these in a way that pays specific attention to sustainable development. In the view of the DRC SUA, sustainable development implies spatial quality (project), social quality (people), environmental quality (planet) and economic quality (prosperity). It entails the realisation of a level of quality that reflects current and future needs and the elimination of current obstacles in urban development.

At SUA, 'urban areas' are a geographical concept. Urban and rural are no longer seen in juxtaposition. Current scientific and policy discourse (Asbeek Brusse *et al*., 2002; Castells, 1996; Hall, 1998) are highlighting a more dynamic relationship between the two. The SUA programme defines urban areas as areas in which the red functions, such as living, working, leisure and mobility, are dominant. Green and blue functions may also be present, but they may not be dominant. Functions may be researched individually (except for mobility) or in combination with each other. Whether one can talk about a 'successful sustainable urban area' depends on the perspective. A number of perspectives are fleshed out to shed light on the concepts used. Sustainability is a very broad concept, which is addressed in many different shapes and forms in research projects and institutes. For example, some people may talk about sustainability in connection with ecology, biodiversity, materials, energy, emissions, waste, indoor climate and health, spatial quality, or efficient use of space whereas others see it in economic, social (including commitment by players) or institutional terms or relate it to decision-making and design. It is important to be aware of these different perspectives when participating in discussions, but they should not be considered separately, as the problems and solutions are closely intertwined. An understanding of all the perspectives and how they interrelate is the key to a sustainable society.

All the contributions in this book relate to the question of how neighbourhoods can be transformed in order to generate a more sustainable housing

stock and living environment. All the analyses also pay particular attention to the role of demolition and replacement strategies as opposed to refurbishment, social strategies and other alternatives. Each chapter has been selected because it highlights one or more of the perspectives on sustainability. Figure 1.2 shows the position of the chapters, according to their primary perspective, within the conceptual framework in Figure 1.1.

Figure 1.2 Positions of the chapters in the conceptual framework for sustainability



Source: Duijvestein, 2004

Chapter 2 – Life cycle of dwellings and demolition by Dutch housing associations

Chapter 2 presents an analysis of demolition strategies in the Netherlands and provides a general, quantitative background to the overall theme of the book. Kees van der Flier and André Thomsen discuss the demolition strategies of Dutch housing associations, the main providers of rented housing in the Netherlands, and also the main demolitionists. They relate their quantitative analysis to an analysis of the demolition motives of Dutch housing associations and their implications for the lifespan of dwellings. The overall picture indicates that roughly 0.2 – 0.3 per cent of the Dutch housing stock is being demolished and that the demolition figures in the Netherlands are rising more sharply than in the surrounding countries. Van der Flier and Thomsen have examined the motives of the landlords and real estate managers and the underlying factors and found a relationship between the year of construction, the technical/physical quality of dwellings and the demolition rate, which is in line with common technical lifecycle theories. However, they found no clear relationship between the demolition figures of housing associations and other variables such as demand, tenure and asset management. Hence, there may be other reasons behind demolition. Van der Flier and Thomsen suggest that 'endogenous' factors play a strong role and refer specifically to the ideas of housing association managers on how to create economically and socially sustainable neighbourhoods.

Chapter 3 – Joint physical and social neighbourhood transformation. Motives, myths, coincidences and perspectives

In Chapter 3 André Ouwehand suggests that neighbourhood transformation could be addressed by a clever combination of physical (demolition, new con-

struction) and social strategies. Ouwehand argues that this combined approach would deliver a more sustainable form of neighbourhood transformation than the 'orthodox' physical approach. The literature highlights the importance of the residents' perceptions of neighbourhood changes in terms of market position and social cohesion, and opportunities for regeneration strategies. A planning process that takes proper account of the residents' views will have a better chance of success than an exclusively physical strategy. Amongst other things, it leads to a more refined analysis of the neighbourhood problems and assets. Ouwehand describes the prerequisites for and some of the success factors and pitfalls of a comprehensive social-physical approach. He supports his argument by quoting the example of Holy-Zuidoost, a neighbourhood in Vlaardingen (a city close to Rotterdam) where carefully organised resident participation has had a clear influence on the nature of the physical renewal operations.

Chapter 4 – Residents' social capital after neighbourhood transformation. An analysis of differences related to residential mobility

In Chapter 4 Reinout Kleinhans looks at sustainable neighbourhood transformation from a social perspective. The area-based urban policies pursued in several European countries aim at strengthening the capacity of distressed neighbourhoods so that they can become more socially sustainable. Sustainability in this perspective is usually understood as fostering social cohesion, building social capital, increasing residential stability and enlarging resident participation and responsibility. Chapter 4 focuses on two aspects of (social) sustainability: social capital and residential stability. Social capital in a neighbourhood context refers to the benefits from incidental contact, shared norms, trust, and collective action by the residents. It may be regarded as one of the building blocks of social stability and self-help and self-sufficiency in the community. Kleinhans reports the results of extensive empirical research in two recently restructured neighbourhoods in Rotterdam. Besides studying the distribution of social capital among stayers, movers and newcomers, Kleinhans analyses the relationship between social capital and residential stability, measured by the households' expected length of residence in the neighbourhood. The survey data show that social capital is not just an asset of long-term stayers; newcomers in particular are relatively rich in social capital. However, expected length of residence seems to be of little importance to social capital. It appears therefore that, though urban restructuring has a strong effect on various preconditions for social capital, it has only a modest effect on residential stability.

Chapter 5 – Neighbourhood transformation and urban planning and design

From an urban planning and design perspective, sustainable district transformation is closely linked to integrated regeneration, claim Robin Houterman

and Edward Hulsbergen. Different sectors, parties and disciplines play a role in neighbourhood regeneration but attention also needs to be paid to spatial scales. Moreover, the transformation of a neighbourhood does not stop short at the geographical boundaries, but extends to the position of the neighbourhood in the city and region. The debate on neighbourhood transformation in the Netherlands seems to be based primarily on housing arguments – more specifically, housing market developments and exploitation results. Demolition followed by new building, though often seen and implemented as an appropriate strategy for neighbourhood renewal is only one of the strategies for a sustainable environment. Urban planning and design is important in various spatial, structural and social questions.

Chapter 6 – Environmental impacts of renovation. The Dutch housing stock compared with new building

When urban renewal projects are undertaken, choices need to be made between maintenance, with some minor interventions, and total redevelopment involving the demolition of the existing stock and the construction of new housing. Simple renovations are only possible if the quality of the existing dwelling is able to meet current needs. However, the existing stock in most urban renewal districts in the Netherlands does not meet current needs. This is one reason behind the large-scale demolition and replacement programmes. Renovation-based strategies could offer more sustainable alternatives. In Chapter 6 Laure Itard *et al*. compare the environmental impacts of maintenance, consolidation, transformation, and redevelopment in two typical cases of urban renewal in the Netherlands. The environmental effects are calculated with the Life Cycle Assessment method and the results are presented according to the environmental impact of quantities of material, energy and water consumption and waste. As assessment of the environmental impact delivers a more complete picture than an inventory of consumption. Transformation emerges as much more environmentally efficient route towards the same result as demolition and replacement. The embodied and operational energy use are also compared. Because post-war dwellings have a relatively short lifespan, the embodied energy can account for 30 per cent of the total energy consumption. It would therefore be worthwhile to use construction methods that reduce embodied energy and to design new buildings with in-built flexibility.

Chapter 7 – The Eco-costs of housing transformation

Tim de Jonge combines the environmental perspective of Itard *et al*. with an economic perspective. He argues that an analysis of the environmental impact of energy consumption and resource depletion (the 'environmental costs') is not enough for a comprehensive evaluative comparison between

demolition and renovation; one must also look at how these factors affect the quality of the housing as perceived by the users (the 'economic value'). New construction and renovation usually result in very different perceptions of the housing qualities. This should be given due consideration when comparing the ecological impact of both approaches. De Jonge therefore uses the Eco-costs/Value Ratio (EVR) model and concludes, in line with Itard *et al*. that, if renovation can offer convenient housing for a particular target group, it has a better chance than new building of improving the environmental sustainability of the housing stock.

Chapter 8 – Conclusions
In our conclusions we reflect on the content of the chapters in relation to the central question posed by the book: What role can demolition and replacement strategies play in creating sustainable neighbourhoods as seen from different perspectives on sustainability and in comparison with other strategies? We also reflect on the implications of our findings for research and policy.

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2 Life cycle of dwellings and demolition by Dutch housing associations

Kees van der Flier and André Thomsen

2.1 Introduction

What is the average life span of dwellings? Unlike that of human beings, the life span of dwellings can technically be endless; extension is subject to decisions of the owner. Recent research shows that life-cycle extension of existing dwellings is often a more sustainable choice than replacement by new construction (De Jonge, 2005; Klunder, 2005). A recent OECD whitepaper emphasizes the need for sustainable use of the building stock (SUBS), where life-cycle extension is a key issue (Awano, 2006). However, current practice is still overwhelming opposed to this and the awareness of SUBS is still a far cry.[1] Though the volume of demolition in the EU has been relatively small and fairly stable in the past, the available statistics show considerable inter-country variation. Compared to surrounding European countries, the Netherlands shows a disproportionately high demolition rate (demolition as per centage of the total housing stock), which has moreover been increasing of recent years (Figure 2.1).

The high demolition rate in the Netherlands is predominantly due to destruction of social rental dwellings (Figure 2.2). A recent study showed that Dutch housing associations have not only demolished relatively large numbers of dwellings (mainly early post-war apartments) during the past 10 years but have also planned a sharp increase in numbers of demolition in the coming years (Thomsen *et al*., 2004). In view of the desirability of life-cycle extension, it may be asked why the owners of Dutch housing stock, in particular Dutch housing associations, decide to demolish so much property?

This question can be approached from two sides and from two disciplines:

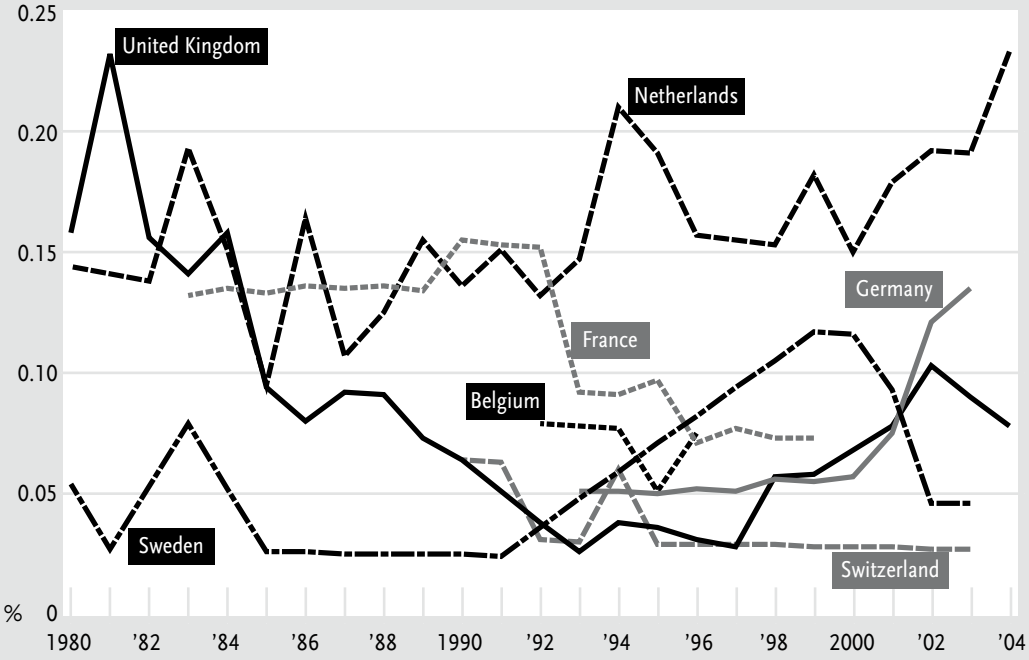
- The characteristics of the dwelling stock that determine the life cycle (building physics).
- The demolition motives and underlying factors of stockowners (building economics and management).

Accordingly we can break down the question into two research questions:

- What is the life cycle of dwellings and what determines this cycle?
- What motives and underlying factors determine the decision making about demolition; what is the relation between these factors and the actual decisions about demolition?

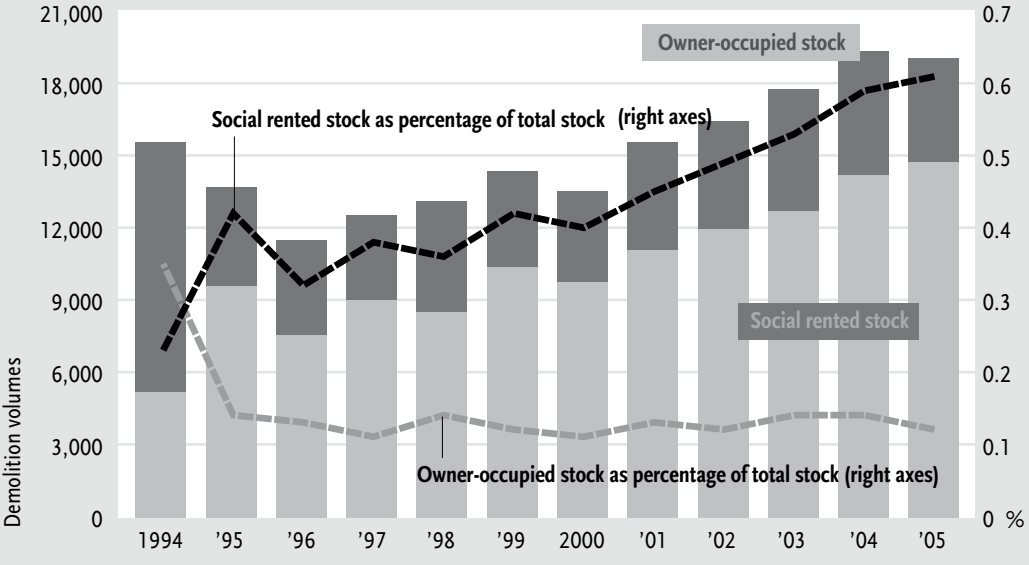
1 A quick review of the abstracts of the IAHS 2004 Congress on Sustainability of the Housing Projects in Trento, Italy, showed that the vast majority of the papers presented at this congress were focused on new construction and less than 25 per cent dealt in some way with existing stock. Other conferences, specialized workshops etc. in this field show a similar bias.

Figure 2.1 Demolition rate in the Netherlands compared to neighbouring countries



Source: UNECE, 2006

Figure 2.2 Demolition volumes and demolition rates in the Netherlands by tenure



Source: CBS Statline (2006a, 2006b)

This chapter is based on a theoretical analysis of the life cycle of dwellings, an inventory of related data and an empirical survey of demolition plans and motives of Dutch housing associations. We did not empirically investigate the decision-making process itself nor evaluate the results from the perspective of sustainability.

The chapter has three parts. We start with a conceptual framework containing the major factors underlying the motives of the stockowners to demolish. We will use this framework to formulate expectations about the relation between some of these factors and the result of the decision making process, the demolition rate. As the available life-cycle approaches do not explicit a relation between demolition decisions and demolition motives, we had to build this model from scratch, making the testing of the model an additional research objective. In the second part we present the actual data on the demolition rate in relation to the presumed underlying factors. In the last section we test the expectations by confronting them with the data and discuss our findings.

2.2 The life cycle of buildings and demolition; a conceptual framework

2.2.1 Life-cycle models and definitions

As the word 'life cycle' indicates, it is common use to compare the life span of long lasting goods like buildings with the life span of living beings. In the same way building pathology studies the causes of decay and collapse of buildings and building components. But unlike the limited and insecure life span of living beings, buildings are man-made, man-maintained and man-demolished.

Buildings are not monolithic objects but consist of a range of parts with different functions and life cycles. Maintenance can be defined as repair and replacement of parts with a short physical life, whereas renovation refers to overall physical and functional improvement, resulting in life-cycle extension of the building as a whole.

The life span of buildings is not limited by physical condition but can in principle be prolonged endlessly, as long as they are considered to be useful. A study of the life cycle of buildings, and more specifically of dwellings, should thus concentrate not only on their physical performance but also on their functional and (micro) economical performance as underlying factors in decisions about continued use, transformation or destruction.

Some authors describe the life cycle of buildings as a cyclic revolving process of building initiative, design, construction, utilisation and redevelopment or destruction/recycling (Lönberg-Holm and Larson, 1953; De Jonge, 2006)). Other scholars describe the decay of buildings as a linear development. Vro-

man describes the decay of dwellings as the gradual loss in the course of time of the original (physical) performance capacity, the theoretical amalgam of the building's technical and functional qualities. Frictions occur where the performance capacity falls below the level that is acceptable to the users (Vroman, 1982). Interventions to prevent frictions and thus extend the life time can be addition of performance by short-term technical maintenance or longer-term renovation on the supply side, or change of users on the demand side. Miles *et al*. (1996) express the economical performance of buildings in a similar way. Unlike Vroman, however, they give concrete form to the performance by using the income appreciation in dollars as a measure. As the balance sheets of Dutch housing associations are at present formally assessed on the basis of the income appreciation of their stock, this variable will be an important input for further analyses.

Demolition can be defined as an intervention to terminate the life span of a dwelling. The OECD uses the term 'service life' of dwellings in this context, which refers to the period between the production and initial use of the dwelling on the one hand, and the loss of its basic performance or its abandonment on the other hand. The concept of service life is somewhat ambiguous, however, since it is not easy to establish when a dwelling has lost its basic performance. Dwellings have a variety of functions; they can be left vacant for some time without being demolished; and many dwellings are demolished even though they are still technically usable (Kohler and Hassler, 2002). For this reason the OECD differentiates between the physical service life, the period between construction and demolition, and the real service life, the period during which the dwelling actually meets the demand (Awano, 2006).

2.2.2 Conceptual framework

To answer the second research question we use a conceptual framework, based on the forgoing sources. This framework contains a number of different elements.

Following Vroman, Miles and Awano we include object-related factors, as the motives of decision makers to demolish will depend on:

- *The physical quality of dwellings*. Dwellings may be demolished because the 'physical service life' has come to an end, due to a loss either of technical quality: the structural parts of dwellings are deteriorated and no longer keep their basic physical performances, or of functional quality: the structure is no longer useable due to insufficient functional performance.
- *The economic quality of dwellings*. Dwellings may be demolished because the effective demand for them has decreased , either due to supply side factors like oversupply, or demand side factors like unwanted dwelling types, causing a negative cash flow. The 'real service life' has come to an end.

Figure 2.3 Conceptual framework with factors underlying decision-making about demolition

	Endogenous (internal factors)	**Exogenous** (external factors)
Market	Market performance - present quality	Market demand - wanted quality
	technical/physical quality functional quality (micro-)economical quality	
	- potential interventions - tenure	- alternative supply - wanted tenure
Policy	Intended supply - portfolio policy - alternative strategies	Required supply - local housing policy - resident opinions
Preconditions	Corporate objectives Business plan - budget sheet - solvability	Government policy Legislation - (building) regulations - urban/regional plans

Following our previous research (Thomsen *et al.*, 2004), we also include actor- and policy-related factors, as the motive will also depend on:

- *The form of tenure*. Home owners and landlords or real estate managers tend to take different decisions about demolition because they have different primary objectives concerning their property: home owners want to live in their dwellings; landlords and real estate managers want to generate profits from their stock.
- *The policy of the landlord and the legal and financial preconditions that shape this policy*. The involvement of landlords and real estate managers in asset management – including interventions like selling of dwellings and new construction – may influence the decision to demolish.

Finally we take account of the manipulability of the factors included, as the decision to demolish will also depend on the question whether the issues lie within the span of control of the decision-makers. We distinguish here between:

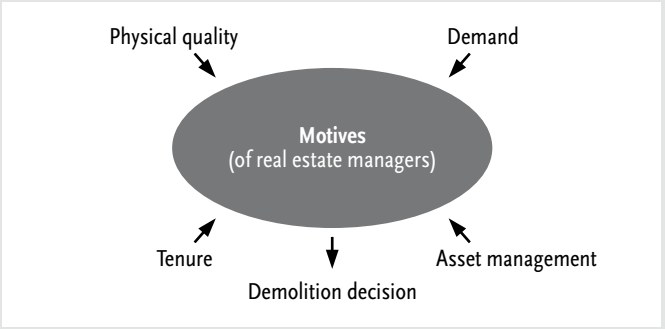
- endogenous factors; internal factors within the control of the decision maker;
- exogenous factors; external factors outside the decision-maker's control, making the decisions dependent on other, in particular governmental parties.

Brought together these elements result in our conceptual framework (Figure 2.3).

2.2.3 Expectations

In this section we will formulate our expectations about the relation between the factors included in the conceptual framework and the actual demolition

Figure 2.4 Conceptual scheme of factors included in research



rate. The conceptual framework as such does not explain how and why decisions about demolition are taken. However, with some knowledge of housing and real estate management we can formulate assumptions and expectations about the impact of the various underlying factors and motives and relate them to the available data on actual demolition practice. As statistics are only available about a limited number of factors, we must confine our analysis to the relation between on the one hand the market factors (technical/physical quality, relation between supply and demand and form of tenure), the policy factor (portfolio policy or asset management) and on the other hand the demolition decision. These relationships are sketched in Figure 2.4.

We will investigate the following expectations:

- *Physical quality*. As the building year correlates with the technical and functional quality (see Table 2.1), we expect the demolition rate to be related to the age of the dwellings; the older the dwellings the higher the chance of demolition. Table 2.2 shows the building period of the Dutch housing stock.
- *Demand*. We expect the demolition rate to be higher in areas with a loose housing market than in areas with a tight market. The reasoning behind the expectation is that landlords and real-estate managers will try to prevent or reduce vacancy by demolition of (least desired) parts of the supply. Table 2.3 gives figures for the quantitative housing shortages in the twelve Dutch provinces in 2002 and 2005. The shortages are relatively large in the provinces that constitute the Randstad (Noord-Holland, Zuid-Holland and Utrecht) and the surrounding provinces (Flevoland, Gelderland and Noord-Brabant).

Table 2.1 The Dutch housing stock; dwellings in substandard condition according to building period, tenure and dwelling (%)

Building period	Home owners		Social rental		Private rental	
	Single-family dwellings	Multi-family dwellings	Single-family dwellings	Multi-family dwellings	Single-family dwellings	Multi-family dwellings
Pre-war	12.8	9.7	5.3	5.9	27.6	21.5
1946-1970	4.1	4.1	3.4	1.3	8.2	4.4
1971-1990	0.6	0.0	0.5	0.1	2.8	0.4
After 1990	0.0	0.0	0.0	0.0	0.0	0.0

Source: MVROM (2003a)

Table 2.2 The Dutch housing stock; tenure according to building period (%)

Building period	Tenure			
	Total	Home owners	Social rental	Private rental
Pre-war	22.8	25.2	11.8	45.5
1946-1970	30.2	23.7	42.0	22.9
1971-1990	35.4	36.3	37.0	26.3
After 1990	11.6	14.8	9.2	5.3
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: MVROM (2003a)

- *Tenure*. We expect the demolition rate in the social rental sector to be below the rate in the other sectors. The reasoning behind this expectation is that the social rental housing stock is relatively young; only 12 per cent of the social rented stock has been built before World War II as compared with 46 per cent of the private rental stock and 25 per cent of the owner-occupied stock (Table 2.2). Moreover, the per centage of social rental stock with a modest, poor or very poor condition is relatively low as shown in Table 2.1.
- *Asset management by the housing association*. We expect housing associations with a high demolition rate, the 'demolishers', also to show relatively high per centage sales of dwellings and new construction of dwellings. The reasoning behind this expectation is that demolition is one of the instruments in asset management alongside other instruments like sale of dwellings and new construction (Van Den Broeke, 1998; Gruis and Nieboer, 2004). Housing associations with an active management style will probably use various instruments simultaneously.

Table 2.3 Housing shortage* as percentage of the housing stock in Dutch provinces in 2002 and 2005

Province	2002	2005
Groningen	1.7	2.3
Friesland	1.4	1.0
Drenthe	1.7	0.3
Overijssel	2.2	2.1
Flevoland	2.5	3.7
Gelderland	3.1	2.8
Utrecht	3.6	4.0
Noord-Holland	2.8	2.9
Zuid-Holland	2.7	2.9
Zeeland	2.0	0.6
Noord-Brabant	2.5	2.8
Limburg	1.2	1.0
Netherlands	**2.5**	**2.5**

*) Housing shortage is the balance of the number of households who actively want to move within two years (urgent demand) and the supply of vacant dwellings.

Sources: MVROM, 2003b (WBO 2002) and MVROM, 2005a (PRIMOS 2005)

2.3 Demolition of dwellings, figures and volumes

2.3.1 Housing stock and demolition

Section 2.1 sketched the broad lines of demolition in the Netherlands (see Figures 2.1 and 2.2). In this section this information is broken down in various ways. Table 2.4 gives the total decrease of the Dutch housing stock because of withdrawals and the decrease in the rental stock and owner-occupied stock. The last two columns give the numbers and per centages of dwellings that have been destructed. Decrease includes withdrawals due to merging of small

Table 2.4 Total decrease of housing stock by year and tenure, and decrease by destruction

(1) Year	(2) Housing stock	(3) Total decrease	(4) Decrease as percentage of housing stock (3):(2)x100	(5) Decrease rental dwellings	(6) Decrease owner-occupied	(7) Decrease by destruction (demolition, pulling down, fire)	(8) Destruction as % of housing stock: (7):(2)x100
1992	5,969,000	11,659	0.20	n/a	n/a	8,006	0.13
1993	6,043,000	12,984	0.21	n/a	n/a	9,744	0.16
1994	6,116,000	15,561	0.25	n/a	n/a	12,607	0.21
1995	6,192,000	13,691	0.22	9.605	4.083	10,382	0.17
1996	6,276,000	11,513	0.18	7.542	3.971	8,220	0.13
1997	6,358,000	12,527	0.20	8.998	3.529	10,338	0.16
1998	6,441,000	13,098	0.20	8.520	4.578	9,904	0.15
1999	6,522,000	14,354	0.22	10.390	3.964	11,811	0.18
2000	6,590,000	13,529	0.21	9.759	3.769	10,258	0.16
2001	6,651,000	15,555	0.23	11.096	4.459	11,959	0.18
2002	6,710,000	16,410	0.25	11.952	4.458	12,738	0.19
2003	6,764,000	17,763	0.26	12.706	5.057	12,633	0.19
2004	6,810,000	19,313	0.28	14.201	5.112	15,910	0.23
2005	6,859,000	19,057	0.28	14.712	4.345	13,907	0.20

Source: CBS Statline (2006a, 2006b)

apartments, change of function and destruction. Destruction includes demolition and a very small number of calamities such as fire damage.

Table 2.4 also shows that the total numbers of withdrawals were stable until 2000: 0.20 per cent in 1992 and 0.21 per cent in 2000. Since then, the numbers are increasing slowly up to 0.28 per cent in 2005. If withdrawals were to continue at this rate the average life span of dwellings will be over 350 years!

Rental dwellings are overrepresented in the withdrawals; the per centage increased from 65 per cent in the early the nineties up to 77 per cent in 2005. In the same period the rental stock decreased from 55 per cent of the total stock in 1990 to 45 per cent in 2005. Since the volume of commercial rented stock is very limited – less than one-fifth of the rented stock – and commercial landlords hardly do demolish, the demolition of rented stock is almost fully due to the social rental stock. Withdrawals because of destruction, mainly demolition, show the same picture as withdrawals in general: a small and stable per centage until 2000 and a slow increase since then.

2.3.2 Physical quality and demolition

Table 2.5 displays the building period of the dwellings withdrawn form the housing stock. Unfortunately in 2001 the periods have been changed in the statistics so there are no complete time series of the data. Despite the break in the periodisation, the general picture is clear. Until 2000 the pre-war part of the housing stock – 23 per cent of the total stock – was overrepresented; over 50 per cent of the withdrawals were dwellings built before or just after World War II. The per centage of withdrawals built in the early post war pe-

Table 2.5 Housing stock, total decrease and decrease by building period

Year	Housing stock	Total decrease	Decrease built before 1950	Decrease built between 1950 and 1975	Decrease built after 1975
1992	5,969,000	11.659	8.856	2.651	152
1993	6,043,000	12.984	9.805	151	32
1994	6,116,000	15.561	10.651	4.667	243
1995	6,192,000	13.691	8.880	4.491	320
1996	6,276,000	11.513	7.830	3.336	347
1997	6,358,000	12.527	7.921	4.182	424
1998	6,441,000	13.098	8.807	4.073	218
1999	6,522,000	14.354	7.313	6.571	290
2000	6,590,000	13.529	7.020	6.035	451
2001	6,651,000	15.555	7.378	6.671	1.508
2002	6,710,000	16.410	7.419	7.693	1.296
2003	6,764,000	17.763	–	–	–
2004	6,810,000	19.313	–	–	–
2005	6,859,000	19.057	–	–	–

Sources: CBS Statline (2006a, 2006b)

Table 2.6 Decrease by destruction in percentages of the housing stock per province, the four largest cities and the Netherlands

Year	Area																
	Groningen	Friesland	Drenthe	Overijssel	Flevoland	Gelderland	Utrecht	Noord-Holland	Zuid-Holland	Zeeland	Noord-Brabant	Limburg	Amsterdam	Rotterdam	The Hague	Utrecht (city)	Netherlands
2000	0.32	0.12	0.20	0.17	0.02	0.10	0.06	0.14	0.25	0.44	0.09	0.04	0.13	0.41	0.43	0.10	0.16
2001	0.68	0.18	0.38	0.20	0.30	0.11	0.15	0.14	0.20	0.13	0.10	0.13	0.11	0.17	0.66	0.42	0.18
2002	0.40	0.18	0.24	0.26	0.34	0.12	0.12	0.11	0.26	0.26	0.16	0.13	0.12	0.53	0.53	0.29	0.19
2003	0.37	0.25	0.16	0.22	0.04	0.17	0.06	0.16	0.28	0.12	0.13	0.13	0.23	0.67	0.28	0.06	0.19
2004	0.44	0.26	0.22	0.23	0.07	0.16	0.24	0.09	0.41	0.12	0.19	0.20	0.07	0.86	0.44	0.49	0.23
2005	0.62	0.21	0.12	0.10	0.05	0.11	0.07	0.32	0.26	0.09	0.17	0.11	0.44	0.36	0.59	0.12	0.20

Source: CBS Statline (2006a)

riod, 1945/50–1970/75, increased to 45 per cent in 2002. Approximately 30 per cent of the building stock has been built in this period. The number of withdrawals built after 1975 was small but accelerated after 2000.

2.3.3 Demand and demolition

Table 2.6 shows the per centage withdrawals because of destruction in the twelve provinces and in the four largest cities. At these lower levels of ag-

Table 2.7 Social rented stock and demolition figures

(1) Year	(2) Social rented housing stock	(3) Demolition (including merging)	(4) Demolition as % of stock (3):(2)x100
1992	2,237,000	4,500	0.20
1993	–	–	–
1994	2,289,000	5,200	0.23
1995	–	–	–
1996	2,365,000	6,100	0.26
1997	2,372,000	5,200	0.22
1998	2,374,000	7,401	0.31
1999	2,475,000	8,937	0.36
2000	2,438,000	7,537	0.31
2001	2,441,000	8,214	0.34
2002	2,436,000	9,681	0.40
2003	2,420,000	14,163	0.59
2004	2,412,000	13,514	0.56

Sources: until 1998: MVROM (1998, 2004), after 1998: CFV (2003-2005)

Table 2.8 Demolition in the total dwelling stock and in the social rented stock compared

Year	Demolition in the total stockas % of the total dwelling stock	Demolition in the social rented stock as % of the total social rented stock
1992	0.13	0.20
1993	0.16	–
1994	0.21	0.23
1995	0.17	–
1996	0.13	0.26
1997	0.16	0.22
1998	0.15	0.31
1999	0.18	0.36
2000	0.16	0.31
2001	0.18	0.34
2002	0.19	0.40
2003	0.19	0.59
2004	0.23	0.56
2005	0.20	

Source: CBS Statline (2006a, 2006b), recalculated by authors

gregation the per centages show more variation by area and by year than the per centages for the stock as a whole. This variation is probably due to diverging needs for restructuring and discontinuous implementation of restructuring projects. We see relatively high per centages in the provinces of Groningen and Zuid-Holland and in the cities of Rotterdam and 's-Gravenhage. Low per centages occur in Gelderland, Utrecht, Noord-Brabant and Limburg.

2.3.4 Type of tenure and demolition; the social rental sector

Table 2.7 shows the demolition figures for the social rental stock. This stock reached its peak in 1999 at almost 2.5 million dwellings. After this year the stock decreased slowly because of the sale of dwellings to tenants, a low level of new construction and rising demolition. The table shows the same demolition trends as Table 2.4 for the total stock. However, the increase in the number and per centage started earlier and proceeded faster in the social rental stock than in the total stock.

Table 2.8 shows that the demolition per centage in the social rental sector has been two to three times higher than that in the total housing stock in the

Table 2.9 Social rented dwellings; stock and demolition: realised and forecasted

(1) Year	(2) Housing stock	(3) Demolition	(4) Demolition as % of housing stock (3):(2)x100
2004 (realized)	2,412,000	13,514	0.56
2005 (forecast)	2,410,000	15,996	0.66
2006 (forecast)	2,420,000	26,048	1.08
2007 (forecast)	2,433,000	22,525	0.93

Source: CFV (2005)

first years of the new century.

When we look at the forecast for the social housing stock this difference will probably increase as Table 2.9 shows. This is in line with our previous findings (Thomsen *et al*., 2004) which showed not only the same overall average increase but also strong regional differences, up to an increase with a factor 7 in the Randstad.

2.3.5 Asset management by housing associations and demolition

Recently the Dutch Ministry of Housing, Physical Planning and Environment published a performance indicator for housing associations (2005; 2006), which was intended to boost the performance of housing associations in the field of urban restructuring. The indicator has three components, which measure the performance of the housing associations in new construction, in the sale of dwellings to residents and in demolition. For each of these items a ranking has been made and the three rankings have been combined into one ranking showing the most active association in urban restructuring. Unfortunately figures are only available for 2003 and 2004 and there is considerable variation between the rankings in these two years. So we have to be careful drawing conclusions from these figures.

Given this proviso we can compare the performance of the 20 housing associations with the highest per centage of demolition, the 'demolishers', with the average performance of the housing associations in the selected areas. We can also compare the performance of the 'demolishers' with the performance of the 20 most active – highest ranking – associations with no demolition, the 'active non-demolishers'. As most demolitions take place in the largest urban areas we only considered the figures of the associations in the largest urban communities who are receiving money form the Urban Investment Fund (ISV) directly, the so-called G30 (in 2003) and G31 (in 2004).

Comparison of Tables 2.10 and 2.11 shows that in 2003:

- 10 of the 20 'demolishers' came from the Randstad, an area with a relatively tight housing market; 4 of the 20 'active non-demolishers' were also from the Randstad.
- The 'demolishers' were slightly larger than the average housing association in the G30 and larger than the 'active non-demolishers', but in view of the wide spread these differences are not significant.

Table 2.10 The 'demolishers'; the 20 housing associations with the highest demolition rate in the G30 and their performances in sale and new construction in 2003

Housing association	Housing stock 01.01.03	Demolition as % of the stock	Sale as % of the stock	New construction as % of the stock
1. Nieuw Amsterdam*	9,757	11.88	0.09	0.75
2. ZVH Zaandam	5,523	6.83	1.01	1.76
3. Woonplaats Enschede	4,617	5.13	3.23	0.02
4. Woonplus Schiedam	14,113	4.62	0.84	0.00
5. Brabant Wonen Den Bosch	6,202	3.47	0.03	0.00
6. Het Oosten Amsterdam**	13,005	2.66	2.65	4.19
7. Woonbron Rotterdam***	26,533	2.65	1.07	0.71
8. Stichting In Groningen	7,895	2.51	0.25	0.61
9. Wooncom Emmen	11,469	2.27	1.65	0.08
10. Wonen Zuid Heerlen	2,209	2.26	1.27	0.95
11. Volksbelang Helmond	2,479	2.10	0.00	2.34
12. Hoogkerk Groningen	1,938	2.06	0.67	0.10
13. TIWOS Tilburg	7,893	2.00	0.10	0.00
14. Com Wonen Rotterdam***	20,503	2.00	0.43	0.31
15. Elan Wonen Haarlem	5,327	1.82	0.00	0.00
16. Portaal Nijmegen	11,974	1.64	0.79	0.00
17. Woondrecht Dordrecht	7,368	1.56	0.92	0.20
18. Vestia Den Haag****	19,663	1.52	0.16	0.70
19. Zomers Buiten Amsterdam**	9,427	1.52	0.03	0.52
20. SSWB Den Bosch	5,113	1.49	0.16	0.78
Average 1-20	9,650	3.10	0.77	0.70
Average G30 (n=109)	9,195	0.75	0.63	0.67

*) Bijlmermeer; **) Westelijke Tuinsteden; ***) Hoogvliet; ****) Den Haag Zuidwest

Source: MVROM (2005b)

- The performances of the 'demolishers' in sale of dwellings and new construction were comparable with the average for the housing associations in the G30; the performances of the 'active non-demolishers' in the sale of dwellings and new construction were far above average as might be expected from their high ranking.

The data are somewhat coloured by the fact that the 'big' demolishers include six large housing associations with stock in the four largest demolition areas in the largest cities: the Bijlmermeer and the Westelijke Tuinsteden in Amsterdam, Hoogvliet in Rotterdam and Den Haag Zuidwest in The Hague. The decision to demolish large numbers of dwellings in these areas was taken by the housing associations in collaboration with the local government.

Comparison of Tables 2.12 and 2.13 shows that in 2004:

- 7 of the 20 'demolishers' came from the Randstad, an area with a relatively tight housing market; 4 of the 20 'active non-demolishers' were from the Randstad.
- The 'demolishers' were larger than the average housing association in the

Table 2.11 The 'active non-demolishers'; the 20 most active (=highest ranking) housing associations with no demolition in the G30 and their performances in sale and new construction in 2003

Housing association	Housing stock 01.01.03	Demolition as % of the stock	Sale as % of the stock	New construction as % of the stock
1. Portaal Amersfoort	5,544	0.00	1.01	1.88
2. Hanzewonen Deventer	2,920	0.00	0.86	2.50
3. PWS Rotterdam	16,127	0.00	1.17	1.43
4. Rentré Deventer	4,356	0.00	1.01	1.56
5. SVH Arnhem	14,005	0.00	1.64	0.82
6. Haag Wonen Den Haag	23,591	0.00	0.71	1.48
7. SVA Alkmaar	2,652	0.00	1.58	0.53
8. Ons Huis Enschede	4,210	0.00	0.50	1.64
9. Compaen Helmond	2,035	0.00	0.34	6.78
10. Woonwaard Alkmaar	8,792	0.00	1.62	0.31
11. Openbaar Belang Zwolle	2,056	0.00	0.29	3.40
12. Standvast Nijmegen	4,407	0.00	0.34	1.95
13. CHF Leeuwarden	8,186	0.00	2.71	0.00
14. Ymere Amsterdam	37,475	0.00	0.36	0.80
15. Bejaardenhuisvesting Eindhoven	795	0.00	1.13	0.00
16. Progrez Dordrecht	6,897	0.00	1.03	0.00
17. Volion Enschede	7,003	0.00	0.49	0.46
18. Friesland Leeuwarden	8,179	0.00	0.37	0.66
19. Portaal Arnhem	5,568	0.00	0.88	0.00
20. Huismeest. Groningen	7,661	0.00	0.59	0.17
Average 1-20	8,523	0.00	0.93	1.32
Average G30 (n=109)	9,195	0.75	0.63	0.67

Source: MVROM (2005b)

G31 and larger than the 'active non-demolishers', but in view of the wide spread the differences are not significant.

- The performances of the 'demolishers' in the sale of dwellings and new construction were comparable with the average for the housing associations in the G31; the performances of the 'active non-demolishers' in the sale of dwellings and new construction were far above average, as they had also been in 2003.

The data are again somewhat coloured by the fact that among the 'big' demolishers are 5 large housing associations with stock in the largest cities: the Bijlmermeer and the Westelijke Tuinsteden in Amsterdam, Hoogvliet in Rotterdam and Den Haag Zuidwest in The Hague.

When we compare Tables 2.10 and 2.11 (2003) with Tables 2.12 and 2.13 (2004) we can see that:

- In both years the 'demolishers', often originating from the Randstad, are slightly larger than the average housing association in the G30/31 and show average performance in the sale of dwellings and in new construction (Table 2.14).
- In both years the 'active non-demolishers' were smaller than the demolish-

Table 2.12 The 'demolishers'; the 20 housing associations with the highest demolition rate in the G31 and their performances in sale and new construction in 2004

Housing association	Housing stock 01.01.03	Demolition as % of the stock	Sale as % of the stock	New construction as % of the stock
1. Nieuw Amsterdam*	8,662	9.34	0.15	1.56
2. ZVH Zaandam	5,633	3.87	0.28	3.37
3. Vestia Den Haag****	19,546	3.55	0.09	2.19
4. Woonbron Rotterdam***	25,673	3.53	0.93	0.28
5. Volksbelang Helmond	2,485	3.30	0.00	0.00
6. Vestia Rotterdam***	27,212	2.32	0.17	1.50
7. Woonplus Schiedam	13,341	2.24	0.63	0.87
8. Trudo Eindhoven	8,116	2.19	2.37	0.67
9. Rentré Deventer	4,145	1.76	1.01	4.22
10. Laurentius Breda	6,633	1.64	0.77	3.80
11. ZO Wonen Sittard	10,329	1.64	0.79	0.47
12. SWZ Zwolle	7,356	1.63	0.50	1.81
13. Com Wonen Rotterdam***	19,467	1.60	0.45	0.12
14. Servatius Maastricht	10,539	1.58	0.56	0.55
15. Nieuw Wonen Leeuwarden	8,174	1.52	0.72	0.02
16. Voorzorg Heerlen	2,644	1.51	0.30	0.34
17. Woonpartner. Helmond	7,638	1.51	0.22	0.25
18. Ons Huis Enschede	4,248	1.48	0.80	1.46
19. Volkshuisvesting Arnhem	13,902	1.43	1.40	1.24
20. Wocom Helmond	1,964	1.43	0.10	0.00
Average 1-20	10,385	1.52	0.61	1.24
Average G31 (n=106)	9,439	0.66	0.71	1.09

*) Bijlmermeer; **) Westelijke Tuinsteden; ***) Hoogvliet; ****) Den Haag Zuidwest

Source: MVROM (2006)

ers and smaller than the average housing association. They often originate from outside the Randstad.

- There is some stability in the rankings over the two years; 7 of the 20 'demolishers' in 2003 also appear in the list of 2004: Nieuw Amsterdam Amsterdam, ZVH Zaandam, Vestia Den Haag, Woonbron Rotterdam, Volksbelang Helmond, Woonplus Schiedam and Com Wonen Rotterdam. Five of the 20 'active non-demolishers' in 2003 also appear in the list of 2004: Woonwaard Alkmaar, Hanzewonen Deventer, Portaal Arnhem, Ymere Amsterdam and Friesland Leeuwarden. However, two 'demolishers' in 2003 appear in the list of 'active non-demolishers' in 2004: Stichting In Groningen and Wonen Zuid Heerlen. This variation between years underlines the fact that we have to be careful in drawing conclusions from these data.

2.4 Conclusions and discussion

The overall picture of the demolitions in the Dutch housing stock shows a demolition rate of approximately 0.2 to 0.3 per cent, which is higher than in

Table 2.13 The 'active non-demolishers'; the 20 most active (=highest ranking) housing associations with no demolition in the G31 and their performances in sale and new construction in 2004

Housing association	Housing stock 01.01.03	Demolition as % of the stock	Sale as % of the stock	New construction as % of the stock
1. Delta Wonen Zwolle	7,196	0.00	3.34	3.52
2. De Key Amsterdam	21,697	0.02	2.09	2.44
3. GroenrandWonen Utrecht	1,522	0.00	0.72	8.34
4. Woonwaard Alkmaar	8,648	0.00	1.55	2.09
5. Hanzewonen Deventer	2,917	0.00	1.44	2.23
6. TBV Wonen Tilburg	5,905	0.00	0.78	2.74
7. Wooninvest Den Haag	1,793	0.00	0.00	10.15
8. Woonplaats Enschede	11,211	0.00	1.01	1.96
9. Standvast Nijmegen	4,426	0.00	0.43	3.00
10. Ons Belang Hengelo	6,304	0.00	0.82	1.60
11. Interstede Dordrecht	2,627	0.00	0.04	3.50
12. Portaal Amersfoort	5,352	0.00	1.05	1.05
13. Wonen Zuid Heerlen	2,131	0.00	2.91	0.00
14. Portaal Arnhem	5,519	0.00	0.22	2.07
15. Portaal Utrecht	11,501	0.00	0.41	1.66
16. Ymere Amsterdam	37,268	0.00	0.76	1.04
17. Domein Eindhoven	4,160	0.00	0.19	2.02
18. Stichting In Groningen	7,707	0.00	0.56	1.36
19. Friesland Leeuwarden	8,064	0.00	1.12	0.42
20. Woonunie Deventer	6,010	0.00	0.72	0.88
Average of housing associations 1-20	8,097	0.00	1.01	2.60
Average of all housing associations in G31 (n=106)	9,439	0.66	0.71	1.09

Source: MVROM, 2006, Prestatie-index corporaties 2004

Table 2.14 'Demolishers' and average housing associations compared (2003 and 2004)

Year	Housing association	Demolition as % stock	Sale as % stock	New construction as % stock
2003	'Demolishers'	3.10	0.77	0.70
2003	Average all housing associations	0.75	0.63	0.67
2004	'Demolishers'	1.52	0.61	1.24
2004	Average all housing associations	0.66	0.71	1.09

Sources: Tables 2.10-2.13

the surrounding countries and is also increasing faster. Whether the Dutch demolition rate is too high or that in the other countries too low is something of an academic question, as there are no agreed standards in this field. One approach is to assume that housing needs to be replaced when it reaches the end of its 'life'. From this viewpoint it will take over three centuries to replace the total stock at the current demolition rate. Regarding the often pre-calcu-

lated economical lifetime of 50 years the actual demolition rate might be considered as far too low. But as stated in the introduction, the life span of buildings is not limited by its physical condition but can in theory be prolonged endlessly as long as it keeps being useful. This means that there is no such thing as a necessary replacement rate, and that a low demolition rate simply shows that in practice lifetime extension is preferred to replacement. Another approach is that lifetime extension is needed to reduce waste, urban sprawl etc. From this perspective a low demolition rate is desirable and underlines the conclusion of other researchers that we need to shift focus from new construction to the various ways of adapting the existing stock to meet present-day requirements (Carmon and Thomsen, 2000; Kohler, *et al*., 2002; Thomsen and van der Flier, 2002; Awano, 2005).

As regards the motives of the landlords and real-estate managers and the factors underlying these motives we have found a relationship between building year, related with technical/ physical quality of dwellings and the demolition rate. Housing built before or just after the war is twice as likely to be demolished as the total housing stock. The chance of dwellings built in the early post-war period to be demolished is stock is now 50 per cent higher than dwellings in the total housing stock. This is in line with our expectations based on common technical life-cycle theories.

The relation between demand and demolition is unclear. We expected the demolition rate to be relatively high in areas with a loose housing market. The presented data do not support this expectation, however; some areas with a relatively loose market like Groningen show high demolition rates but so do some areas with a tight housing market like the province of Zuid-Holland and the large cities in the Randstad like Rotterdam and The Hague. There has been a considerable and growing housing shortage in the Netherlands since 2000, due to a diminishing number of new construction and a growing demand. Though this shortage occurs in most parts of the country it affects the areas with a tight market in particular. Nevertheless the demolition rate in these areas shows an upward trend.

A strong relation was found between type of tenure and demolition; with 77 per cent of the demolition taking place in the social rental sector in 2005, even though this sector contains only 34 per cent of the total stock. Contrary to what we expected the demolition rates in the social rental sector are roughly three times as high as in the total stock. The fact that the relation between the building year and quality of the stock and the demolition rate in the social rental stock is weaker than in the rest of the housing stock indicates that other reasons are prevailing in the decision-making in this sector.

When we look at the portfolio policy (asset management) of housing associations in 2003 and 2004 in the larger communities (G30/31) we may conclude that there is no relation between demolition as an instrument of asset management and other instruments like sale of dwellings and construction of new

ones. Despite the limitation of the data to only two years and the presence of 4 large-scale demolition areas in the Randstad, our results clearly confirmed the distinction between 'demolishers' and 'non-demolishers' that we found in our previous survey. Though these two groups differ slightly in size, location and asset management performance, these differences are insufficient to explain their demolition behavior.

We started this chapter by asking why stock owners in general and housing associations in particular are demolishing a relatively high per centage of their property and are planning to demolish even more in the near future. We have considered a number of possible reasons such as technical quality, demand, type of tenure and asset-management approach, but none of these provided a satisfactory answer to the initial question. One reason may be the limited availability and high level of aggregation of the data, which may hide variations at lower levels. This is well illustrated by the list of 'demolishers', which is headed in both years by housing association that played a major role in large-scale restructuring areas, like Nieuw Amsterdam in Amsterdam (Bijlmermeer) and Woonbron in Rotterdam (Hoogvliet). On the other hand, similar housing associations in the same cities rank high as 'active non-demolishers'.

The limited availability of data also made it difficult to validate our conceptual model fully.

Summing up, the present study produced no clear explanation for the high Dutch demolition volume, in particular in the Dutch social rental sector, nor for the striking difference between 'demolishers' and 'non-demolishers' and for the growing demolition volume despite an increasing housing shortage. As the outcomes of our analysis do not bear a clear relation to the most relevant variables, other factors must be decisive in the decision-making process. This conclusion corresponds with the findings of our previous research (Thomsen *et al.*, 2004). In terms of the conceptual framework, introduced in Section 2.2, we suppose that factors are more likely to be found in the endogenous policy and preconditions segments than in the market-performance related segment, or – in more concrete terms – that corporate identity and management ambitions are more decisive than rational asset analyses in determining when demolition should or should not occur.

It may be noted that the growing demolition by Dutch housing associations of recent years parallels their increasing independency and prosperity. At the same time we observe rising criticism of the way housing associations fulfill their social tasks. A recent report by the Dutch National Bank (Schilder *et al.*, 2006) criticizes the poor internal and external controls on the societal performance of housings associations. While these circumstances support our assumptions, we do not have sufficient evidence to prove them conclusively. To find out whether and to what extent our suppositions are true we need to explore the decision-making process of housing managers in greater detail by means of case studies.

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3 Joint physical and social neighbourhood transformation

Motives, myths, coincidences and perspectives

André Ouwehand

3.1 Introduction

When we study pictures and reports of neighbourhood transformation, we often see vandalised houses and public space, rubbish, and rundown high-rise buildings being demolished by gigantic cranes. We also see new housing, often semi-detached, and freshly designed public space and greenbelts. On the face of things, neighbourhood transformation looks like a brick-and-mortar activity. However, it is neither a purely physical nor a purely spatial phenomenon. Like urban life and housing in general, neighbourhood transformation is always tied in with social and economic motives and results. The pile of literature on neighbourhood change reflects the many different perspectives on the subject (see for instance: Temkin and Rohe, 1996). While physical, social and economic aspects are interconnected, urban renewal does not by definition benefit all three to the same extent; in fact, the social revenue from urban restructuring has been contested on many occasions (Musterd and Ostendorf, 2000; Uitermark, 2003; Uitermark and Duyvendak, 2005). It is just as simplistic to imagine that renewal of the housing stock alone will solve the social problems as it is to criticise demolition programmes for aiming at a better social mix in neighbourhoods. The situation is far more complex. The various factors need to be analysed separately, but within an integrated approach that covers all the problems and perspectives of the neighbourhood.

Sustainability, according to Pareja Eastaway and Støa (2004), has economic, socio-cultural, environmental and governance dimensions and should be understood as a process rather than a product. This implies that time is a key factor. Sustainability is not solely or – to put it more strongly – not primarily a matter of balancing the physical environmental effects of demolition and new building against renovation. As social factors play an important role in the image and problems of deprived neighbourhoods, they have become a major theme in urban renewal strategies (see for instance: Krantz, *et al*., 1999, Schwedler, 1998). Social factors have a crucial influence on sustainability. The objective of sustainable urban renewal is to intervene in neighbourhoods in such a way that the problems are solved and that the housing gains built-in value so that it can adapt to changes in use without necessitating huge investments at a later date. That means that residents' opinions and population dynamics should be taken into account.

I do not intend in this chapter to explore the details of the debate on the relationship between the physical and social aspects of urban renewal (see

for instance: Kleinhans, 2004; Kruythoff, 2003). Instead, I shall concentrate on the perspectives that have developed in recent years in a combined social and physical approach to neighbourhood transformation and thereby try to bridge the gap between demolition and a social strategy.

I shall start in Section 2 with a brief review of the literature on neighbourhood transformation. Next, I shall explain the motives behind the joint physical and social approach by tracing the trends in urban development and housing demand in the Netherlands in recent years and by outlining official strategies. I shall illustrate this with information at local level from the city of Rotterdam. The fourth section offers some facts, myths and coincidences relating to the social effects of physical neighbourhood transformation, based on recent research in the Netherlands. Section 5 describes the way in which the physical and social approach to neighbourhood transformation are integrated in practice. Section 6 sets out the perspectives of an integrated approach, explicitly connecting the social and physical aspects in one strategy within the concept of the social neighbourhood vision. Section 7 discusses the example of neighbourhood transformation in Holy-Zuidoost in Vlaardingen – a process in which the social and physical dimensions were interwoven. I shall end by presenting conclusions and recommendations.

3.2 Neighbourhood change: a threefold phenomenon

As I stated above, a strong inter-relationship exists between the social and physical aspects of neighbourhood life and neighbourhood change. This is underpinned by the wealth of literature on the subject, but scholars differ in the degree of importance they attach to the social, physical and institutional aspects.

In the early 20th century the Chigaco School laid a solid foundation for the literature on neighbourhood change when it developed the 'filtering theory'. The status of neighbourhoods was reviewed on the basis of their relative position in a broader, regional housing market. It was deduced from the characteristics of the population, the housing stock, migration levels and turnover rates. Van der Meer quotes Bourne: "In its broadest form, filtering refers to any change in the relative position of a housing unit or household in the inventory, or matrix of housing units in an area. Dwellings or households are said to 'filter-up' if their position improves over time or to 'filter down' if their position deteriorates" (Van der Meer, 1996, pp. 60). Neighbourhoods that accommodate the weakest groups in the housing market are easily described as 'problematic'. Hence, neighbourhoods plummet in the popularity stakes when their residents are downgraded. 'Upgrading' is then seen as a positive development. Filtering has been described as a normal 'ecological' process: cities

grow and each newly built housing scheme starts at the top of the hierarchy while others slide downwards as they lose their ability to meet the growing demands. Van der Meer provides an overview of the authors who have criticised and added to the filtering theory, such as Firey, Bourne and especially Goetze – whom she quotes: "The idea that household income and filtration govern neighbourhood change is still generally accepted, but no longer suffices to explain increasingly sharp dynamics (….) The trickling down of older housing to lower-income residents has become irregular and unpredictable, particularly in large cities. No longer do all neighbourhoods seem to follow steady, straight-line trends as they mature." And further: "The tenor of the neighbourhood, declining, revitalising, gentrifying or stable, is set by the interplay between indigenous residents and newcomers and, in particular by the way they perceive each other's status" (Van der Meer, 1996, pp. 63; see also Downs, 1981). Varady (1986) also drew attention to the importance of the social dimension in neighbourhood change and the way it is perceived. In an empirical study he demonstrated the influence of 'neighbourhood confidence'. He established that neighbourhood confidence is more a function of changes in the residents and the social cohesion in a neighbourhood and less a function of physical deterioration (Varady, 1986). Temkin and Rohe (1996) describe this angle as 'subculturalist'.

They identify the subculturalist perspective as a second approach to neighbourhood change analysis, alongside the 'ecological perspectives' of the filtering theory: "Subculturalists argue that non-economic factors such as social networks, socially determined neighbourhood reputations and the degree to which neighbours feel a sense of attachment to their community influence a neighbourhood's stability over time" (Temkin and Rohe, 1996, p. 162). The third angle is 'political economy': "Institutional models assume that a neighbourhood's fate is determined to a large degree by powerful forces allocating scarce resources throughout a metropolitan area. Neighbourhood change then, is a function of actors outside the neighbourhood, rather than the actions of its residents" (*ibid,* p. 163) Temkin and Rohe give the perspectives a place in their 'synthetic model' and show that neighbourhood change can be analysed by distinguishing between neighbourhood characteristics and neighbourhood maturation that lead to short-term change. This short-term change shapes perceptions (that may differ for the different parties in the process) and elicits responses from both the institutional players and the residents. These responses can interact and lead to long-term change.

If we take a closer look at the three angles identified by Temkin and Rohe, we might conclude that they differ in emphasis, but have a lot in common. The residents' opinion of their neighbourhood is a key factor in all perspectives on neighbourhood change. It forms the operational basis for the market forces in the filtering theory; it determines social action and social cohesion and plays a dominant role in confidence in the future of the neighbour-

hood. From the institutional point of view the opinion of the residents is moreover crucially important in the strategies of, amongst others, housing associations and local authorities. The residents' opinion cannot be ignored in strategies for neighbourhood transformation, especially if they are for sustainable neighbourhood transformation.

If the social aspects of the neighbourhood are neglected, the measures might well prove unsuccessful. Neighbourhood transformation cannot be whittled down to just building new homes and expecting that everything will turn out fine. The 'subculturalists' have provided ample evidence to refute this.

3.3 Motives behind neighbourhood transformation

Urban renewal in the Netherlands

In the Netherlands urban renewal is carried out amid a housing stock which consists of a large proportion of rented dwellings: 35 per cent of the stock is owned by the housing associations, 11 per cent by private landlords and 54 per cent is owner-occupied (Ministry of Housing, Spatial Planning and the Environment, 2004, pp. 114). At the end of the 1990s, a slack housing market and a shift to the owner-occupied sector changed the market in parts of the country from a supplier's market to a demand market. Small apartment blocks with no lift, or located in unpopular neighbourhoods, ended up in a difficult position in many segments of the housing market. Annual economic growth in 1990-1998 was on average 3 per cent, the average mortgage interest rate was 4.4 per cent, and the average real growth in income per household was 0.6 per cent. The increase was much greater for households with a modal income, *viz.* 0.96 per cent a year. For households with a minimum income it was less than 0.15 per cent per year (Ministry of Housing, Spatial Planning and the Environment, 1999).

The substantial growth in modal income coupled with the low interest rates led to a sharp rise in the demand for owner-occupied dwellings. The trend was further strengthened by the steep rise in rents triggered by the mid-term review in the early 1990s. The change in demand also resulted in the selective migration of modal and higher-income groups from the cities to suburban municipalities with a large supply of owner-occupied dwellings, or to extensive new developments (Van der Wouden and De Bruijne, 2001).

Ongoing economic growth, individualisation and emancipation inevitably led to further differentiation in lifestyles. Through time, the low-income group would become proportionately a little smaller than at the end of the 1990s but there was not that much difference in absolute numbers. This group consists mainly of elderly people, one-parent families and households from ethnic minorities. The Housing Memorandum (Remkes and Pronk, 2000) trans-

lated this analysis into numbers and set out an urban renewal programme till 2010, which was rather ambitious and has since been modified (Remkes, 2002). However, it is no less of a challenge to the housing associations:

- more demolition and more conversions (turning three or four old units into two renovated units) resulting in the loss of around 200,000 dwellings;
- more improvements: 761,000 instead of 681,000 dwellings;
- more new-built dwellings: 285,000 instead of 200,000;
- more sales: 538,000 instead of 238,000.

Post-war housing schemes, in particular, are often experienced as one-sided, monotonous places with little identity. The aim is to realise more differentiation in the housing stock in these neighbourhoods and more variety in the living environment (Ouwehand, 2002).

To begin with, the policy to restructure the housing stock was motivated by housing market surpluses and shortages which were calculated in the hope of finding a solution to the changing demand and creating more housing career opportunities. It was also motivated by a desire to encourage higher-income groups to settle in the city. "In certain districts where one-sidedness dominates or threatens, an increase in the variety of the housing stock (...) can serve to raise the physical, social and cultural quality of living and working environments in these districts" (Ministry of Housing, Spatial Planning and the Environment, 1997, p. 49). More differentiation in the living and working environments, better market positions, and more economic vitality in urban neighbourhoods would supposedly enhance the vitality of the entire city. Restructuring also has an important social dimension insofar as it can create social diversity in the distribution of low-income groups and/or ethnic minorities.

This policy was not imposed from the top. It was an answer to requests from the cities to do something about the quality of the post-war housing stock and the problems that had been plaguing some areas since the early 1990s: non-occupancy, deterioration, vandalism, drug abuse, etc. (Ouwehand, 1997). Though the urban renewal policy does address pre-war areas, it focuses mainly on post-war areas. In the 1990s, the urban environment moved up the political agenda. Despite several policy attempts, many social problems, such as unemployment, crime, and lack of safety continued unabated. Economic growth in the cities was lagging behind the surrounding regions. In 1995, the attempts to solve urban problems gained new momentum from the 'Big Cities Policy' – which consists of closely interrelated areas or 'pillars' (physical, social and economic). Urban renewal, as redefined at the end of the 1990s, is now the physical pillar of the Big Cities Policy and provides a broad physical approach in public housing, spatial planning, the environment and the economy (Kruythoff, 2003).

Since the turn of the century, social objectives have generated further support for radical neighbourhood transformation. Ethnic minorities and integra-

tion have figured more strongly in the social and political context, especially since the elections of 2002. This development is also influencing the debate and the strategies on urban renewal. It would be naive to say that the issue of ethnic minorities and integration did not exist before the elections of 2002, but the political situation has changed a lot since then. In the neighbourhoods designated for urban renewal, another song is being sung, in favour of more demolition.

Shifting strategies for post-war neighbourhoods: the case of Rotterdam

The shifting position of post-war areas in the past 15-20 years has been impressive, although perhaps not entirely unexpected. In retrospect we could say that it should have been foreseen and that warnings were ignored because they were not understood and because the day-to-day problems during that period left little time for other considerations – all the more reason for tracing the developments in these areas and outlining the social climate and the renewal strategies. We shall use the city of Rotterdam as an example.

At the end of the 1980s urban renewal policy was dominated by the need to improve neighbourhoods with serious physical problems. Renewal policy at local level gave priority to the pre-war neighbourhoods with very low-quality housing stock. Once most of these neighbourhoods had been renewed in the medium-sized cities in the Netherlands, attention turned to the post-war areas. In Rotterdam, however, post-war areas had to fight to get noticed: only two areas – Overschie and a smaller part of Hoogvliet – in the 10 large post-war housing estates in Rotterdam were designated for urban renewal (Mayor and Aldermen of Rotterdam, 1988, p. 35). A study was conducted for Pendrecht, Zuidwijk and Lombardijen (known as the Southern Garden Cities of Rotterdam) and followed by a renewal project later on. It was expected that housing management and some less radical improvements would preclude more drastic strategies of demolition and new building. A few years later the focus had shifted from 'preservation and repair' to 'renewal and differentiation' (Anderiesen, 1994, p. 246). But this could not prevent the position of the post-war areas from declining further in the years that followed.

A much more radical approach was adopted in Hoogvliet at the end of 1998, when the borough and the Woondienst Maasoevers housing association announced the demolition of almost 5,000 dwellings. Pendrecht was depicted as a problem area around the same time. Various renewal projects had been carried out in both areas in previous years, including renovation, small-scale demolition and new building, but they could not stop the downward spiral in the image and reputation of these neighbourhoods. The dramatic change in the identity and reputation of the post-war areas within a very short space of time had a decisive effect on the urban renewal policy. The thrust was no longer a few repairs and a bit more differentiation. It was now a question of changing the perception of the neighbourhood from a deprived area, fit only

for losers, into a popular living environment. As popularity and identity are strongly influenced by the changing population, this point needs a little more elaboration.

The differences between the population groups that came to the post-war neighbourhoods when they were built in the 1950s and 1960s had faded away and blended into a sense of 'us', albeit coloured by the perception and the time of remembrance (Van der Ree, 1994, p. 110). In the first decades the population was fairly stable, as depicted in the ageing population pyramids (Anderiesen and Martens, 1994, p. 166). But these pyramids started to change shape in the early 1990s. The residents were ageing and more dwellings were being left unoccupied. New residents arrived from different places, including the pre-war areas in the city, to escape the influx of the immigrant households (*ibid.*, p. 171). The allocation system at that time prevented an influx of a cross-section of the Rotterdam population. It was changed in the second half of the 1990s when all official obstructions to migrant households were removed. But other factors also contributed to the population changes in the 1990s. Households with a stronger economic position were moving to owner-occupied dwellings and the market position of the old housing stock was rapidly declining. Only a few applications were being received for vacant dwellings and the candidates were proving choosy and refused offered dwellings. Only households with a weaker position in the allocation system (households that had just arrived in Rotterdam and house hunters who did not yet have their own home) came to live in the post-war areas.

The most striking change is the colouration of the composition of the population. In 1991 the share of migrant population in Zuidwijk was 28 per cent far below the city average of 37 per cent. By 2003 it had risen to 47 per cent, equalling the city average (Ouwehand and Davis, 2004, p. 147). In the nearby area of Lombardijen, which was built a little later, the share of migrant population rose from 16 per cent in 1992 to 18 per cent in 1997 and had reached 30 per cent by 2002. This growth was caused by a rise in the number of migrants and a fall in the number of non-migrants. The new migrants in Lombardijen consisted of, amongst others, underprivileged and vulnerable households from other urban renewal areas in Rotterdam such as Delfshaven and Hoogvliet. A totally different picture emerges in the part of Lombardijen that had already been renewed (Lammerts and Wentink, 2003, p. 11-19). The population changes had a strong influence on the way residents and candidate residents assessed the neighbourhood. The share of migrant households played a key role here. This is not a Rotterdam phenomenon, it exists throughout the Netherlands (Van der Horst *et al.*, 2002; Lammerts and Wentink, 2003; Ouwehand and Davis, 2004; Rigo, 2004) and in other countries (Downs, 1981; Van der Meer, 1996).

As we can see from the case of Rotterdam, social problems and the image of the neighbourhood are playing an increasingly important role in urban renew-

al strategies. Neighbourhood transformation is not just a physical operation. Social factors also contribute to the perceived problems. It is presumed that urban renewal will strengthen the housing market position and help solve social problems as well. This presumption has not, however, been uncontested.

3.4 Social effects of urban renewal: facts, myths and coincidences

As mentioned above, national and local urban renewal policies in the Netherlands embraced social goals more strongly at the end of the 1990s, largely by using demolition and newly built owner-occupied dwellings to link physical renewal to a more stable and better social climate. The theory that positive social effects can be gained by using demolition and new building to transform the housing stock has, however, been contested. After the publication of the Urban Renewal Memorandum in 1997, different articles and research reports appeared in the Netherlands. We may conclude from the content of these publications that this theory is part true, part myth and part coincidence. Different assumptions have been made regarding the effects of urban renewal in the Netherlands in the course of the ongoing policy debate. These fall into five categories (Ouwehand *et al.*, 2006):

- prevention of social decay as a consequence of physical decay;
- enforcement of social cohesion and social capital in the neighbourhood by differentiating the housing stock;
- prevention of neighbourhood effects and segregation;
- enforcement of the economic structure of the city by attracting households with a middle or higher income;
- strengthening support and trust in the authorities by linking social and physical strategies in urban renewal.

There is not enough scope in this article for a detailed examination of these points. Suffice it to say that social decay often goes hand in hand with physical decay and thus weakens the position of the neighbourhood on the housing market (Heeger, 1993). It is precisely in these neighbourhoods that the weakest and most vulnerable households tend to concentrate (Knol *et al.*, 2006). The enforcement of social cohesion and social capital through neighbourhood transformation is largely a myth with an element of truth, but that issue is dealt with in Chapter 4. In the Netherlands research has revealed that a high concentration of low-income or ethnic minority households in the neighbourhood only have a small effect on the improvement of social mobility of the households. Musterd *et al.* (2003) discovered that the social mobility of households living purely on benefit was scarcely dependent on the number of similarly challenged households in the immediate vicinity. In more recent research (Van

der Laan Bouma-Doff, 2005) the concentration of ethnic households in a neighbourhood was observed to have a slight effect on participation in the labour market and modernity of outlook. Command of the Dutch language and cultural orientation is indirectly influenced by the concentration of ethnic households; that is, through the frequency of contact with indigenous households. In most of the urban renewal target areas the concentration of ethnic minorities is (much) higher than the city average. Hence, neighbourhood transformation and differentiation in the housing stock geared to changing the composition of the population and attracting more indigenous households may improve slightly the social mobility and integration of ethnic households.

Another aspect that merits attention with regard to the concentration of ethnic households in neighbourhoods is the image and reputation of the neighbourhood. A high concentration of migrant households has a negative influence on the neighbourhood's image and reputation, and indirectly, on its position on the housing market (Ouwehand and Davis 2004; Rigo, 2004; SCP, 2005). Transformation helps to strengthen the reputation of the neighbourhood insofar as it attracts indigenous and more affluent households (Lammerts and Wentink, 2003; Bolt and Torrance, 2005).

Bolt and Torrance (2005) analysed the relationship between urban restructuring and social cohesion and concluded that neighbourhood bonds are determined by identification with the neighbourhood and satisfaction with the population mix (perception component). They maintained that socially mobile households were more likely to bond with the neighbourhood in cases where there had not been much change in the diversification of the housing (some of the newly built homes were social rented dwellings). Neighbourhoods where the newly built homes were developed as owner-occupied dwellings were less successful in binding households but more successful in attracting new households. In that instance more residents said that deterioration had come to a standstill in the neighbourhood and that the atmosphere and image had improved.

So far, we have seen little evidence that neighbourhood transformation has explicitly contributed to the slight increase of middle-income households in the cities. This increase could just as easily stem from general economic trends, new development areas or land annexation. I shall review the last assumption – support and confidence in the authorities is strengthened by linking social and physical urban renewal strategies – in the next section.

Summarising, it is fallacious to assume that demolishing part of the housing stock and replacing it with owner-occupied dwellings will be enough to solve the social problems in neighbourhoods. There is, however, a connection between social and physical factors. Social factors strongly influence the housing market position of the neighbourhood. A more mixed population might improve the reputation of the neighbourhood and create better integration and participation opportunities for residents from ethnic minorities,

although the prime aim is to provide them with good education and job prospects. A joint physical and social renewal programme may therefore contribute to more sustainable neighbourhood transformation.

3.5 Linking physical and social measures in practice

As stated in Section 3.3, urban renewal is the physical pillar of the Big Cities Policy, which adopts a broad physical approach in public housing, spatial planning, the environment and the economy. The Big Cities Policy does not address neighbourhood decay as a housing issue alone, but sees it in a broader context. The three pillars of the Big Cities Policy have, however, different backgrounds, different financial structures and different agencies and bureaucrats to implement them. It is easy enough to announce an integrated policy, it is not so easy to realise it and thus create a more sustainable situation.

One Dutch development project in which this struggle came to the fore was *Heel de buurt* ('Heal the neighbourhood' but also 'The whole neighbourhood'). In this project, national institutions worked together to develop an area-based integrated approach to neighbourhoods. In order to combine and evaluate experience, pilot projects were set up in ten post-war housing estates. The results of four of these pilots have been processed. The main question behind the research I conducted with colleagues was: How is restructuring progressing and developing in these 'Heel de buurt' pilots and how do the physical changes in the restructuring process relate to the social aims of the project? (Helleman *et al.*, 2001).

We identified five success factors and pitfalls in the efforts to combine physical and social measures in one integrated strategy.

Recognisable analysis

We found that local policy documents often make general remarks about the one-sidedness of districts (copied from national policy), but with barely any clarification of the problems these are causing in the specific situation. The key question is whether (potential) residents see one-sidedness as a problem and, if so, whether it influences choice on the housing market. Unpopular housing properties, lack of housing options, high non-occupancy rates and a disproportionately high influx of problem households seriously erode the existing social cohesion. The analysis should be precise and recognisable, possibly partially carried out by the residents themselves.

Wide range of social facilities

Some general social facilities have been provided in all districts, such as Internet cafes for the youth, sport for the adolescents, and neighbourhood par-

ties. These activities can be found in every neighbourhood. There are also other activities, connected to the difference in the physical approach. In one of the cases, Emmen, where the emphasis was on maintaining the housing stock and better neighbourhood management with more resident involvement, a project called Hidden Treasures was carried out, whereby residents shared their most cherished places. Only rarely are measures implemented to preserve the social fabric and social ties during a restructuring process. These include 'demolition parties', 'chat houses' for older people and the formation of housing communes. 'Demolition parties' were successfully developed in the case of Hoogvliet. They were festive events in which residents could bid farewell to their old house – a ceremony of collective mourning and at the same time a celebration of a fresh start for the area.

The combination of activities within and between groups and an individual approach

A successful move was to combine communal activities in which various neighbourhood groups could share experiences with individual contact with residents to support them in their personal situation. Communal activities for all the residents improve social cohesion between the groups. At the same time, cohesion must be stimulated within specific groups (e.g. teenage mothers and ethnic minority organisations). If individual groups are unable to adopt a confident position, they will also be unable to work effectively with other groups. Recognition of how interests will be served by the approach is essential to social cohesion. The group activities need to be combined with an individual approach. Each person has his or her own problems and dreams, which cannot be met by group-targeted approaches alone. Restructuring must meet the demand for a better quality of life for all involved.

The need for a social agenda

We have also concluded that an integrated (area-based) approach implies that both physical and social aspects should be guided by an agenda of the (desired) future developments and how the programme should respond to possible developments. Our research revealed that the four cases did not have a social agenda for more than one or two years. The approach was project-based and for the short term. Long-term finance for, amongst others, education and social benefits is not exactly engaged in the area-based approach. This is in sharp contrast with the extensive physical development concepts and visions for the future. Neglect of the programmatic aspect in the social sector makes it much harder to achieve reciprocity and synergy between physical and social measures.

The added value of combined physical and social activities

We have observed that optimal combination and coordination of physical and

social measures creates maximum (policy) interaction and synergy. An inspiring example is the special assistance for young Antillean single mothers in Hoogvliet. These women receive 'participation tutorials' – which are also used to ascertain the need for a specific form of communal living – combined with a day-care centre. The knowledge is then used when developing the physical reconstruction programme.

Despite this engaging example, practice is trickier than theory. In all the situations studied, an integrated approach was selected without an *a priori* definition of the content. Thus, the adoption of an integrated or holistic approach seems more of a sign of mediocre analysis and helplessness than deliberate action.

The physical renewal programme differed widely in the researched cases: in Hoogvliet more than 50 per cent of the housing stock in the two designated neighbourhoods will be demolished within ten years. In other cases demolition accounted for a much smaller per centage of the housing stock. Resident approval for the programmes appeared to be much more related to similarities in the perception of the problems by residents and professionals, to participation possibilities for the residents, to the entire package of measures for improving neighbourhood maintenance and management, and to social measures, than to the proposed demolition per centage. The case study also proved the potential for a joint physical and social strategy.

Our research (Helleman, 2001), other publications on the 'Heel de Buurt' project (De Boer, 2000) and similar projects and research prompted the Ministry of Housing, Spatial Planning and the Environment to instigate a 'social neighbourhood vision' and later to set up a project called 'social and physical area approach' with the Ministry of Health, Welfare and Sport. These initiatives were adopted in order to stimulate and create better conditions for a joint and more sustainable approach to problem neighbourhoods.

3.6 A social-physical approach

The aim of a social-physical approach and a social neighbourhood vision is to analyse the social problems and preferences in a suitable manner and connect them to the physical survey and measures in order to establish a mature position in the process of urban renewal. It is assumed that this will enlarge the sustainability of the neighbourhood transformation and the investments. It is meant as a tool, to be used along with the analysis of the physical plan of the neighbourhood and the analysis of the housing stock portfolio. When these three analyses are performed at the same juncture in the process, the foundations can be laid for a thorough plan. A successful urban renewal project depends, however, on more than just competent analysis. The right (material) conditions must of course be created to get the process off the

ground: conditions such as a real choice for residents facing compulsory relocation and proper compensation for their expenditure.

The elements needed to arrive at a neighbourhood vision which also includes a social agenda were defined (Ouwehand *et al.*, 2001) and discussed in detail with urban renewal practitioners. The next step was to write a guideline (Fortuin and Ouwehand, 2003), explaining the principles and providing numerous examples of methods that can be used in the different phases of urban renewal processes, illustrated with six cases. The ministries continued the project by issuing a number of publications that elaborate on different aspects of the social-physical approach.

Key principles

If social structure is a dominant factor in the quality and potential of a neighbourhood, then it should also figure prominently in the transformation strategy. Physical plans have not always realised the good intentions of the planners. It is not only, or rather, not merely a question of incorporating social aspects in strategies. One should also be aware that residents and users have different perceptions and interpretations of the environment. The potential environment is the possibilities the planners have seen in a neighbourhood. "The effective environment may thus be defined as that version of the potential environment that is manifestly or latently adopted by users." (Gans, 1986, p. 6, as cited in Van der Horst *et al.*, 2001).

Accordingly, a number of notions need to be addressed.

- *Social and physical measures* differ in character and in effect. Lack of safety in a neighbourhood may be tackled by physical changes, but also by trying to influence the behaviour of the residents. The effects may be rather different. Trying to improve the situation by influencing behaviour may end up with better organised residents and more social cohesion, but the codes may still be broken by individuals.
- The *identity of a neighbourhood* is based on its physical structure, its environment and its social structure. History is part of identity, but identity is not a product of history alone. The changing context and position in the city influence the identity of the neighbourhood. Identity is also a 'social construction of space' and the result of "…, peoples' social exchanges, memories, images, and daily use of the material setting-into scenes and actions that convey meaning." (Low, 2000, p. 128). Those elements must form part of the urban renewal analysis and measures.
- The *context of a neighbourhood* plays an important role. The context is also physical: adjacent neighbourhoods have an influence with their facilities and population, but so do the traffic connections that run through the neighbourhood and connect it with places outside. Passers-by may contribute to the vivacity of the neighbourhood, but also to insecurity and inconvenience. The context is also a social and historical phenomenon. Events in

other parts of the world may have an impact on specific neighbourhoods, as we have seen since 9/11.

- The *social structure is subject to change*: people are ageing and are thus using the neighbourhood in different ways. These trends and the changing composition of the population can strongly influence the identity of a neighbourhood. Not only change itself, but the influx of new groups of residents can significantly influence the confidence of the old residents in the future of the neighbourhood and thus affect the migration patterns (Varady, 1986). If we want to include the social aspects in our transformation strategy, we need to be open to these changes and decide how to respond to them. Some of them we know already although they will occur in ten years time, others are difficult to predict. We have to create space to be able to respond to them in the coming years.
- *Working with different levels*: though the neighbourhood is an appropriate level of approach for many problems, it must not be seen as the most efficient level for all problems. Problems may occur *in* a neighbourhood, but that does not mean that they are problems *of* the neighbourhood. Big problems may have little causes and vice-versa.

These notions have resulted in a guideline that strives to combine the social and physical aspects in all phases of the policy on neighbourhood transformation, besides the analysis, the exploration of different scenarios for neighbourhood improvement and change in the design, the decision-making, and the implementation of the process. The residents need to be involved in the process in order to stay close to their perception of the neighbourhood and to maintain their trust in the future. Hence, the concept implies a strong plea for resident participation.

Resident participation

There are countless motives for resident participation in neighbourhood change (Ouwehand *et al.,* 2006). We have selected the most frequent.

- *creating support*: policies can no longer be executed top-down nowadays, given the governance structures with different parties;
- *acquiring market information*: it is important to know what the customer and consumer prefers in terms of the position of housing on the market;
- *increasing the quality of the product*: using residents as consumer experts may increase the quality of the product;
- *increasing social cohesion*: by stronger involvement in the process;
- *emancipation of the residents:* helping them towards more social mobility;
- *legal rights to participation*: although not every municipality or housing association is strongly in favour of participation, it is legally obliged to offer possibilities;
- *direct democracy:* supplementary to representative democracy;

- *mending the gap between civil society and the authorities*: participation to improve the credibility of the authorities.

The term 'participation' can easily be misinterpreted. Indeed, disappointment and counter-productivity may ensue if the motives and scope in specific situations are not properly explained. Some instruments will suit specific motives, others will be more suited to specific goals. A mixture of motives appears in the guideline. Most important are the first four in the above list.

Not a blueprint but a toolkit

The guideline is not a blueprint for a successful renewal process that encompasses the social as well as the physical dimension. Each neighbourhood has its own characteristics and its own special mix of players and population. The guideline is more like a toolkit which offers different approaches and possibilities in diverse situations. In each situation a decision needs to be taken on which model or instrument can best be used in the process. There is a wide variety of instruments, from group interviews and mental-mapping to 'DIY' analysis for residents, which can be used in the inventory and analysis phase. Branding and scenarios are used to explore different views of the neighbourhood's future. Appealing examples for giving residents a say in the decision-making process can be found in the residents' survey for the final plan for the Bijlmermeer, one of the biggest renewal areas in the Netherlands. The result of an enormous residents' survey was decisive the programme of demolition. It turned out that, given the other possibilities in the renewal programme and a wide range of housing choice, the majority of the residents opted for the maximum level of demolition (Helleman and Wassenberg, 2001). Another example is the neighbourhood budget in several transformation neighbourhoods in the city of Breda. The residents propose and decide on solutions to problems in their neighbourhood and enlist civil servants to implement them. The annual budget is € 225,000 (Weterings and Tops, 2001). The system has proven very successful.

Many of these instruments have been applied in renewal processes throughout the Netherlands, but that does not mean that they are common sense. An interesting case is presented in the next section.

3.7 Success of a joint social and physical approach: Holy-Zuidoost

One of the cases that appears as an example in the guideline for the social-physical approach (Fortuin and Ouwehand, 2003) is Holy-Zuidoost, the south-east part of Holy, a district in the city of Vlaardingen near Rotterdam. Holy-Zuidoost was built in the late 1960s and early 1970s and is typical of the

housing schemes from that period: almost exclusively housing, built mostly with the industrial construction methods popular at that time (now suffering physical problems, such as damp, lack of insulation etc.). The neighbourhood consists of almost 2,000 dwellings and some 4,000 residents. There is a small per centage of terraced one-family houses, the rest consists of blocks of flats, some with four storeys, and three complexes with eight or ten storeys.

Holy-Zuidoost is the third area in Vlaardingen which is designated for urban renewal. One of the reasons for a more drastic form of urban renewal – including some extensive demolition – in all the areas was the influx of new ethnic-minority residents from Rotterdam. Urban renewal in the other two areas sparked a new influx in Holy-Zuidoost. This, in turn, led to the initiative for urban renewal in Holy-Zuidoost, which was vigorously encouraged by the local residents' organisations, still dominated by white, middle-aged people from the upper lower-class and lower middle-class.

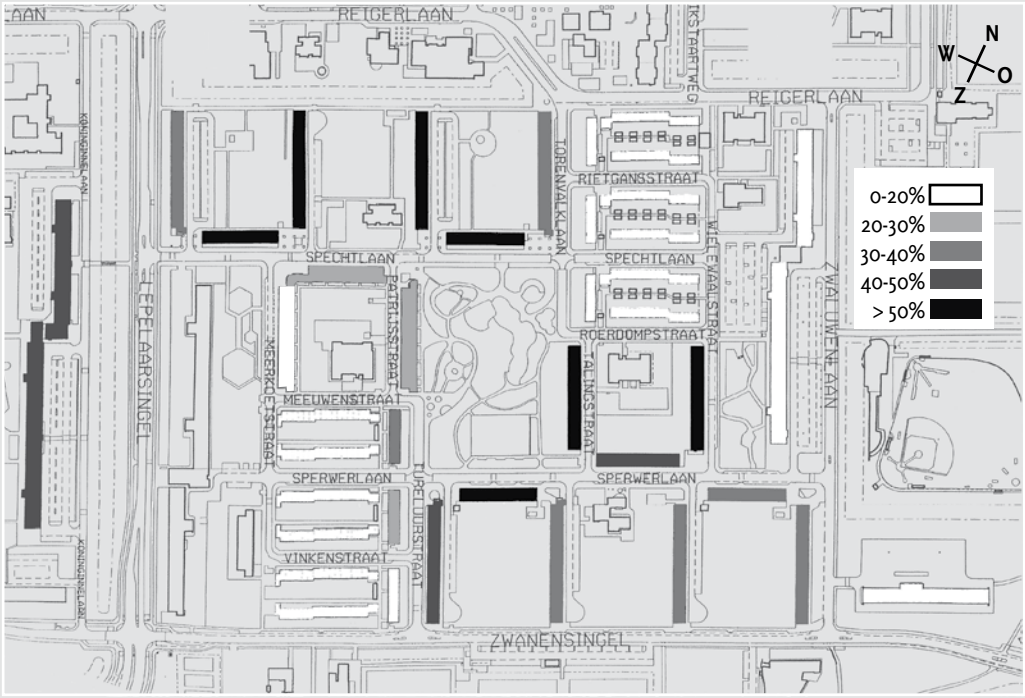
Social structure as part of a threefold analysis

At the end of 2001 the Holy-Zuidoost housing association and the residents' organisations settled on an approach whereby three analyses would be conducted at the same time, i.e. for the housing stock, the spatial planning, and the social structure of the area. The analysis of the social structure comprised different elements and was performed by our institute (Van der Horst *et al.*, 2002).

We collected all the data and statistics we could find on the area. We held interviews with key persons in the residents' organisations and the housing association and with public servants and the police. We also held interviews with six different groups of residents: four comprising people of more or less Dutch ethnicity, one comprising Turkish residents from the area, and one comprising people from the Dutch Antilles. Five in-depth interviews and approximately twenty short interviews with individual tenants were held to get more detailed insight in the housing situation.

A picture emerges of a neighbourhood with a rapidly changing population in some parts. The people of Dutch ethnicity who have been living in the neighbourhood for a long time now are ageing. The new influx consists largely of people from ethnic minorities. However, this picture varies considerably depending on the dwellings. The influx in the most popular parts is still predominantly of Dutch origin. In the less popular parts, the flats in the four-storey blocks without a lift, ethnic minorities account for up to 60 per cent of the population (see Figure 3.1). The long-established residents see this change in population as a problem. Ethnic minorities are perceived as the group that causes all the trouble; they connect this with material symbols, such as satellite dishes, and with closed curtains. These residents see the changes as a stain on the neighbourhood. To some of them, the changes are already manifesting themselves in their immediate environment, on their external walk-

Figure 3.1 Inhabitants with a non-Dutch ethnicity of each complex, as percentage of the total of inhabitants of the complex



way. To others, who live in the better-off complexes, the changes are farther away, but they sometimes express similar feelings, usually borrowed from the 'experience' of other neighbourhood residents, family or television. The residents have very little insight into the mechanics of housing allocation and sometimes feel that the housing association is deliberately placing people in their neighbourhood.

The residents' perceptions of the neighbourhood are closely related to their own feelings towards the changes. Those who see the changes heading towards them tend to experience them as a threat: Will I get out in time, or will I be left behind? Those who embody the changes do not see them as a threat, so there is a difference in what they perceive as problems. We can also conclude that there is a wide gap between the facts and the residents' perception of nuisance, vandalism, etc. and between the picture in the minds of the residents and the picture in the minds of the professionals.

The analysis of the spatial planning and the housing stock provided detailed information on the quality of the differently built groups of dwellings, again based on interviews with residents and inventories of the strengths and weaknesses of the area.

Direct action and further participation

After the findings had been presented, the residents' organisations discussed the process of change in their neighbourhood. The project manager told us

that the residents had abandoned the idea that 'everything should return to the situation of twenty years ago'. The inconvenience experienced by the residents was acknowledged, but also placed in context of different cultures and lifestyles and connected with the inevitable change of the neighbourhood's position in the housing market. Once these problems had been sorted out, it was possible to set up a programme of short-term and long-term actions. The housing association is trying to regain the trust of the residents by setting up an area office to step up neighbourhood management. The housing association has invested a lot of time and energy in getting in touch with the different residents' groups in the neighbourhood. A project was launched to intensify the discussions with the residents in the different parts of the neighbourhood by introducing *Buurtcoaches* (neighbourhood coaches) to organise things in ways that reflected the specific character of the complexes and to ask the residents about the quality of their dwellings and how they imagined their own part of the neighbourhood. These talks ranged from breakfast meetings in orderly apartment blocks to dinner parties in more multicultural settings and from individual sessions to small group interviews in other buildings. It all culminated in a brochure on the 'loved and lasting' qualities of the neighbourhood (Waterweg Wonen & Urban Support, 2003). This information, combined with the analysis of the housing association portfolio and detailed research into the physical condition of the different blocks of houses, eventually led to a multifaceted renewal programme for the neighbourhood. In some areas the emphasis was on improving the condition of the existing stock, in others radical renovation was carried out, and in others still, demolition is on the cards. The first 84 dwellings will be demolished by 2009. Demolition starts on another 288 in 2008: this accounts for half of a complex; radical renovation will start on the other half in 2006. All the households in the complex will be re-housed. Physical and social arguments played an equal role in the decision-making. The poor quality of the entire complex necessitated a choice between demolition and radical renovation. Renovation will be carried out in the part with a fairly good social climate; the part with the most social problems will be demolished. The fate of the other parts of the neighbourhood ranges from demolition after 10 years (single-family substandard dwellings and some of the high-rise buildings) to moderate renovation in areas that function fairly well and are physically sound.

Although it is still too early to draw conclusions on how far the strategy in Holy-Zuidoost has contributed to sustainable change in the long term, it would be fair to say that the integrated approach has delivered a clear picture of the problems and how to deal with them. The social aspects influenced the renewal process and the physical solutions. The residents participated intensively in the process and were generally committed to the chosen programme.

3.8 Conclusions and recommendations

Sustainability implies economic, socio-cultural, environmental and governance dimensions and should be understood as a process rather than a product. We have seen that a huge gap exists between the state of the current housing stock and the current and predicted demand for housing. Neighbourhoods with less attractive houses are subject to rapid population changes. There is a fast influx of new households with few possibilities, often from ethnic minorities, in the weakest parts of the housing market. People with better chances on the market tend to buy or rent a dwelling in other areas. This process accelerates the downgrading of areas with a weak position on the market. It further undermines the reputation and lowers the residents' confidence in the prospects of the neighbourhood.

Social problems and the perceived identity of the neighbourhood play an increasing role in neighbourhood change and should therefore be addressed in urban strategies. As I have shown, the demolition of old dwellings and the construction of new ones that reflect the current demand does not answer all the problems in neighbourhoods with a weak position in the housing market. Either social problems are displaced to other neighbourhoods, or the negative effect of still existing social problems on the partly renewed neighbourhood undermines sustainability.

Investment in social measures while ignoring the weak position on the housing market is not a smart solution as better-off households will still turn to other neighbourhoods.

Though the assumed social effects of physical renewal have turned out to be limited, social and physical factors are interconnected. Good-quality and differentiated housing stock will offer an answer to today's housing demand, also among households that have improved their living conditions and income. A more mixed population may lift the reputation of the neighbourhood and assist the integration and participation of residents from ethnic minorities, although what they most need are good educational facilities and job opportunities. As a one-sided strategy will not prove successful, a joint programme of physical and social renewal is needed to bring about a more sustainable neighbourhood transformation.

Research has shown that though an integrative approach to the problems and process of urban transformation is not easily realised, it is certainly worthwhile. A joint social-physical approach as in the 'social neighbourhood vision' can help to produce a clear analysis and win support for the action programme among the different groups of residents. There are many instruments and working methods which can connect the social and the physical dimension in the analyses of the neighbourhood problems. Different scenarios can be drafted which may help to address the problems and facilitate the decision-making and the implementation of the urban transformation proc-

ess. The process should be organised in such a way that it combines the analysis and renewal programme with more input and commitment from the residents. Only then will it be possible to bolster the confidence of the residents in the future of their neighbourhood. This, in turn, will contribute significantly to sustainable neighbourhood change.

To achieve a more sustainable result, it is best to build on the positive elements of the identity. It is essential to conduct a thorough analysis of the problems and to win the support of the residents and other stakeholders by involving them in all aspects of the renewal process. This must be followed by a short- and long-term action plan to tackle the social as well as the physical problems in neighbourhood and a design and implementation programme. This approach will contribute to a more sustainable form of urban renewal and prevent disappointment and the displacement of problems to other areas – which will later simply have to be renewed as well. It also brings perspective to a programme that is supported by the residents and includes changes in the housing stock.

In this way, we see that a joint programme of physical and social transformation takes account of the three different angles in the literature on urban studies. Intervention in the built environment through renovation, maintenance and demolition and replacement goes hand in hand with analysis and measures, which are geared to strengthening the social structure and, at the same time, allow the residents a role in the process and the decision-making.

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4 Residents' social capital after neighbourhood transformation

An analysis of differences related to residential mobility

Reinout Kleinhans

4.1 Introduction

Urban regeneration policies are a common phenomenon in Western European countries. Comparisons demonstrate that policy contents and implementation differ strongly between countries, but there are also similarities. Area-based urban renewal policies in several European countries share the common goals of strengthening the capacity of distressed neighbourhoods to become both 'sustainable' and 'self-governing' (Cole and Etherington, 2005). This is to be achieved through fostering social cohesion, building social capital and increasing the participation and responsibility of residents (see e.g. Forrest and Kearns, 2001; Kearns, 2004; Kleinhans, 2004; Middleton *et al.*, 2005). As Middleton and his colleagues (2005) put it: "Social capital is seen as the foundation on which social stability and a community's ability to help itself are built; and its absence is thought to be a key factor in neighbourhood decline" (ibid., p. 1711). To turn the tide, urban regeneration policies often target the housing stock of certain neighbourhoods. Frequent interventions are demolition and upgrading of social rented housing and new construction of owner-occupied housing. Urban restructuring is a commonly used term for those measures. They result in a considerable temporary turnover of residents, because significant residential mobility out of, within and into the restructuring area is inevitable.

The substantial impacts of urban restructuring policy for so many households have resulted in fierce debates. There is a general agreement that restructuring policies not only aims to improve the housing stock, but also want to preserve or create a socially mixed neighbourhood population (e.g. Kearns, 2004; Kleinhans, 2004). Policymakers especially hope for beneficial effects of new or staying middle-class residents on liveability and social capital in the neighbourhood. In broad terms, social capital refers to resources that are accessible through social contacts and participation in social networks (e.g. Bourdieu, 1986; Coleman, 1988; Field, 2003; Putnam; 2000). In a neighbourhood context, social capital concerns the benefits of cursory social interactions, shared norms about treating each other and behaviour in space, trust, and of residents acting collectively for a shared purpose.

It is clear that these benefits frequently contribute to a favourable social climate in the neighbourhood. Although not particularly defined in the restructuring policy, it is clear that the social quality is highly important for the (social) sustainability of neighbourhoods (see also the English approach:

http://www.communities.gov.uk). Nevertheless, it remains unclear what urban restructuring means for different groups of residents and their social capital within the neighbourhood. Furthermore, what are underlying factors of current levels of social capital? We know little about residents' social capital in the context of restructured neighbourhoods. The reasons are twofold. First, much previous research has concentrated on 'traditional' neighbourly contacts between residents, while neglecting other social capital aspects, such as unwritten social norms, reciprocity and trust. Second, policymakers and researchers do often not distinguish properly between different groups in restructured areas. At best, they distinguish between original and new residents (e.g. Van Beckhoven and Van Kempen, 2003), following the classical study of Elias and Scotson (1965). But what about residents who moved within the same neighbourhood, or from directly adjacent neighbourhoods?

This contribution focuses on the social capital of different types of residents in recently restructured neighbourhoods. I will make explicit distinctions based on their residential mobility patterns, their previous location and perceived changes in their housing situation. The focus is on changes in the neighbourhood population due to restructuring policy. The effects of the policy process are beyond the scope of this chapter. Instead, this chapter aims to answer the three research questions, by presenting the results of empirical research in two recently restructured Dutch neighbourhoods. First, what is the level of social capital among stayers, movers and newcomers in the neighbourhood? Second, what are the factors underlying the differences in social capital level? Third, is there a relation between social capital and residents' expected length of residence in their house and neighbourhood? (Dantas, 1988; Hoogvliet, 1992; Kleinhans, 2003). There is evidence for a connection between the number of years of residence and social capital in the neighbourhood (e.g. DiPasquale and Glaeser, 1999; Saegert and Winkel, 2004). But is social capital also influenced by residents' expectations of their future length of residence? (cf. Middleton *et al.*, 2005, p. 1726). It is possible that households score low on social capital because they are planning a move within a few years. If so, investing in good social ties with neighbours and other residents may become less worthwhile. On the other hand, residents may be more likely to invest in social capital if they intend to stay in the area for a long time. Therefore, the expected length of residence is a proxy for residential stability and, consequently, an important aspect of social sustainability.

In many Dutch cities, early post-war neighbourhoods are subject to considerable interventions. Low-cost social rented apartments often dominate the housing stock in these areas. This housing type is increasingly not in accordance with high consumers' demands for housing quality. Consequently, mainly low-income households with limited options rent these houses. Middle-class and higher-income households lack attractive housing career opportunities in these neighbourhoods and often leave (Ministry of Housing, Spa-

tial Planning and the Environment, 1997, 2000; Van Kempen and Priemus, 2002; Priemus, 2004). In 1997, the Dutch government launched an ambitious restructuring program to tackle the problems of urban post-war districts (see Chapter 1). Demolition, sale or upgrading of social rented housing and new construction of more expensive owner-occupied housing should create more variety in the housing stock. The neighbourhood layout, public space, services and infrastructure are improved simultaneously. Two successive white papers of the government (Ministry of Housing, Spatial Planning and the Environment, 1997; 2000) and the Urban Renewal Act of 2000 have given momentum to urban restructuring policy. In the coming decade, tens of thousands of households are directly affected. Either they are forced to move out of the area due to demolition of their house or they voluntarily move to upgraded or newly constructed housing.

This chapter is divided into seven sections. After the introduction, the second section discusses theories of social capital, especially in the context of neighbourhoods. Here, I also make clear why policymakers are so interested in social capital. The third section describes the residential mobility implications of urban restructuring for different types of residents. This section explains the distinction between stayers, movers and newcomers. The fourth section switches to the research areas, data and methods. In the fifth section, I present the main results of bivariate and multivariate analyses, followed by a discussion in the sixth section. The final section contains the concluding remarks and policy recommendations.

4.2 Social capital in a neighbourhood context

4.2.1 Theories of social capital

Why are policymakers and researchers so interested in social capital in neighbourhoods? Robert Putnam provides a first answer to this question. "Neighborhoods with high levels of social capital tend to be good places to raise children. In high-social-capital areas public spaces are cleaner, people are friendlier, and the streets are safer" (Putnam, 2000, p. 307). A second answer points to limited knowledge of the social effects of urban restructuring. The implications of Dutch restructuring have mainly been analysed in terms of activity patterns (e.g. Van Beckhoven and Van Kempen, 2003) and the policy discourse (Uitermark, 2003). These useful perspectives have not clarified issues of shared norms, trust in other people and collective action. These issues are strongly related to social capital in a neighbourhood context. A third answer is that urban restructuring policy has shifted to a socially oriented approach, i.e. the 'soft' aspects of restructuring (Kearns, 2004, p. 4; Priemus, 2004, p. 207). Local authorities, housing associations and care providers stimulate volun-

tary work in community groups, liveability, common norms and promoting self-help of residents. In other words, restructuring is expected to positively influence social capital. Fourth, through "highlighting the positive, democracy- and efficiency-enhancing consequences of civil society networks, the conception of social capital has become attractive for policy-makers searching for non-economic low cost solutions to social problem" (Mayer, 2003, p. 115).

Social capital has received much international attention through the works of Bourdieu (1986), Coleman (1988) and Putnam (1993; 2000). But it is by no means a novelty: "The term social capital itself turns out to have been independently invented at least six times over the twentieth century, each time to call attention to the ways in which our lives are made more productive by social ties" (Putnam, 2000, p. 19). Definitions differ per author. Generally, social capital refers to resources that are accessible through social interactions and social networks, reciprocity, norms and mutual trust[1] (Bourdieu, 1986; Coleman, 1988; Fine, 2001; Portes, 1998; Putnam, 1993; 2000).

The usefulness of social capital as an analytical concept has been questioned in the scientific debate (see Middleton *et al.*, 2005, pp. 1713-1717). Basically, however, the concept of social capital is rather straightforward. By making connections with one another, and maintaining these contacts over time, people are able to work together. They are able to achieve things that they either could not achieve by themselves, or only with difficulty and at high costs. To the extent that social interactions and networks constitute a resource, they form a kind of capital (Field, 2003, p. 1). But "it is important to distinguish the resources themselves from the ability to obtain them by virtue of membership in different social structures, a distinction explicit in Bourdieu but obscured in Coleman" (Portes, 1998, p. 5). Portes defines social capital as the ability to mobilise resources from a social network. Thus, an individual must be connected to others to reap social capital benefits.

While a few authors have added a third dimension, i.e. linking capital (e.g. Halpern, 2005; Woolcock, 1998), the distinction between bonding and bridging capital has received most attention. Bonding capital is created in strong social ties between individual people, i.e. certain family members, close friends, and members of certain ethnic groups. Strong ties are a major source of emotional and material support (bonding capital). This type of capital can be very important within poor and excluded communities (Kearns, 2004). The social networks that produce bonding capital can be so strong that they exclude outsiders from the network and impose suffocating norms on the group members (e.g. Briggs, 1998; Portes, 1998). This is known as the dark side of social capital (Portes and Landolt, 1996; Putnam, 2000). Bridging capital is hidden in

1 For comprehensive overviews of the literature on social capital, see e.g. Field (2003), Fine (2001), Halpern (2005) and Kearns (2004).

the weak, less dense, cross-cutting social ties between heterogeneous individuals such as friends of your friends, indirect acquaintances, or certain work colleagues. This form of capital helps people to 'get ahead' through access to opportunities and resources in other social circles than your own. Thus, it contains a different type of resources than bonding capital. A classic example of bridging capital is information about job opportunities, passed on between loosely connected people through a common acquaintance. The weak ties concept originated from Granovetter. "Whatever is being diffused can reach a large number of people and traverse greater social distance when passed through weak ties rather than strong ties" (ibid., 1973, p. 1371).

Thus, bonding and bridging capital have their own specific merits and drawbacks. But they are not 'either-or' categories into which social networks can be neatly divided, but 'more or less' dimensions along which we can compare different forms of social capital (Putnam, 2000, p. 23). If Dutch policymakers try to stimulate basic levels of social control, collective action between residents and shared social norms, they appear to aim mainly at weak ties and bridging capital. However, the application of these network terms is problematic in a neighbourhood context. I will discuss this in detail below.

4.2.2 Social capital in neighbourhoods

Because social capital and weak ties are basically network concepts, studying social capital in neighbourhoods poses several problems.[2] Most important is that neighbourhoods and networks are completely different entities that almost never converge (e.g. Wellman *et al.*, 1988). 'Neighbourhood' is a socio-spatial or imagined unit with a specific, but a limited social significance for its residents. It is only one of the many contexts in which people establish and maintain their social networks. Thus, neighbours and other residents usually form just a small part of residents' social networks (Bridge, 2002, p. 25; Fisher, 1982, p. 41; Henning and Lieberg, 1996).

However, the neighbourhood is a context that residents choose or are forced to live in. Therefore, of interest are the cursory, everyday social interactions between residents that may produce social capital without necessarily being a member of each other's network. These cursory ties may develop into strong ties (bonding), but they usually remain of a weak nature and of "a shifting, moving, fluid character" (Lofland, 1985, p. 118). In her book *A World of Strangers*, Lofland studied social interactions in public space, characterised by limited verbal communication and a short duration. While Lofland emphasises evasive behaviour, I will argue that cursory social interactions may have a positive social capital value. "Like pennies dropped in a cookie jar, each of

2 I am indebted to Talja Blokland for important suggestions on this issue.

these encounters is a tiny investment of social capital" (Putnam, 2000, p. 93). Neighbourhood residents 'accidentally' run into personal encounters in staircases, on the street, on squares, in playgrounds and in neighbourhood facilities such as shops and community centres. To a certain level, there is a form of mutual dependency. This dependency is hidden in the extent to which residents live peacefully alongside each other, succeed to maintain common norms and trust, and cooperate successfully if a shared neighbourhood interest is at stake. In a negative sense, the dependency between residents is felt clearly if nuisance occurs. However, the benefits of shared norms, trust and collective action are a resource from cursory, everyday social interactions. Consequently, these benefits are forms of social capital.

Cursory social interactions can yield public familiarity. Public familiarity implies that residents get sufficient information from everyday interactions to recognise and 'categorise' other people (Fischer, 1982, pp. 60-61; Blokland, 2003, pp. 90-93). Public familiarity can result in social capital in the sense of a favourable social climate, but also in more tangible forms of social capital. I will give some examples to clarify our argument. I first refer to work of Henning and Lieberg (1996), who studied the role of weak ties between residents. They define weak ties as the "unpretentious everyday contacts in the neighbourhood" (ibid., p. 6). These contacts range from a nodding acquaintance to modest levels of practical help. The number of weak ties outnumbered the strong ties. Weak ties not only appeared to be significant for support, but also for a feeling of home and security (Henning and Lieberg, 1996; Briggs, 1998, p. 88; Skjaeveland and Garling, 1996). Forrest and Kearns (2001) argue that "the less robust and less deep-rooted are neighbourhood networks, the more stable and conflict-free may be the social order in which they sit" (ibid., p. 2134). According to Bridge (2002), what we can reasonably expect from other residents is neighbourliness. This is the exchange of small services or support in an emergency against a background of routine convivial exchanges, such as greetings and brief chats over the garden fence or in the street (ibid., p. 15).

A second element of social capital concerns social norms. In a neighbourhood setting, norms are unwritten social rules and opinions with regard to social interactions with other residents and behaviour in public spaces. Social capital then consists of benefits of shared norms and social control, such as nuisance that fails to occur, agreements how to use scare parking space, and parents also keeping an eye on other playing children than their own (cf. Foley and Edwards, 1999; Putnam, 2000). Related is the concept of collective efficacy, defined as social cohesion among neighbours combined with their willingness to intervene on behalf of the common good (Sampson *et al*., 1997, p. 918). Sampson and colleagues showed that collective efficacy is negatively associated with variations in violent crime in neighbourhoods. Residents' willingness to intervene in unpleasant situations partly depends on the quality of social interactions and mutual trust (ibid., p. 919; Coleman, 1990; Duncan

et al., 2003). Social capital theory claims that effective enforcement of norms is only possible if a social structure has closure (Coleman, 1998, pp. 105-107). Closure refers to the extent to which different actors in a social setting are interconnected, i.e. know each other. In a neighbourhood, this would mean that residents must know each other if they want to exercise social control. However, Bellair (1997) has suggested that the mere presence of social interactions is sufficient for a basic level for social control. Moreover, certain explicitly agreed norms can be enforced top-down by landlords. They can also stimulate initiatives of residents who want to draw up basic norms for their apartment buildings. This 'codification' may simplify residents' efforts of norm enforcement.

Trust, a third component of social capital, is a complex issue. "The causal arrows among civic involvement, reciprocity, honesty, and social trust are as tangled as well-tossed spaghetti" (Putnam, 2000, p. 137). A basic level of trust is a condition for social interaction, support and reciprocity. Trust may also develop as a positive consequence of interactions and mutual support (Brehm and Rahn, 1997). In a neighbourhood context, trust refers mainly to predictability of residents' behaviour. A deteriorating neighbourhood poses threats to this predictability and social interactions between residents (Fukuyama, 1995, p. 26; Lelieveldt, 2004; Ross *et al*., 2001). However, an improving neighbourhood may have beneficial effects for trust levels. Residents may perceive neighbourhood transformation and investments in the physical infrastructure as a sign of public interest in their neighbourhood, raising their optimism and trust in its future.

In sum, I have described how social capital can be analysed in a neighbourhood context. While strong ties in a neighbourhood can produce bonding social capital, it seems that weak ties, i.e. casual and cursory connections between residents, are far more likely to occur. These connections can produce a variety of resources, all supporting a favourable social climate. I designed the survey to match this line of reasoning. That brings us to an important difference between social cohesion and social capital. Whereas social capital refers to resources accessible through social networks, norms and trust, social cohesion commonly denotes the networks, values, norms and solidarity themselves. Additionally, social capital is, by definition, limited to social interactions between people, excluding relations between people and places. Interestingly, several authors consider social capital as a dimension of social cohesion, with the other dimensions being common values and civic culture, social order, solidarity, and place attachment (Forrest and Kearns, 2001).

Finally, we turn to the connection between residential mobility and social capital. As mentioned earlier, there is evidence for a connection between years of residence and (preparedness to contribute to) social capital in the neighbourhood (e.g. DiPasquale and Glaeser, 1999; Saegert and Winkel, 2004).

Nevertheless, residents' expectations of their future length of stay in the neighbourhood may also be associated with social capital. A tendency to move in the near future may have a negative impact on the social capital of households. Whether they are planning a move, is reflected by their expected length of residence (see Dantas, 1988; Hoogvliet, 1992). Research has shown that residents who claim to move within a few years, can usually indicate the main triggers of their intentions (Mulder and Hooimeijer, 1999). This finding was replicated in the research reported in this chapter (Kleinhans, 2005).

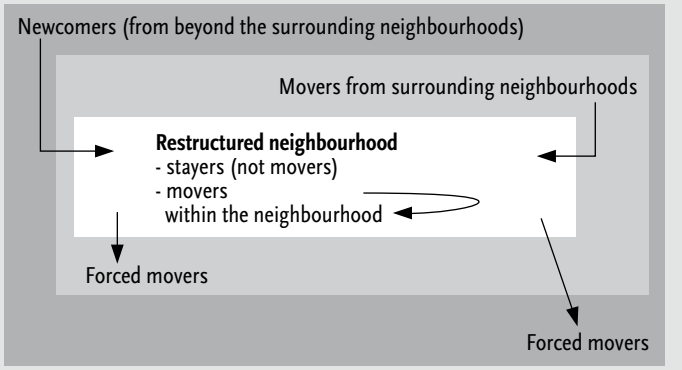
4.3 Neighbourhood transformation and residential mobility

Urban restructuring is basically a physical strategy, although it is usually accompanied with social and economic policy measures. In practice, measures such as demolition and new construction are often so substantial that significant residential mobility out of, within and into the renewal area is inevitable. This renewal-related residential mobility almost certainly changes the population characteristics more fundamentally than regular residential mobility patterns. The more the new and upgraded dwellings differ from the previous housing with regard to housing type, price and tenure, the more differences in population characteristics generally arise. From that perspective, urban restructuring preserves or increases a social mix in the neighbourhood population.

Selective migration is considered one of the most pressing problems of post-war neighbourhoods. There, social rented housing is increasingly not in accordance with high demands for housing quality. Consequently, mainly low-income households with limited options rent these houses. Middle and higher-income households often ignore these post-war neighbourhoods in their search for a new dwelling. But even if these households live in those post-war districts, they often leave because of a lack of attractive housing career opportunities (Ministry of Housing, Spatial Planning and the Environment, 2000; Van Kempen and Priemus, 2002; Priemus, 2004, p. 203). Precisely for this reason, the government claims that restructuring should not only aim at newcomers, but also target middle-income households who are considering a move out of areas with much social rented housing (Ministry of Housing, Spatial Planning and the Environment, 2000, pp. 176-177). Consequently, a successful restructuring policy may tempt wealthier residents to take advantage of new housing career opportunities within the same area. This also applies to residents not completely new to the restructuring site, as they live in neighbourhoods adjacent to the area subject to restructuring.

Therefore, we cannot answer the question of policy implications in terms of a simple dichotomy of old versus new residents. The variety in moving dis-

Figure 4.1 A graphical model of the five categories of residents



tances, previous locations and changes in housing situation asks for a more refined typology. Hence, I distinguish between five resident categories whose mobility pattern and housing situation are directly influenced by urban restructuring (see Figure 4.1):

- *Stayers* who remain living in the same dwellings in the restructured area. It is quite common that only part of the neighbourhood is demolished. In the other parts, restructuring measures did not require the stayers to move. Either their houses were subject to limited renovation or to no physical measure at all. Thus, many have a (far) longer length of residence in the restructured area than other resident categories.
- *Movers within restructured neighbourhoods* to untouched, renovated, or newly constructed houses. This group also includes residents who experienced forced relocation from demolished dwellings within the same neighbourhood.
- *Movers from surrounding neighbourhoods*. This category includes all movers from adjacent neighbourhoods to the restructured area. A common finding in housing research is that many moves cover short distances (e.g. Mulder and Hooimeijer, 1999).
- *Newcomers* are new residents from anywhere outside the restructured area and its surrounding neighbourhoods. The newcomers mainly moved to the newly constructed houses, but also to the original or the renovated houses.
- *Forced movers out of restructured areas*: residents who are forced to move to a different neighbourhood, due to demolition or upgrading of their dwelling. The issue of forced relocation is beyond the scope of this chapter. However, the issue is studied in depth in other papers (Allen, 2000; Clampet-Lundquist, 2004; Ekström, 1994; Fried, 1967; Gans, 1991; Goetz, 2002; Kleinhans, 2003; Popp, 1976).

As mentioned in the introduction, there is evidence for a connection between the number of years of residence and social capital in the neighbourhood (e.g. DiPasquale and Glaeser, 1999; Saegert and Winkel, 2004). Therefore, I hypothesise that the stayers and movers within the neighbourhood have (access to) higher levels of social capital than the movers from adjacent neighbourhoods and the newcomers. Following the third research question, I also hypothesise that the expected length of residence has a positive, autonomous effect on residents' social capital (if other relevant factors are held constant). Below, I will test these assumptions empirically and provide answers to the research questions.

Table 4.1 Categories of residents in De Horsten and Hoogvliet Northwest

Category	De Horsten		Hoogvliet Northwest	
	N	%	N	%
Stayers	42	9.0	199	44.4
Movers within the neighbourhood	63	13.4	58	12.9
Movers from surrounding neighbourhoods	136	29.0	94	21.0
Newcomers	219	46.7	96	21.4
Missing (unknown)	9	1.9	1	0.2
Total (n=917)	**469**	**100.0**	**448**	**100.0**

4.4 Data and methods

Data collection

Studying social capital of stayers, movers and newcomers in restructured neighbourhoods requires thorough empirical research. Our resources enabled fieldwork and data analysis in two neighbourhoods where urban restructuring policy was recently completed.[3] The case study areas are two peripheral post-war neighbourhoods in the city of Rotterdam: De Horsten and Hoogvliet Northwest. Both neighbourhoods were built during a period of severe housing shortages as a result of the Second World War. The area of Hoogvliet was also meant for housing employees of the petrochemical industry nearby. The areas were dominated by multi-family apartment buildings in the social rented sector. During the 1990s, extensive urban restructuring transformed the housing stock of De Horsten and Hoogvliet Northwest. Nowadays, both neighbourhoods consist of almost 1.000 dwellings of different forms, tenures, prices and quality. In total 1,941 written questionnaires were distributed and recollected in a door-to-door campaign. This yielded a response rate of 47 per cent, equally spread between the areas. Subsequently, I acquired neighbourhood census data, such as household composition, age, ethnic background and tenure. These data were compared with the equivalent survey variables. This analysis (not printed here) showed that the response is a representative sample of the population in both areas. Several questions in the questionnaire enabled categorisation of respondents (see Table 4.1).

A striking difference between the research areas is the relative size of the categories. In Hoogvliet Northwest, stayers are much more present that in De Horsten. On the other hand, the proportion of newcomers is much higher in De Horsten than in Hoogvliet Northwest. The sheer size of the restructuring measures determines these differences. In De Horsten, about 70 per cent of the housing stock has been demolished and renovated. For Hoogvliet Northwest, this figure amounts to 40 per cent. The newcomers in both areas are mainly from other districts in Rotterdam, as well as other municipalities.

3 The author wishes to acknowledge the financial assistance of the Dutch government through the Habiforum Program Innovative Land Use and Delft University of Technology through the Delft Centre for Sustainable Urban Areas.

Box 4.1 The Social Capital Index

A list of all social capital indicators, as used in our survey. Many indicators are derived from validated social capital surveys (such as Grootaert *et al*., 2002).

In this neighbourhood, we are on good terms with each other.
I must solve many problems for myself because few people support me. 1)
If I help a neighbour with something, I expect him to return a favour in the future. 1)
It is not easy to establish contacts with the people around here. 1)
In case of emergency, I can always ask someone in this neighbourhood for help.
There are tensions here between newcomers and people who have lived here for a long time. 1)
Actual support offered to neighbours during the last two months. 2)
Active membership in a voluntary association (resident organisation, sport club, church, and other). 2)
Voluntary work in an association or in general. 2)
Cooperation with other residents in the last year to achieve something for the neighbourhood. 2)
The people around here would cooperate well to get something done for the neighbourhood, e.g. a face-lift of the public park.
In this neighbourhood, there is a good level of social control.
The residents in this neighbourhood take no account of each other. 1)
I feel jointly responsible for the liveability in this neighbourhood.
The residents have common norms with regard to keeping this neighbourhood tidy.
Residents should not meddle with each other's affairs.
If you encounter a person in this area, would you know if he or she lives in this neighbourhood?
If a resident parks his car on the sidewalk, would you ask him to move it to a parking place?
Generally speaking, residents in this neighbourhood can be trusted.
When I go on a holiday, I can leave my house key safely with my neighbours or other residents.
One cannot be too careful in dealing with people you do not know. 1)
I don't mind several ethnic groups living in this neighbourhood alongside each other.

1) These items have a reversed meaning and are recoded accordingly.
2) Bivariate items (0 = no; 1 = yes).

Measures

From the previous section, it is clear that social capital is a multidimensional concept (Foley and Edwards, 1999; Fine, 2001; Narayan and Cassidy, 2001; Putnam, 2000). The survey contains 22 indicator variables of social capital (see Box 4.1). The variables both reflect the nature of the specific type of social capital and the way in which it can be 'accessed' by the respondents. As mentioned earlier, all variables on social interactions, norms and trust are designed in a way to indicate cursory connections, but not to exclude possible strong ties. Most variables are measured on a five-point Likert-scale. Yet, it makes no sense using each item as a dependent variable. Therefore, I combined all variables in a Social Capital Index (cf. Putnam, 2000, p. 291). Cronbach's α-coefficient of this index is 0.75.

The multivariate analysis includes several potential predictors of social capital. First, I use expected length of residence (ELR), neighbourhood and resident category, as defined in Table 4.1. ELR is a dummy variable, indicating an expectation to move in less than five years or not, measured at the moment

of answering the question. Secondly, I include age (years), household composition (five categories), labour market position (paid employment or otherwise), net household income per month (four categories), and ethnic background (native Dutch or ethnic minority). In Dutch statistics, a person belongs to an ethnic minority if at least one of his parents is born abroad, regardless of his own country of birth. Finally, data on educational levels of respondents were not available.

Measures of housing and neighbourhood perception are also included. The housing variables include satisfaction with the current dwelling (a scale ranging from 1 = very unsatisfied to 5 = very satisfied), tenure (social or private rented versus owner-occupied), dwelling type (single- or multi-family) and dwelling age (newly constructed or not). The remaining variables are place attachment and perceived neighbourhood quality. Place attachment involves dynamic, but enduring positive bonds between residents and their physical and social settings (Brown and Perkins, 1992). In our research, place attachment is an index based on nine questionnaire items and contains the mean score per respondent for all items. These items are statements reflecting to what extent respondents appreciate living in the neighbourhood, feel proud of it, feel at home in the area, perceive accessible moving opportunities and are feeling safe on the streets at night (Brown *et al.*, 2003; Burns *et al.*, 2001; Forrest and Kearns, 2001; Perkins and Long, 2002). Each item is measured on a five-point Likert-scale. Scales with reversed meanings were recoded accordingly. The scores of the index range between 1 and 5 (Cronbach's = 0.84).

Perceived neighbourhood quality is a measure of residents' perceptions of the physical quality of their immediate living environment. Here, I developed an index that is constructed similarly to the place attachment index. Perceived neighbourhood quality consists of five items measuring how often vandalism, graffiti on buildings, litter and dog dirt on the streets, nuisance of other residents and unsafely on the streets occur, according to the respondent (cf. Brown *et al.*, 2003; Ellaway *et al.*, 2001; Parkes *et al.*, 2002). Each item is measured on a four-point scale (1 = often occurs here, to 4 = never occurs). Again, the coding of certain items was reversed to take negative statements into account. Scores of the perceived neighbourhood quality index range between 1 and 4 (Cronbach's $\alpha = 0.80$).

4.5 Results

As a starting point, I calculated the average Social Capital Index score for each of the resident categories in our research areas (see Table 4.2). This yields notable results. Firstly, the groups in both neighbourhoods differ significantly in the average SCI-score. In De Horsten, stayers have a much lower level of social capital than the movers and newcomers. Contrary, the stayers score highest

Table 4.2 Social Capital Index*: mean scores per resident category (n=871)

Areas	Stayers	Movers within restructured neighbourhoods	Movers from surrounding neighbourhoods	Newcomers	Average per area
De Horsten	2.27	2.64	2.68	2.71	2.65
(SD)	(0.39)	(0.41)	(0.32)	(0.34)	(0.37)
Hoogvliet Northwest	2.73	2.68	2.61	2.68	2.68
(SD)	(0.32)	(0.27)	(0.34)	(0.33)	(0.32)

* Social Capital Index: all respondents with more than five missing values for variables in the index are excluded.
The higher the index score, the higher the average level of social capital of the resident category (index range: 1-5).
De Horsten: ANOVA Sum of Squares between groups = 6.62; df = 3; F = 18.06; $p<0.001$.
Hoogvliet: ANOVA Sum of Squares between groups = 0.87; df = 3; F = 2.83; $p<0.05$.

of all groups in Hoogvliet Northwest. Secondly, the newcomers in both areas have a relatively high level of social capital. If length of residence is a strong predictor of social capital, the newcomers would score much lower than stayers. Thus, I reject the hypothesis that stayers and movers within the neighbourhood have higher levels of social capital than movers from adjacent neighbourhoods and newcomers. Finally, the total average SCI-score does not differ significantly between the research areas.[4]

I used linear regression analysis to establish the predictors of residents' social capital. The regression analysis of the Social Capital Index consists of three models, of which only the final model is depicted in Table 4.3. The final model includes the expected length of residence (ELR), the resident classification, the neighbourhood designation and interaction terms for joint effects of resident category and neighbourhood. The inclusion of interaction terms is based on significant differences in social capital scores between resident categories in the neighbourhood, but also between similar resident categories in different areas. The model also includes socioeconomic characteristics, housing satisfaction, place attachment, tenure, dwelling type, dwelling age and perceived neighbourhood quality.

Table 4.3 confirms that the movers from the surrounding neighbourhoods score lower on social capital than newcomers. The statistical interaction terms also demonstrate that movers from surrounding neighbourhoods of De Horsten score higher on social capital than their counterparts in Hoogvliet-Northwest. Moreover, stayers in De Horsten score significantly lower on social capital than the stayers in Hoogvliet Northwest. An explanation for this latter finding is provided in the next section. In sum, the results of the bivariate analysis (see Table 4.2) are replicated in the regression model.

The regression model of the Social Capital Index shows no significant relationship between social capital and the ELR. Consequently, I must also reject the hypothesis that the expected length of residence has a positive, autonomous effect on residents' social capital. Both age and ethnic background have no significant association with the overall level of social capital. Two-parent

4 Student's t = 1.37, df = 869, p=0.17.

Table 4.3 Predictors of residents' social capital

Dependent variables	**Social Capital Index (final model)**		
Models (N = 781)	**B**	**SE**	**Bèta**
Category of residents			
Stayers	0.05	0.05	0.06
Movers within the neighbourhood	-0.05	0.05	-0.05
Movers from surrounding neighbourhoods	*) -0.11	0.04	-0.14
Newcomers (reference category)	0		
Neighbourhood (0 = Hoogvliet; 1 = Horsten)	0.02	0.04	0.02
Interaction category * neighbourhood			
Stayers	*) -0.17	0.07	-0.10
Movers within the neighbourhood	0.08	0.06	0.06
Movers from surrounding neighbourhoods	*) 0.14	0.05	0.14
Newcomers (reference category)	0		
Expected length of residence (ELR) (0 = more than five years; 1 = less than five years)	0.04	0.03	0.03
Age (in years)	0.00	0.00	0.03
Ethnicity (0 = ethnic minority; 1 = native Dutch)	0.02	0.02	0.03
Household composition			
Single (reference category)	0		
Two adults without child(ren) at home	-0.04	0.03	-0.04
Two adults with child(ren) at home	*) 0.06	0.03	0.05
One-parent family with child(ren) at home	0.06	0.05	0.05
Others	-0.05	0.06	-0.02
Labour market position (0 = unemployed, retired; 1 = paid employment)	*) -0.06	0.03	-0.09
Net household income per month			
Low: below € 1,500 (reference category)	0		
Middle: € 1,500 to € 2,500	**) 0.08	0.03	0.11
Higher: € 2,500 or more	**) 0.09	0.04	0.11
Non-response	-0.02	0.03	-0.02
Satisfaction with current dwelling	0.02	0.02	0.04
Place Attachment (index)	***) 0.22	0.02	0.38
Tenure (0 = rented; 1 = owner-occupation)	*) 0.07	0.03	0.10
Dwelling type (0 = single-family home; 1 = multi-family dwelling)	***) -0.11	0.03	-0.16
Dwelling age (0 = other; 1 = newly built)	0.03	0.03	0.04
Perceived Neighbourhood Quality (index)	***) 0.07	0.02	0.14
Constant	***) 1.64	0,10	
F	21.60		
Df	24		
Significance	0.000		
R^2	0.40		

Note: Significance levels: *) p<0.05; **) p<0.01; ***) p<0.001; (two-sided). All respondents with more than five missing values for variables in the Social Capital Index are excluded from the analyses. This step decreases the number of incomplete index values for the three other indexes to six per cent or less. The linear regression models meet the requirements of multiple regression: linearity of relationships and homoscedasticity (tests of these assumptions can be requested for at the first author).

families with children at home score higher on social capital. Labour market position, i.e. having a paid job, has a negative effect on both social capital and the perception of the social interactions. Of all the socioeconomic characteristics, household income is the strongest predictor. Both middle- and higher-income households have a higher level of social capital than lower income households, i.e. the reference group. Respondents who refused to reveal their household income have a similar score as the low-income households.

Finally, I analyse the effect of housing and neighbourhood characteristics. The inclusion of the corresponding variables to the final SCI-model has resulted in a substantial improvement of the explanatory power.[5] Housing satisfaction and dwelling age have no relation with social capital. However, the strength of the relation between place attachment and social capital is remarkable (ß = 0.38, $p<0.001$). Two other significant factors are dwelling type and tenure. Firstly, owner-occupiers score higher on social capital than renters. Secondly, living in a single-family dwelling is associated with higher levels of social capital than living in multi-storey apartments. In conclusion, not only socioeconomic factors but also housing and neighbourhood characteristics play an important role in explaining residents' level of social capital.

4.6 Discussion

We have applied the concept of social capital in the context of two recently restructured neighbourhoods that have experienced substantial residential and social instability. The results are only valid for our case studies, not necessarily for the general Dutch situation.

Several socioeconomic characteristics are important for the level of social capital. Couples with children at home clearly stand out in comparison to singles, couples without children and one-parent families. Obviously, parents meet other parents by means of their children, for example in the playground or in the schoolyard. This is a common way to get to know other residents (e.g. Forrest and Kearns, 1999; Saegert and Winkel, 2004). These interactions can increase public familiarity between residents. If experienced positively, they are likely to produce social capital in various forms (see Section 4.2).

Ethnic background is not significantly related to the overall level of social capital, but income is. Closer inspection of our household income data (not shown) reveals that we are dealing predominantly with middle-income households and relatively few high-income households.[6] Both middle- and

5 The explained variance R^2 increases from 0.17 in the second model (not shown) to 0.40 in the third model.

6 The number of households with a net household income considered as high (€ 3,000 per month or more) amounts to only 12 per cent in De Horsten and 7 per cent in Hoogvliet Northwest.

higher-income households have a significantly higher level of social capital than low-income households (see also Butler and Robson, 2001; Drukker *et al.*, 2005; Saegert and Winkel, 2004). Presumably, this is a joint effect of economic and cultural capital, i.e. the level of education and skills. Middleton *et al.* (2005) claim that the presence of (bridging) social capital is a consequence of social and economic well-being, not a cause of it. They write that membership of many organisations, such as sport clubs, requires wealth in order to invest time and money in participation (ibid., p. 1731, 1734). Through retaining and attracting middle-income households with children, restructuring has a highly indirect, but positive impact on social capital levels in the neighbourhood. A complementary indirect effect is that the majority of the middle- and higher-income households, especially the newcomers, moved into the restructured neighbourhoods in a limited period of time after the completion of the new dwellings. They experienced a joint new start in the neighbourhood. Research into new estates shows a relatively high level of social interaction in the first years of the estate, and those interaction levels tend to diminish afterwards (e.g. Reijndorp *et al.*, 1998; Jupp, 1999). This finding seems to apply to restructured neighbourhoods as well.

Place attachment has a remarkably strong association with the level of social capital. In other words, residents expressing a higher level of place attachment also report higher levels of (access to) social capital. Several authors have hinted at such a relation between place attachment and social capital (e.g. Burns *et al.*, 2001, p. 7; DiPasquale and Glaeser, 1999; Forrest and Kearns, 2001, p. 2140; Perkins and Long, 2002). Our place attachment index takes into account residents who prefer to move, but simply lack the resources and opportunities to act accordingly. Thus, stronger place attachment is likely to raise residents' willingness to join in favourable social interactions that create social capital.

Dwelling characteristics also matter. Owner-occupiers in the restructured neighbourhoods enjoy higher levels of social capital than the renters, whether private or social renters. This finding fits neatly in a research tradition that points at the beneficial effects of homeownership for both the owner-occupiers and the neighbourhood (see e.g. Campbell and Lee, 1992; Davidson and Cotter, 1986; DiPasquale and Glaeser, 1999; Elsinga and Hoekstra, 2004; Temkin and Rohe, 1998). Here, owner-occupiers participate significantly more often than renters in associational activities and volunteering, both in and outside their neighbourhood. They have, therefore, more access to social networks potentially rich in social capital. Motivated by protecting their investment, homeowners may be more likely to organize themselves. They may be able to endorse unwritten codes of conduct more easily than tenants. Again, restructuring has an indirect, positive impact on social capital levels in the neighbourhood, through raising levels of owner-occupation.

The analysis in Table 4.3 shows that the relationship between expected

length of residence and social capital is not significant. This result is comparable to a well-known conclusion of Kasarda and Janowitz (1974). They established that residents want to leave the local community if it fails to meet their aspirations, despite a strong neighbourhood attachment and intensive local participation (ibid., p. 329). Despite an improved physical quality of the neighbourhood, restructuring can never yield a neighbourhood that satisfies anyone's aspirations and demands. Moreover, people also move for other reasons, such as job changes and other factors that are completely disconnected from the neighbourhood.

Residents from multi-family dwellings report significantly lower levels of social capital than respondents living in single-family dwellings. This may be largely explained by a combined effect of tenure, a higher tendency to move, and the actual length of residence of people living in apartment blocks or single-family homes. This combination is different in each neighbourhood, partly due to the differences in the nature of the restructuring. In De Horsten, all single-family homes are new owner-occupied properties. All old dwellings are social rented apartments, of which significantly more residents reported a tendency to move. In Hoogvliet Northwest, the relationships between dwelling type, tenure and dwelling age were less straightforward. Another explanation is that it is harder to create and maintain pleasant social interactions and shared norms in old apartment blocks with a high occupancy turnover than in terraced dwellings with a very low occupancy turnover. This probably decreases opportunities for the creation of social capital.

Finally, I return to the finding that stayers in De Horsten display much lower social capital scores than the stayers in Hoogvliet Northwest. The explanation is partly connected to differences in significant variables described in this section. In De Horsten, the stayers exclusively live in old, social-rented multi-family dwellings, earn predominantly low incomes and are less attached to the neighbourhood. In this context, engaging in pleasant interactions and hoping for some convergence in norms is rather difficult. Additionally, their satisfaction of their housing and neighbourhood situation strongly lags behind those of other groups. On the other hand, many stayers in Hoogvliet Northwest live in owner-occupied single-family dwellings and earn modest but not low incomes. They are relatively often native Dutch empty nesters that have been living for a long time in their neighbourhood. Furthermore, their place attachment and satisfaction of their housing and neighbourhood are comparable to those of the movers and newcomers (Kleinhans, 2005).

4.7 Conclusions and policy implications

This chapter has focused on the social capital of four different resident categories in Dutch restructured post-war neighbourhoods. The concept of social

capital was elaborated to analyse potential benefits of cursory connections and casual contacts in a neighbourhood context. I distinguished between the stayers, the movers within the neighbourhood, the movers from surrounding neighbourhoods and, finally, the newcomers.

Contrary to our expectations, it appears that newcomers enjoy (access to) relatively high levels of social capital, compared to stayers and movers. While stayers scored highest in Hoogvliet Northwest, stayers in De Horsten have much less access to social capital than the movers and newcomers. In both areas, movers from surrounding neighbourhoods are just behind the newcomers in their social capital scores. Altogether, these results imply that length of residence is not a decisive determinant of residents' social capital.

By changing the population composition of a neighbourhood, restructuring has several indirect effects on social capital levels. Firstly, it turns out that homeowners, couples with children and middle- or higher household incomes in single-family dwellings score relatively high on social capital. They are socially upward mobile households that made a positive choice for living in the research areas. Exactly this type of households is mostly represented among the newcomers, and relatively underrepresented among the stayers. Secondly, many newcomers and movers from the surrounding neighbourhoods make a joint new start in the area. Thirdly, newcomers are the least heterogeneous group of all resident categories when it comes to socioeconomic and household characteristics. All these factors encourage public familiarity, mutual understanding – however fleeting and superficial – and give especially newcomers with middle- and higher household incomes a social capital 'head start' over the low-income groups. Finally, the higher residents' place attachment, the higher their social capital. The same applies to the perceived neighbourhood quality, which is directly and positively affected by restructuring measures.

Our third research question concerns the connection between social capital and residents' expected length of residence. The analysis shows that this relation is not significant. Thus, the indirect effect of restructuring measures on residents' expected length of residence is only of minor importance for the social sustainability of the neighbourhood. The actual length of residence may become an important factor in the formation of social capital above a certain threshold, but this is an issue for further research.

A shortcoming of this study is its cross-sectional nature. The use of quantitative data of one moment in time only allows us to note differences between resident categories. But there is no such thing as a fixed level of social capital. Due to the lack of social capital data regarding the situation preceding urban restructuring, a proper evaluation of the direct restructuring effects is not possible. Through the typology of residents, this shortcoming was only partly overcome.

Nevertheless, the results clearly point at a number of policy implications.

Firstly, the examples confirm earlier evidence that restructuring successfully provides attractive housing career opportunities for movers within the neighbourhood. Their social capital levels are higher than or comparable to those of long-term stayers. This suggests that their (access to) social capital is not disturbed by their intra-neighbourhood move (cf. Piachaud, 2002, pp. 17-18). From a social sustainability perspective, every restructuring project should include scope for affordable re-housing if possible. Especially with substantial projects, this would not necessarily conflict with the aim to attract middle-class residents.

The second implication is strongly related to the latter point. The evidence from De Horsten and Hoogvliet Northwest confirms that the restructured neighbourhoods succeed in attracting middle-class households so desired by Dutch policymakers (see also Ministry of Housing, Spatial Planning and the Environment, 2000; Van Kempen and Priemus, 2002; Kleinhans, 2004; Priemus, 2004). These households, often with a double income, are strongly represented among the newcomers in the research areas. Consequently, the incidence of homeownership was also far greater among the newcomers than the other resident categories.

Thirdly, place attachment and the (perceived) physical quality of the neighbourhood are strongly and positively related to residents' social capital levels. Paradoxically, this finding could easily cast doubt on the usefulness of restructuring if one wants to stimulate social capital. One could argue that proper maintenance of the dwellings and public spaces would have beneficial effects without expensive demolition and new construction efforts. However, restructuring is also conducted for several other reasons, such as housing career opportunities (see first section and also Chapter 1). The operation in itself appears to significantly improve neighbourhood quality.[7] After restructuring, housing associations can do much in terms of social management, such as dealing with nuisance of problematic tenants, mediation between quarrelling neighbours and support resident associations. All these efforts can win back or raise trust of residents in institutions governing the neighbourhood (cf. Burns *et al.*, 2001; Crawford, 2006; Lelieveldt, 2004) and encourage the favourable interactions and public familiarity, that are important to social capital.

In short, housing associations and local authorities can positively influence several preconditions for the (re)production of social capital. Yet, the residents themselves must make efforts to create social capital. They can invest in social capital through cursory, everyday social interactions that enable public familiarity and basic levels of trust, which support a favourable social climate in restructured neighbourhoods. Both urban restructuring and neighbourhood

7 For an overview of empirical research supporting this observation, see Kleinhans (2004), pp. 375-376.

maintenance policies must ensure attention to those parts of neighbourhoods that were not subject to demolition, new construction and upgrading. The case of De Horsten shows the danger of stayers becoming a neglected group with high levels of dissatisfaction and low levels of social capital. They are least likely to profit from restructuring, in terms of their housing situation. If not dealt with properly, obvious physical cleavages in restructured areas are a breeding ground for social cleavages that may spoil the social sustainability of the restructuring efforts.

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5 Neighbourhood transformation and urban planning and design

Robin Houterman and Edward Hulsbergen

5.1 Introduction

Demolition and new building occur by definition in existing locations and districts. Any discussion about demolition therefore starts with the existing built-up environment, residents, owners and other users. The context for housing demolition in large housing estates is inevitably formed by urban renewal, urban regeneration or urban transformation. Sooner or later the discussion about demolition and replacement of housing in housing estates always includes a variety of sectors, actors, scales and disciplines, as well as other interests. Sooner might be better than later.

The discussion on the improvement of neighbourhoods and districts in the Netherlands is mainly based on housing arguments.[1] The Dutch word 'herstructurering' (restructuring) suggests something about the structure of an area, but in the Netherlands it usually refers to adapting housing typology to what are perceived to be the demands of the present housing market, either by renovation or by demolition of the available housing stock.

This chapter focuses on demolition and new building as instruments for the sustainable transformation of neighbourhoods and districts from an urban planning and design (urbanism) point of view, which has been neglected for too long in the Netherlands.

From the point of view of urbanism, restructuring is about the spatial and functional structure of an area, which is far more complex than housing and the housing market alone. Urban planning and design is important to deal with those spatial, functional and structural topics in relation to societal questions at large. The history of urban renewal and regeneration in the inner cities and residential areas built in the first half of the 20th century shows a widening scope. The initial emphasis is on infrastructural problems, and later, after the recognition of the fact that problems have not been alleviated, including housing and other functions, and of course the concerns of a variety of interested parties. With the regeneration of the districts built in the second half of the 20th century, especially the so-called early post-war neighbourhoods, these lessons in the necessity of integrated approaches seem to have been forgotten, or perhaps they are perceived at the moment as being too difficult to implement in top-down policy and practice.

1 This may be understood as a consequence of the tradition in the Netherlands whereby the Constitution gives the Dutch government responsibility for providing sufficient affordable housing of good quality (Van der Wouden *et al.*, 2006, pp. 34-52). It is still unclear what the future will hold, taking into account the changed and changing role of government.

A relevant question is which projects of demolished and rebuilt environments really contribute to long-term spatial, social and economic urban interests. Roberts, studying urban regeneration, observes that "many public policy decisions are made without a full appreciation of their spatial consequences", where policymakers and practitioners alike have great difficulty identifying urban problems that really matter (Roberts, 2000, pp. 23, 24). This is based on British experiences, but in our view it applies to urban environments all over Europe. Cities and regions are very complex social and spatial organisations. Relationships are rarely simple or singular causal. The improvement, renovation and regeneration of neighbourhoods, districts, cities and regions probably can best be seen as involving multiple sectors (economic, social, environmental), actors (users, owners, policy makers), scales (local, city, region) and disciplines (social, technical). One of these disciplines is urban planning and design (urbanism). The decision whether or not to demolish is not dictated by urbanism. But urbanism should offer facts and arguments relevant for defining problems and indicating potential solutions. Furthermore, since urbanism is a technical discipline its voice must be heard in the execution.

5.2 Demolition from an urban planning and design perspective

There are a variety of reasons for demolition of the built-up environment: from inherent structural aging where regular maintenance is no longer effective, to the lack of opportunities for realising new functions. See the first chapter of this book. In the discussion about demolition and new building, the early post-war housing estates seem a special case. These estates are frequently seen as problematic areas and this is used as a reason for 'restructuring' the neighbourhood. The most outspoken critics even discard the post-war urban areas as a historical mistake. The critique is not new. Since the 1960s and even before, theorists have doubted the urban planning and architectural merits of modernism. In the USA, Jane Jacobs (1961) criticised the mono-functional nature of new urban developments, the lack of human scale and the loss of pedestrian life, which in her view were problematic in modernist urban planning and architecture. Also Team X, proposing to see city-making as an organic, rather than a predetermined process, attempted to integrate human scale in their designs, with varying degrees of success (Kostoff, 1991, p. 90). The construction of low-rise single family housing in the 1970s and later, can be understood as a critical reaction to the large scale of post-war housing estates based on modernist principles.

Arguments in urban planning and architectural design supporting the demolition of post-war housing estates usually follow two lines of reasoning. The first line says that modernist urban planning and architecture is problemat-

ic because it causes social problems. In the course of 2005, the debate on this topic was renewed following the riots in the French banlieues after the death of two young Muslims. In a reaction to these riots, Aaron Betsky (2005) stated that this would probably not happen in neighbourhoods in the Netherlands, especially due to the different design of the neighbourhoods concerned. He pointed out crucial aspects such as less spatial isolation, a more human scale and architectural variation, which indicate better planning and design in the Dutch post-war estates compared to the French ones.

More specifically, critics of early post-war areas have emphasised the problems relating to the scale and size of the areas, their isolation and lack of urban integration, the large public spaces, the internal layout of the areas and the collective structure on the building level (Houterman, 2004). The outcomes of scientific research into problematic post-war housing estates indicate that the design of the areas is related to the problems in these areas, but only in a multi-variable defined context (Hulsbergen, 1995; Fernandez-Maldonado, Hulsbergen and Stouten, 2000). Moreover, Heeger (1993) concludes that the problems in areas with identical design can be quite different.

It would be an oversimplification to blame social problems in post-war estates on urban planning and architecture alone. However, it cannot be denied that certain modernist design solutions do nót contribute to an attractive, safe and clean living environment and thus to an area's desirability. The Bijlmermeer district in Amsterdam is in this sense a telling example. The elevated roads, inner streets and multi-storey car parks have contributed much to the social problems in the district. But the actual decline of Bijlmermeer is a process related to many other factors, such as demographic developments, a labelling process, and the housing market of the 1970s.[2]

A second line of reasoning is that the areas' designs no longer function adequately in contemporary society. Apart from the discussion on the housing opportunities the neighbourhoods offer, this critique focuses specifically on the structures of public space and property in these areas. Yet, as an explanation for the downward spiral in the post-war housing estates, this argument can also be conceived as one-sided. It might be too closely related to contemporary ideas about ways of 'good living'. In this respect, it is striking that during the building of the post-war estates, areas like the late 19th century neighbourhoods were perceived as being outdated, while currently many of these areas are popular residential areas that are a highly appreciated part of today's urban housing stock.

A conclusion might be that bad planning and design aspects (structure, scale, location, urban integration, mono-functionality) in specific cases cer-

2 Compare Taylor (1998) for a general explanation of the labelling process. For a model showing the complexity of the decline of housing complexes, see Prak and Priemus (1984).

Box 5.1 Demolition arguments relevant for urban design and planning, using the tripartite of environment, society and economy, are, among others:

Pros
Environment: more options to change (improve) the existing map (infrastructure, buildings, greenery and water, density) of a district; using 'spilled' space; greater freedom to re-connect the area to the city and region.
Economy: more possibilities to reorganise functions and to add new ones.
Society: possibility to change the population composition (income, age, ethnicity).

Cons
Environment: neglect of the qualities of the originally planned urban structure; negative influence on existing networks of current users.
Economy: loss of relatively cheap space for business and industry (e.g. starters).
Society: exclusion of specific population groups (income, age, ethnicity); disappearance of visible urban history.

Arguments for demolition depend on the district in question.

tainly contribute negatively to the functioning and image of housing estates. However, it is no solution simply to demolish a physical area, especially when social problems in the district hardly get any attention.

In the next section we concentrate the debate on integrated urban renewal and regeneration in theory and practice. Finally, we formulate what we see as necessary recommendations for future urban demolition interventions, especially with regards to demolition.

5.3 Urbanism considerations

Urbanism is the study and practice of the spatial-functional organisation of areas on various spatial scales, from building blocks to transnational regions. In this chapter we focus on neighbourhoods with special attention to sustainable development. Sustainable development is an important subject for the discussion about the necessity and rationality of demolition as a tool for urban regeneration. The debate on urban sustainability is characterised by a variety of views (see the first chapter of this book). Sustainable urban developments are to be understood here corresponding to the definition of the European Union (European Commission, 1999) and the European Council of Town Planners (ECTP, 2003), which both stress the integration of societal, economic and environmental aspects (see Box 5.1). Of interest is also Mulder (2006) who, discussing the relation between engineering and sustainability, connects sustainable development with reaching new equilibriums: between the poor and the rich, between current and future generations, between humankind and nature, while one of the basic principles should be the contribution "to the common good and not just to the private good" (Mulder, 2006, pp. 18,19).

Urban sustainability, by definition, has a long term perspective. To be precise from the viewpoint of urbanism it is about a continuing adaptability of

the physical organisation within the changing framework of society, constantly responding to changing social and economic demands. Interventions (projects) in this physical organisation, which are by definition short term, are crucial to obtain the goals on the long term. In this paragraph we concentrate on six themes which in our view are essential for any neighbourhood transformation with a (middle) long term perspective, aimed at sustainable urban development. We start with housing, which is seen as an important tool but only in the wider context of integrated urban development. Then we discuss three approaches which deal with urban structural questions, i.e. the environmental dimension in its connection with the social and economic dimensions: urban structure principles, the network city, and urban design principles. After that we discuss vulnerability and deprivation as crucial concepts to get insight in the social costs of urban interventions, and we end with attention to the actors and their (potential) role in transformation processes; both subjects concern the social dimension of sustainable development in its connection to the spatial and economic dimensions. All themes end with comments on the effects of demolition.

5.3.1 Housing is important but it is not everything

Houses, especially housing estates, are the result of considerable investments, not only in their design, planning and construction, but also in their use and maintenance. Once built, their value is diverse: a place to live, a living environment, an investment object, etc. Edgar and Taylor discuss housing in the context of integrated urban regeneration: "While the general history of urban regeneration and renewal is that it has been housing led, there is a widespread acceptance that area renewal cannot simply be housing focussed" (Edgar and Taylor, 2000, p. 168). In a long-term urban perspective, housing is only one of the sectors. Integrated regeneration includes a variety of actors (tasks, partnerships), and deals with a diversity of spatial scales (block-district-city-region).

Integration is understood here as "comprehensive and integrated vision and action which leads to the resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social and environmental condition of an area that has been subject to change" (Roberts, 2000, p. 17).

The role of housing is important in Edgar and Taylor's view, because: "New housing can be a driver of urban generation, and decent housing is an essential ingredient of any regeneration scheme. Decent housing stimulates both physical and economic improvement, and the resulting enhancements in turn stimulate new investment and new opportunities as the urban environment once again becomes full of life and enterprise" (Edgar and Taylor, 2000, p. 153). "Cities have to be re-created as attractive places where those people with

Box 5.2 Hoogvliet (Rotterdam): more than housing; using identity in regeneration strategies

The regeneration of Hoogvliet, a satellite city of Rotterdam with 30,000 inhabitants, is an example of multi-sector regeneration in which housing is a driver. An unattractive housing stock, a high vacancy and removal rate, and a declining social and safety situation are the main reasons for taking action here, among other more specific motives.
Other than the replacement of 5,000 dwellings and a specific, ongoing social approach, the Wimby!-project is the most eye-catching aspect of the regeneration. Wimby! stands for "Welcome into my backyard" and is a project which focuses on the identity of Hoogvliet, including its residents. Through various projects it tries to identify and use the character of Hoogvliet to alter the negative image of the area among the general public. But more importantly, the projects respond to the needs of the local population. Being part of an International Building Exposition (a variation on the German IBAs), the projects use architecture and urban design as a means of highlighting the social and cultural identity of Hoogvliet and the needs of the local population.

(http://www.kei-centrum.nl, for further information)

choice will want to live and work and where they will enjoy leisure and cultural pursuits" (p. 158). To meet urban needs, however, housing should be part of a regeneration strategy aimed at integration and the inclusion of residents (pp. 170-1). See Box 5.2 for an inspiring Dutch regeneration example. Concerning housing, a major question is who is actually 'included' in the regeneration outcome: who can afford the housing, or has access; who is displaced, by own initiative or having no choice? It is a main question in which way the 'vulnerable/deprived residents' are part of policy and research categorisations, e.g. to what extent these residents have been looked for and identified in data collection and elaboration, and are included in the (ex ante and ex post) evaluation criteria.[3]

5.3.2 Urban structure principles

From an urbanism (urban planning and design) perspective, urban structural questions play a major role in the evaluation of the potential effects of demolished and rebuilt housing. Nikos Salingaros (physicist and mathematician, as well as urbanist and architectural theorist, and fervent critic of modernist architecture) is in this context an important source of information, critique and vision. That is why we pay ample attention to his work. He argues in his book *The Principles of Urban Structure*, that "a living city depends on an enormous number of different paths and connections" (Salingaros, 2005a, p. 11). "The most successful urban regions all over the world are found to have a great

3 In our data analyses of a database of unemployment residents in Rotterdam (Feddema and Hulsbergen, 1990) one of the conclusions is that the unemployed in Rotterdam are characterised by, among others: no social network outside the home 50 per cent, bad dwelling 46 per cent; lack of local amenities 47 per cent; but also, health problems 25 per cent.

range of connections, from footpaths, to bicycle paths, to low traffic roads, to through roads, up to expressways; in decreasing number" (p. 76). His 'theory of the urban web' identifies fundamental processes behind urban design. A living city exists through complexity, in an organised form (nodes, connections, hierarchy) to meet the human ability to establish connections, both simple and complex. A good 'urban web' is characterised by a high degree of organised complexity. Not in the way of "a neatly-ordered aerial plan" (p. 12) characterised by geometrical and functional simplicity (p. 30). For, the experience is that "an ordered urban environment that is strongly connected [for uses] usually looks irregular from the air" (p. 21). An urban web consists of overlapping networks of connections concerning different spatial scales, functions and uses (p. 30).

Information, that is what users perceive and use, is also a basic concept. Information here has a broad meaning: visual, tactile, auditory, and electronic. Also the built environment, horizontal, vertical and functional is a source of information. Urban areas that fail to connect the senses and activities of pedestrians in a positive way are a risk. They actually endanger the neighbourhood and city in the short and long term. "The neighbourhood works only if contrasting nodes are placed so as to provide active links between like nodes. […] Without a sufficient density and variety of nodes, functional paths (as opposed to unused ones that are purely decorative) can never form. Here we come up against the segregation and concentration of functions that has destroyed the urban web in our times" (p. 27).

Salingaros (following Christopher Alexander) points out that pedestrian paths are basic to the vitality of neighbourhood and city. Design should start with spaces for pedestrians and greenery, followed by pedestrian connections, buildings and roads. Following the reverse order eliminates pedestrian and usable green areas (p. 33). Urban elements should be integrated from the viewpoint and use of the pedestrian (p. 88).

Salingaros' three axioms of generating successful urban space are important for the discussion about neighbourhood transformation (p. 42):

1. Urban space is bounded by surfaces that present unambiguous information.
2. The spatial information field determines the connective web of paths and nodes.
3. The core of urban space is pedestrian space protected from non-pedestrian traffic.

Salingaros also defined 28 elements of a new urban philosophy, which form his "guide for developing more specific urban rules that better adapt to context", referring to urban components, uses, functions, users, sizes, distances, mobility, means of transport, car web, nodes, buildings, etc. (Salingaros, 2005b, pp. 267-272).

Philibert Petit (2005), following Salingaros, concurs on the importance of

urban projects as a tool and strategy to improve connectivity on the local, urban and regional scale, especially for pedestrians, i.e. with pedestrians as a criterion. Also in the New Charter of Athens 2003 (ECTP, 2003) 'connections' and 'connectivity' are seen as vital elements for a sustainable city.

One might disagree with Salingaros' views on modernist architecture and the priority to pedestrians. But we judge his urban principles highly relevant for sustainable urban development: for the structural improvement of neighbourhoods themselves, for their connections with other parts of the city as well as for the position of a neighbourhood in the city and region. Moreover, also we agree that in the transformation of neighbourhoods, demolition should support with priority the (safe) uses by pedestrians and cyclists.

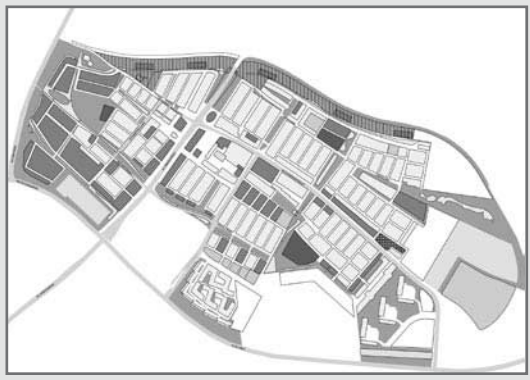
5.3.3 Network approach

The urban environment can be described and analysed in terms of networks, i.e. networks of the basic necessities of city life, including water, sanitation, power, transport, and communications. These networks, in the time when they appeared, were the result of new technological developments. They were not always recognized as important forces behind urban developments, in a physical, economic and social sense (Graham and Marvin, 2001; Dupuy, 2005). "Many of the early networks appeared in the days when urban planning was beginning to establish itself as a doctrine and a professional practice, and for quite some time, urban planners failed to recognise the importance of their role" (Dupuy, 2005, p. 125). Dupuy distinguishes three levels of operators who organise or reorganise space: the first level is about technical networks of roads, gas, water, electricity, public transport, telephone, etc.; the second level is about functional networks of production and consumption; the third is the network or actual territory of the urban household (Dupuy, 1991, p. 119). Drewe (2005) points out the importance of linking Dupuy's networks with time, basic rhythms, time use and space-time budgets, in his Network City approach. Today, new networks are primarily being produced by developments in information and communication technologies.

In the Network City approach a network is viewed as a material and/or virtual set of connections which produces physical-spatial, social-economic, social-technical and social-cultural relations in space and time, also in relation to sustainable ecological-spatial networks (http://www.network-city.bk.tudelft.nl). The actual middle and long term effects of new technologies and societal developments are sources of great uncertainty in the development of demands of space. Therefore the Network City implies a design approach which is strongly connected to societal urban processes and the accommodation of these processes in space. To be clear about what is meant by 'network' in a specific case, the spatial scale is very important. The Network City approach to networks should not be confused with the discussion

Box 5.3 Malburgen (Arnhem): Demolition as a means to create new urban qualities

Malburgen is a post-war neighbourhood, located strategically on the south bank of the River Rhine at Arnhem. The Malburgen development plan is a mix of interventions; besides demolition and rebuilding, extensive renovation and redesign of public spaces are also planned and executed. The goal of the neighbourhood's transformation is to make use of the various spatial conditions in order to increase the variety of living environments.
In certain places, demolition and rebuilding serve to increase the density (in programme and use) of the area in order to improve the neighbourhood's relationship with the rest of the city. In other places, demolition and rebuilding are used to make space for new green areas in order to improve the neighbourhood's relationship with the surrounding landscape. This makes it possible to introduce new housing typologies, such as semi-detached housing.
For these transformations, houses in relatively good condition are sometimes demolished. From the viewpoint of housing stock management, this might be a strange decision. However, the result is a better functioning urban structure, with more quality than before.



Malburgen Development Plan (Courtesy of gemeente Arnhem)

Areal View of Malburgen (Courtesy of KLM Aero Carto)

(http://www.malburgen.com/ontwikkelingsplan.html, for further information)

about 'stedelijke netwerken' (literally 'urban networks', meaning networks of cities) in the Netherlands, which is mainly focussed on the functional and infrastructural relations and divisions between the cities in the Randstad, the urban agglomeration in the west of the country.

The urban environment can be time-efficient for its residents, with good possibilities to link activities with a minimum of energy. But the urban environment can also be time-consuming in relation to the bare necessities of daily life, and consequently unsustainable for residents and users that have to cope with the situation. From the viewpoint of networks (technical, functional and personal), also in relation to time, demolition should contribute to the improvement of these networks.[4]

4 The further development of the 'new science of networks' and its application on urban areas is also important, as expressed by the social scientist Watts (2004), who to his own surprise comes to the conclusion that space is more than just a social construction.

5.3.4 Urban design principles

Sustainable transformation of the urban environment is (also) a question of continuing and adjusting existing spatial forms and structures. This is primarily a task for urban design (Hereijgers and Van Velzen, 2001). Box 5.3 and Box 5.4 show two different ways to intervene in the spatial form and programmatic structure to improve a neighbourhood's functioning. In Malburgen demolition has served to improve the structure and form of public space. This made it possible to produce new and more popular housing typologies. In Kanaleneiland demolition has served to change the programmatic structure in order to provide better local services, and to link the neighbourhood to the city's functional structure.

Relevant structures include, for example, the networks of public and private spaces. In the framework of the research programme of the Chair of Urban Design called 'De kern van de stedebouw' (The core of urban design), Part 2 is dedicated to the design of public space (Meyer, De Josselin de Jong and Hoekstra, 2006). The authors argue that this design of public space will be one of the core tasks of urban design in the 21st century. To improve the urban conditions it is important to improve the condition for multi-functional, complex and dynamic use of space, not so much tours de force of design and beautification. By making possible the exchange of material and immaterial goods, the city can be a source of technical, economic and cultural innovation, and of social change and progress (p. 10). Central design questions concern the relationship between the public and private domain, typology in relation to use, interweaving of different types and networks of public spaces, and the connections in the design of the whole network of public space (p. 13). Networks of public space, well structured and designed linear elements and nodes, are vital for the creation of the urban feel. This kind of urban design should be based on thorough knowledge of actual use of public space and of a typology that matters.

Networks of public space are also important in a social sense. It is the place where exchange can take place between varying societal groups; the place where a change of perspective is possible (De Hoog and Van der Kooij, 2001).

An interesting development is the research of space in relation to criminality, with the aid of the 'space syntax' (López and Van Nes, 2006). This instrument was developed at the Space Syntax Laboratory of University College London. Spatial relations in urban built environments are described and quantified, and linked to social statistical data about, for example, the location of flows of human movement and the dispersal of crime. In their study (in Alkmaar and in Gouda in the Netherlands) the authors conclude that direct mutual visibility of streets, housing and doorways make spaces more safe, and also that the greater the distance from the main urban routes the greater the susceptibility to burglary.

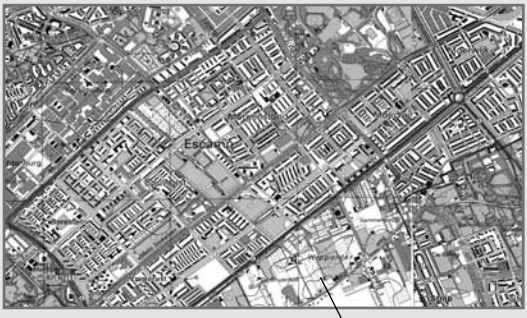
Box 5.4 Kanaleneiland (Utrecht): creating a new centrality as a strategy for regeneration

In Kanaleneiland the regeneration strategy in urban planning terms is creating a new centrality. In this strategy new infrastructure to establish new connections plays an important role in establishing new connections. A new bridge was built to connect the office area Papendorp, via Kanaleneiland, to the centre of Utrecht. This puts Kanaleneiland in a potentially more integrated, strategic position within the greater Utrecht area. It creates chances to upgrade and revitalise the current centre of Kanaleneiland.

The plan comprises a mixed-use area, with a great diversity of functions, including shopping, offices, education and housing. The existing buildings will be demolished in order to create space for a built-up area of higher density and more intensive land use. An important goal is to build an area with a different character than the other neighbourhoods in the district and to introduce new housing types which should make it more appealing for people to change houses as household make-up and/or income change.

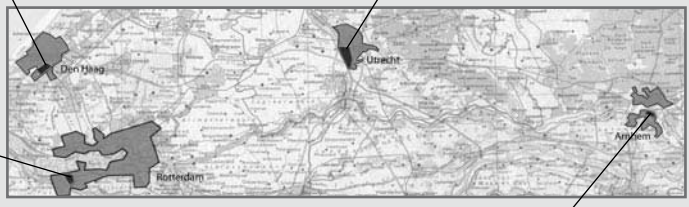
Although the increase in facilities and housing types is a clear advantage for the surrounding areas, it remains unclear how the revitalisation of the centre is related to or could enhance or inspire development in the surrounding degraded neighbourhoods.

(Gemeente Utrecht, 2005)

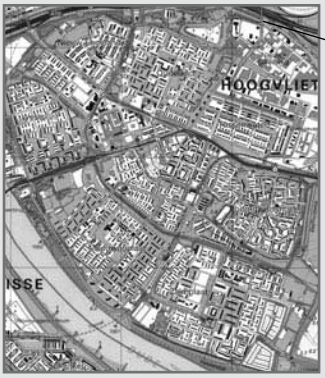


South West, Den Haag

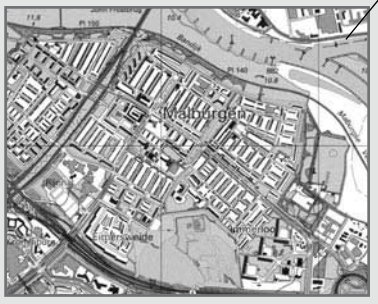
Kanaleneiland, Utrecht



Location of the referred neighbourhoods



Hoogvliet, Rotterdam



Malburgen, Arnhem

(Courtesy of Topografische Dienst Kadaster)

These findings about public spaces and about safety can be arguments in the debate on what and where to demolish and to build.

5.3.5 Vulnerability and deprivation

Neighbourhoods, districts, cities and regions cope with the urgent need of spatial and social interventions to meet new demands caused by social changes, regionalisation and globalization (Drewe, Klein and Hulsbergen, in preparation). Usually a limited definition of urban economy is put forward (financially quantifiable, attractive image, with implicit assumptions about the trickle-down of prosperity to all population groups). However, the persistent continuation of urban problems for a great deal of citizens demonstrates the failures of 'the market' for certain individuals, and also the occurrence of sectored and disciplinary divisions.

The view held here is that vulnerability and deprivation are crucial concepts for understanding urban problems, and for attaining insight into the social (societal) costs of spatial urban interventions. Vulnerability refers to the 'social dimension' and consists of different forms of (social, economic and physical) dependences, while deprivation refers to the 'spatial dimension', and consists of a variety of shortages in the living environment on various spatial scales (Hulsbergen, 1992; 2005; Drewe and Hulsbergen 2006). For a good understanding of urban problems, vulnerability and deprivation have to be sharply distinguished (as 'social' and 'spatial') in order to prevent fallacies of aggregation or disaggregation.[5]

Vulnerability becomes manifest and thus can be measured in various ways: (small) number of social contacts; (limited) networks and participation; how one provides for one's household; the time spent on all kinds of activities (including leisure); aspirations and future expectations; knowledge of societal developments; the use of social amenities and services; health and handicaps. A person is vulnerable when any change in living conditions has a negative impact and he or she has no opportunity to improve the situation. Being vulnerable means that the system that creates the changes cannot be used to improve one's own situation.

Deprivation is about the form and uses of available space which create the material conditions for either facilitating or restricting one's life. Deprivation concerns the shortages experienced in providing for one's household caused by spatial and physical constraints at home, in the neighbourhood and the district up to the urban and regional level. It covers the quality and quantity

5 In this we strongly disagree with the concepts of deprivation and vulnerability used by the SCP, where both concepts and measurement tools are an inconsistent mix of social and spatial variables (Van der Pennen, *et al.*, 1998).

Box 5.5 The Hague South West: Housing corporations in a leading role

The Hague South West is the largest early post-war extension of The Hague, with about 33,000 dwellings, predominantly apartments. An important goal of the restructuring is to make this part of the city more diverse, including a greater diversity of living environments and housing typologies. A second goal is to integrate population groups with differing earning potentials.
From the end of the 1980s on, the renewal was based on a variety of projects, without a long-term, district-wide perspective on the renewal itself. The demolition/rebuilding projects were defined by strategic housing stock management of the three corporations involved. This led to a non-cohesive approach, which lacked the very spatial cohesion that had been purported to be one of the main qualities of the area. The structural vision tried to make an end to this practice and put the different projects in relation to each other. New projects have to be judged according to this vision, which functions as a framework for new projects.
Although this is an improvement in the development process, the decisions to demolish and rebuild are still primarily based on the individual housing stock management arguments of the housing corporations. There is, for example, no input from the local authority's urban planners in this regard.
One consequence is that, in our view, the structural vision lacks a strategic dimension. There is no clear vision regarding development over the course of time, for example: what strategic projects will improve the functioning of the area in the urban and regional network? The development of certain crucial areas (e.g. the so-called dynamic zone) is not being steered by the municipality, but is being left entirely to the initiatives of housing corporations. They not only develop new housing, but the public spaces within the area as well. The involvement of other actors, for example residents, is not being facilitated. Their participation mainly depends on the housing corporation's initiatives.

(Gemeente Den Haag, 2003)

of housing, the accessibility of all kinds of relevant activity, suitable employment, and access to new technologies, e.g. the rapidly developing information and communication technologies.

The combination of vulnerability and deprivation are considered here as necessary indicators for the evaluation (and measure of success) of urban development. In this way it is possible to analyse urban conditions and the effects of intervention with multivariate definitions and quantifications. Demolition and rebuilding should be evaluated with their impacts on decreasing vulnerability and deprivation. Empowerment of households and residents is a key word here, i.e. capacity building and improving economic opportunities like getting access to paid work. A point of attention is the reciprocal relation between technological and social-economic innovations (Drewe, Fernandez-Maldonado and Hulsbergen, 2003).

5.3.6 Actors and process

Many actors play a role in the transformation of neighbourhoods. Recent practices show that the traditional leading role of the municipality in urban development processes is not self-evident anymore. Today, private parties have a strong position in many transformation areas. This societal develop-

ment stresses the question about who will take responsibility for the sustainable development of an urban area and involve and coordinate the necessary actors. It is an open question if these private parties have the wide scope that is needed for sustainable transformation. In other words, how can it be assured that all relevant aspects, such as urban planning and design matters, are being sufficiently considered within the transformation process? And how can the involvement of all relevant actors, including residents, be assured?

Resident participation is important in terms of efficiency; residents and users have the knowledge of local dynamics and may have a sound grasp of which services will work and which will fail to connect (Hull, 2001). How much space will be made available for bottom-up initiatives, which can become true investments in urban areas? Within certain conditions, bottom-up initiatives are a necessary extension to participation and planning (Hulsbergen and Vellinga, 2001; Houterman and Hulsbergen, 2005). The case of The Hague South West, described in Box 5.5 shows that the questions above are more than relevant. It might be that in similar cases, not only buildings are demolished but, more importantly, also the existing social structures and local support which are so important in sustainable urban transformations.

5.4 Conclusions

In this chapter we consider demolition and rebuilding, mainly as part of a strategy for sustainable neighbourhood transformation from the perspective of urban planning and design (urbanism). Though the discussion about sustainable demolition and rebuilding is as yet far from being finalised, six conclusions can be proposed for implementation in the process of regeneration and transformation.

1. Include urban matters in district transformation
Demolition in urban areas, whatever its scale, is an irreversible intervention in the functioning of these areas, not only in terms of the physical space, but also socially. When part of a district is demolished, this may often have consequences for neighbouring or comparable (in terms of price/quality) districts elsewhere in the city. Sustainability in urbanism is about continuing care for areas and communities on different spatial levels. Our first conclusion is that, when considering the demolition of any built-up environment, there should always be a discussion about the impact of demolition on various spatial scales. Details of what such an intervention supports and what it neglects - spatially, socially and economical - should be clearly understood.

2. Demolition and rebuilding are strategic instruments
Demolition and rebuilding should be part of an integrated approach to neigh-

bourhood improvement. Integrated district regeneration is not only about the built-up environment. It is a multi-sector enterprise, which includes partnerships and participation, and of course the vulnerable and deprived part of the population. Demolition in the framework of improving a district should never be seen as a goal with a limited scope, but rather as a strategic instrument.[6]

Strategic means here that the intervention solves a specified problem and at the same time triggers, stimulates or supports other necessary developments. Demolition and rebuilding should therefore always be implemented in clear relation to other interventions. For example demolition/rebuilding is a spatial instrument that can be part of a two-pronged approach to improving economic opportunities. Firstly, as a means of repositioning the area within the city, so as to make it more interesting to investors. Secondly, as a way of improving the residents' opportunities in relation to work, having or starting a business, or simply empowerment.[7]

3. Urbanism is a frontline discipline

The current practice in post-war housing estates is that demolition is mainly based on housing stock management arguments. This limits the problem analysis at the start of the regeneration processes, which means that insufficient account is taken of the views of the other relevant disciplines. Urban planning and design is one of these disciplines. As they are essential pieces in the transformation puzzle, aspects of urban planning and design (most importantly the spatial-functional structure of an area and its spatial and functional position in the urbanised area) should be included in the problem definition from the start. Demolition is only an effective instrument for the construction of a sustainable urban living environment if it is combined with improvements in the urban structure and with the addition of new qualities.

4. Priority to needs, including vulnerable and deprived residents and users

The urban space should facilitate social, economic and natural processes on the various spatial levels. Especially in the post-war districts there is more at stake than the aging of the built-up environment and changed user demands which can no longer be satisfied by the housing supply these districts offer. Building 'for the market' should be more broadly interpreted. There are

6 Compare Van Kempen *et al.* (2006, p. 12) who call demolition "by far the most radical option to 'improve' a housing estate" and "just one of the many options".

7 A revealing example. For Trowbridge Estate, Wick in the London Borough of Hackney, all kinds of plans were developed. To better integrate the neighbourhood into the city, a proposal was prepared to make two connections, one between the area and the M11 (an urban main road), and another connection underground to the centre of London. These were intended to make the area attractive for new investors. For the proposed interventions there was little support from outside the neighbourhood (Donaghy, 1991).

the needs of the current residents to be considered. These individuals might want to stay, or they might wish to move to another district. Alternatively, they may be inclined simply to give up and disappear. There are the needs of people who presently live elsewhere but who are looking for a house. And there are entrepreneurs and entrepreneurial starters looking for space. Demolition and rebuilding might be a good strategy for improving conditions, but this needs (ex ante) clarification. Any socially equitable transformation of a district should include all residents and users, and should openly include the most vulnerable and deprived residents: "the worst off should be as well off as possible".[8]

5. Focus on available space for building, before demolition
Demolition is usually a traumatic experience for a neighbourhood. Investments in upgrading the environment and, eventually, in new buildings are important tools for showing residents that there is a genuine intention to improve living conditions. Also, the perspective of such improvements might serve to stimulate the necessary participation. Besides, these measures might draw the attention of potential investors in economic activities. A basic lesson from the past is that the existing available and transferable space should be used before resorting to the demolition of existing buildings.

6. Look at the districts, one at a time
No two neighbourhoods or districts are the same. Theoretically they can be described in comparable terms, but the complexity of a specific area is unique. Easy generalisations are a threat to any area. An intervention that works in one neighbourhood might be disastrous in another, even when the neighbourhoods are relatively comparable at first sight. The organisers of district transformations have to take such factors into account when revising and adjusting their planning and design practices. On the urban level the available old, renovated and new housing in a district must remain appealing to residents who are able to choose to live elsewhere. Sustainable building on the neighbourhood level, however, implies that the residents appreciate the qualities of their neighbourhood as a living environment, and take care of its continuation.

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8 Radcliffe Richards, 1982, p. 123.

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6 Environmental impacts of renovation

The Dutch housing stock compared with new construction

Laure Itard, Gerda Klunder and Henk Visscher

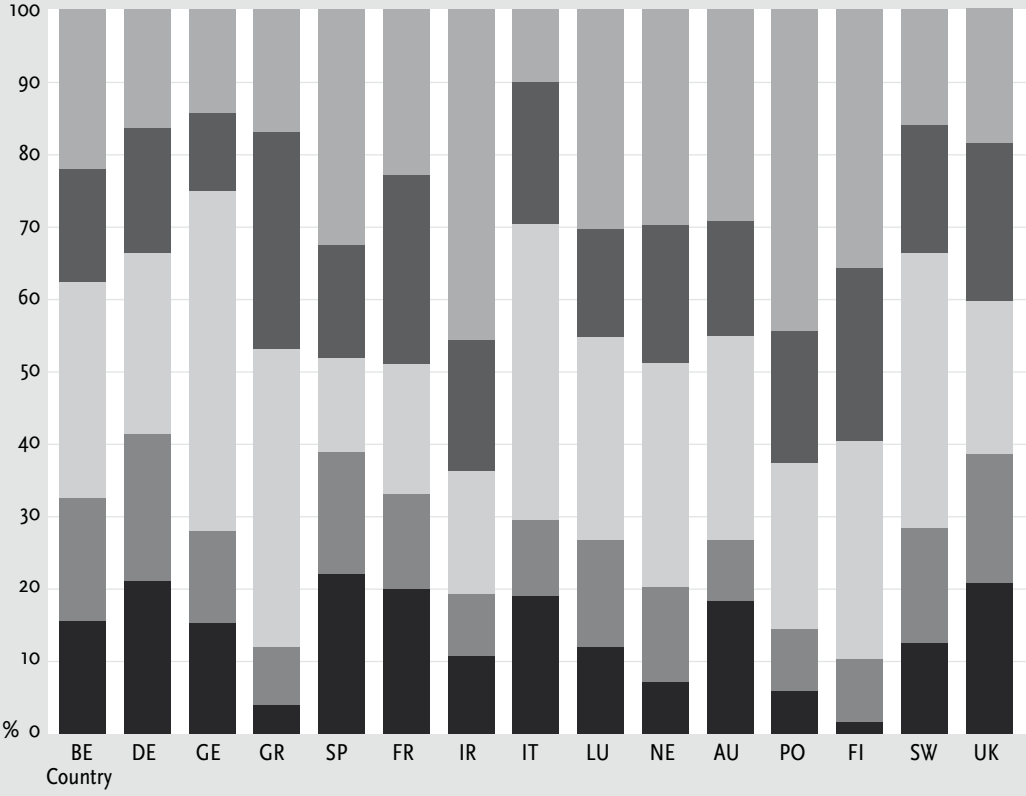
6.1 Introduction

Most of the housing stock in the European Union was built after the Second World War (see Figure 6.1). Housing shortages led to enormous production of mass housing (see Chapter 1). Today, however, the volume of the housing stock is sufficient in absolute terms to provide for the population. Current needs centre on the quality rather than the quantity of existing housing. It is the post-war mass housing that falls short of adequate quality to fill current needs, and is consequently threatened by large-scale demolition. When undertaking urban renewal projects, decisions must be made between housing maintenance, with some minor interventions, and total housing re-development, demolishing the existing stock and replacing it with new houses. Financial considerations and technical difficulties usually preclude using approaches that centre on renovation.

Thomsen and Van der Flier (2002) argue that renovation-based approaches should be considered when updating housing stock because the declining annual housing production in Europe barely exceeds 1 per cent of the total housing stock. They also point out that environmental sustainability and the aim of reduced energy consumption that follows the Kyoto treaty guidelines make renovation-based strategies a much better alternative than demolition. Simple renovations such as insulating walls or replacing single glazing with double glazing are only possible if the quality of the existing dwelling is sufficient to fulfil current needs. In most urban renewal districts in the Netherlands, the existing stock does not meet current needs for size and differentiation in housing types. That is why large-scale demolition and construction of new dwellings are undertaken to achieve more varied housing types, as well as inhabitants. According to Te Velde (2003), sustainable urban renewal means that at least the existing stock should be dealt with carefully. Existing physical and social structures may offer qualities and opportunities for preservation, and it is important to achieve a balance between preservation and renewal.

Consolidation and housing transformations may fill the gap between simple housing maintenance on the one hand and demolition and new construction (redevelopment) on the other hand. In this chapter, we define consolidations as improvements of the building shell (such as insulation, without any change in the floor plan of the house or housing block). Transformations are improvements or interventions in a housing block or complex that go beyond

Figure 6.1 Housing stock per building period per country in 2002



BE: Belgium; DE: Denmark; GE: Germany; GR: Greece; SP: Spain; FR: France; IR: Ireland, IT: Italy; LU: Luxemburg; NE: Netherlands; AU: Austria; PO: Portugal; FI: Finland; SW: Sweden; UK: United Kingdom.

Source: Ministry of Housing, Spatial Planning and the Environment, 2004

a single individual house. Examples of this are joining dwelling units together horizontally or vertically. Housing transformation requires that at least the load-bearing structure will be preserved when the remaining components are renewed.

Yet, little is known about the impact on the environmental Burdon of these different strategies. The environmental effects of maintenance, consolidation, transformation, and redevelopment have been compared in detail for the first time in the PhD-thesis of Klunder (2005). This chapter presents an elaboration of the comparison of the environmental impact of these options for two typical cases of Dutch urban renewal. In Section 6.2, we explain the criteria for choosing an assessment method. Section 6.3 discusses how these are calculated and what the underlying assumptions are. Section 6.4 presents two case studies based on the Dutch situation, and the final section (6.5) discusses the results and conclusions.

6.2 Criteria for an assessment method

First we examined the literature to review the methods for calculating the environmental effects of interventions on housing stock. There are several qualitative methods, mostly based on numerical scores and on a holistic approach to sustainability. A few examples of these methods are The Green Building Label, Spear (Gowri, 2004), and national guidelines for sustainable buildings. But none of these methods were suitable for achieving the aim of this research, which is to generate quantitative data on the environmental effects of interventions on housing stock. Life Cycle Assessment (or LCA) is a method for analysing the environmental burden of products (goods and services) from cradle to grave, including extraction of raw materials, production of materials, product parts and products, and discarding them by recycling, reuse, or final disposal (Guinée, 2002). LCA is defined as the 'compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle' (ISO, 1997). The product system is the total system of processes needed for the product, which in this case is a house. Inputs and outputs are materials and energy, which enter and leave the product system. In the building research community, LCA has been generally accepted as a legitimate basis for comparing building materials, components, elements, services, and entire buildings (Cole *et al*., 2005). Several LCA tools have been developed in the past decade to assess buildings. An inventory of these methods can be found in Howard (2005). Despite this progress, it remains difficult to compare the environmental impact of interventions on housing stock (Klunder, 2003) because there is no consistency or standardisation among current databases, and there is too much complexity in the buildings themselves.

To address the inconsistency, incompleteness, and lack of standardisation among the LCA databases, several authors suggested linking the databases to the results of material flow analysis (Daniels *et al*., 2002; Daniels, 2002) and especially to input-output analysis (Treloar *et al*., 2000; Yokoyama, 2005). Researchers believe this is a powerful way to complete existing databases and generate data for policy-making at regional, national, and continental levels. Improving the databases of Dutch building materials is beyond the scope of this research, however, and we assumed the present databases were good enough to characterise the environmental impacts for two specific redesign projects at the level of apartment blocks.

Buildings are much more complex than the simple goods for which the LCA method was primarily developed. Each building has its own characteristics and contains a very large number of components. Unlike simple goods such as a cup or even a computer, buildings have a long life span and during this period produce environmental effects that may represent a substantial part of their total environmental burden. The energy use of an Australian house has been analysed for a thirty-year life cycle in Treolar *et al*. (2000a), who stress

the relative importance of energy consumption with respect to the way the house is used and to household behaviour. The relative values of the embodied and operational energies are important factors in choosing design strategies, such as insulation (Fay, 2000; Myhre *et al.*, 1994). In Tucker *et al.* (1994), the embodied energy in a refurbishment project is compared with the embodied energy for demolition and new construction. It was found that the demolition of buildings should be regarded as environmentally unfriendly. In these papers, the analysis focused on energy use but did not consider other environmental effects. These effects were considered in Peuportier (2001) to compare three types of dwellings, but results were aggregated for their entire life cycle. In this study, some of the impacts used to determine the final environmental profile of the dwellings are interdependent (e.g. energy and global warming potential), possibly resulting in a distorted profile.

Unlike conventional consumer goods, buildings can change in the course of their life span. Components are replaced or removed according to their technical and functional life cycles. Life Cycle Assessment is a static method that sums up all environmental effects during the life cycle of the product (Klunder and Van Nunen, 2003). But buildings behave dynamically. Because of this it is difficult to track the environmental effects of changes in buildings using a life cycle assessment (Dobbelsteen *et al.*, 2003). Because developing a dynamic LCA method was far beyond the scope of this project, we decided to choose an LCA tool and to adapt calculations to the dynamic aspects of a building for the aspects of energy use.

We used EcoQuantum, version 2.00 (SEV and SBR, 2002). EcoQuantum is a Dutch LCA tool for assessing the environmental effects of buildings in terms of material use, energy consumption, water consumption and ten environmental impacts: depletion of abiotic resources, global warming, ozone depletion, photo-oxidant formation, human toxicity, aquatic ecotoxicity, sediment ecotoxicity, terrestrial ecotoxicity, acidification, and eutrophication. EcoQuantum uses a particular Dutch database of building materials maintained by IVAM (www.ivam.nl). The impact assessment method is based on the CML-2 method. The role of the EcoQuantum tool with respect to other international LCA tools was discussed in Forsberg (2004) and Howard (2005).

6.3 Principle for calculating the environmental effects of interventions on housing stock

Comparing various interventions on housing stock lifetimes is the most important issue here, because interventions such as maintenance or renovation are needed before the expected service life of a house will have expired. This is especially true for renewal of post-war housing stock. Furthermore, comparing the various interventions requires looking at the same periods of time (e.g.

Hansen and Petersen, 2002).

The principle for calculating the environmental effects of a house is illustrated in Figure 6.2. Each building component in the database has a particular life span, which is not necessarily the same as the life span of the entire building. For instance, the life span of a house can be estimated at 80 years. If the life span of the window frames is 40 years, they will need to be changed once during the service life of the house. In the available database the environmental effects of each of the building components is aggregated to one value for its entire life cycle. This means that the environmental effects of the window frame are calculated at 40 years, and include all maintenance interventions like regular paintwork. The left side of Figure 6.2 shows the environmental impact of the building over time, and the right side shows the environmental impact taken from the database. Figure 6.2 represents the usual maintenance. The vertical lines show the environmental impact of replacing a component, which includes the embodied environmental effects of removing the old component, adding a new one, and the activities related to the placement of this component and its maintenance (e.g. paintwork). The latter should be included in the diagonal lines of Figure 6.2, not in the vertical one, but the EcoQuantum database aggregates it with the environmental impacts of component replacement. The diagonal lines represent the environmental impacts in the use of the house.

Figure 6.2 Environmental effects as a function of time: maintenance

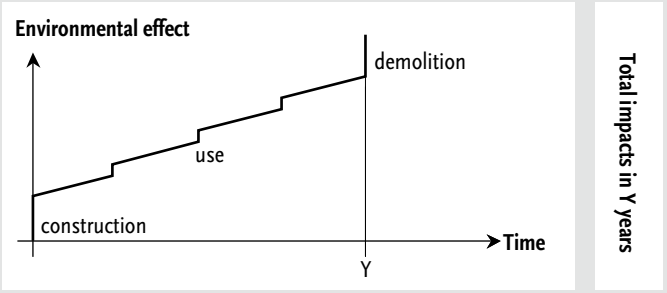


Figure 6.3 Environmental effects as a function of time: transformation

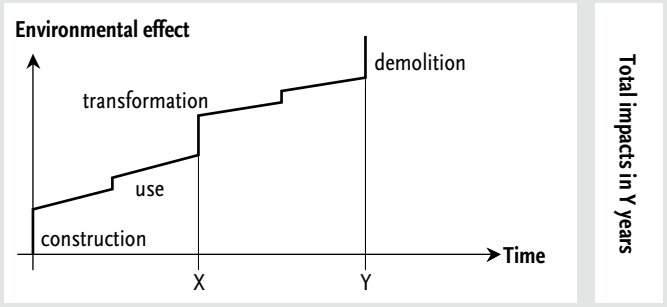
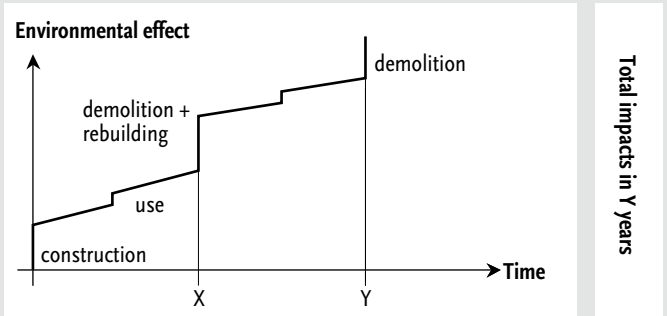


Figure 6.4 Environmental effects as a function of time: demolition and rebuilding



These effects are related to the operational energy and water use of the house and household, which are described in the next section. Figure 6.3 illustrates the transformation of a house in year X, and Figure 6.4 shows the demolition and rebuilding of the house in year X. In the three figures the life cycle of the house is assumed to be Y. The slope of the diagonal lines in Figures 6.3 and 6.4 is less than in Figure 6.2, because transformation and new construction are expected to have less environmental effects: the energy and water consumption should be less because of mandatory energy saving measures.

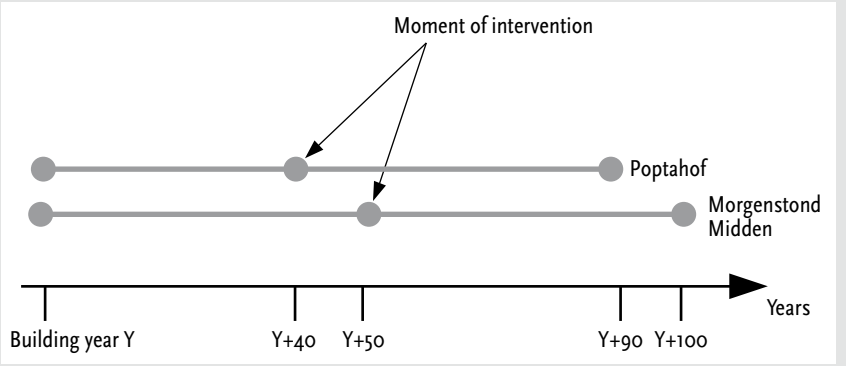
Life span and related problems

An important issue when calculating the environmental effects of buildings is determining which life span to use. In the Netherlands a 50-year life span is usually assumed for post-war neighbourhoods. In this research we used the same life span of 50 years after renovation or rebuilding (see Figures 6.3 and 6.4, (Y – X) = 50). Transformations are intended to compete with new construction, so we assumed the same service life as for new construction. The comparison among maintenance, consolidation, transformation, and rebuilding is based on the same life span for all four options, including the consolidation option. Once the options of transformation or rebuilding are considered, it is not likely that the house will be demolished without rebuilding it. The reference case will thus be keeping the house as it is (maintenance). A second issue when comparing maintenance and consolidation with transformation and rebuilding is that current designs and building methods are different from the designs and building methods used in the past, and present ones will also be different from the designs and building methods in the future. In this research, the building method is considered constant over the years. Both assumptions are quite arbitrary and have a large impact on the results of the calculations. The consequences for the validity of our results are discussed further in the last section of this chapter.

Operational energy and water use

The operational energy use is calculated according to the Dutch energy performance regulation, taking into account the energy for space heating, water heating, ventilation, and lighting. The operational energy in this research is not the energy that the building owner or tenants pay for, but the primary energy use, which takes into account the entire energy chain, including power generation through power stations. For calculating the energy for space heating, transmission and ventilation losses are taken into account, as well as passive solar gains and internal gains. For lighting, energy, and water consumption standard values are used. The method is described in NEN 5128 (1998) and in Beerepoot (2002).

Figure 6.5 Life span in the case studies Morgenstond and Poptahof



6.4 Description of the case studies

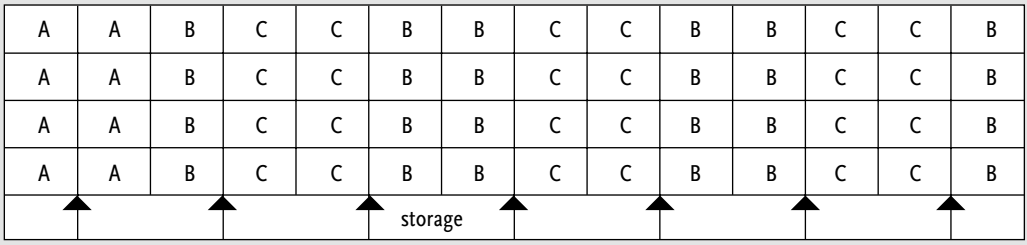
Two case studies were used to gain insights into the relative environmental impact of maintenance, consolidation, transformation, and rebuilding. The case studies are: Morgenstond Midden in The Hague and Poptahof in Delft, the Netherlands. Both are post-war housing areas to be renewed. These case studies were chosen because they are composed of different types of neighbourhoods as well as housing, and both are common neighbourhood types in the Netherlands. Figure 6.5 illustrates the life span of the houses in both cases (100 years for Morgenstond Midden and 90 years for Poptahof) and when intervention was required (after 50 years for Morgenstond Midden and 40 years for Poptahof).

Morgenstond Midden

Morgenstond Midden is a neighbourhood that was built in the 1950s, and mainly consists of three and four-storey tenement houses. Almost all housing in Morgenstond Midden is scheduled to be demolished according to the renewal plans. This means a housing programme of demolition for 2,350 houses and new construction of 1,650 houses (Municipality of The Hague, 2002a, 2002b).

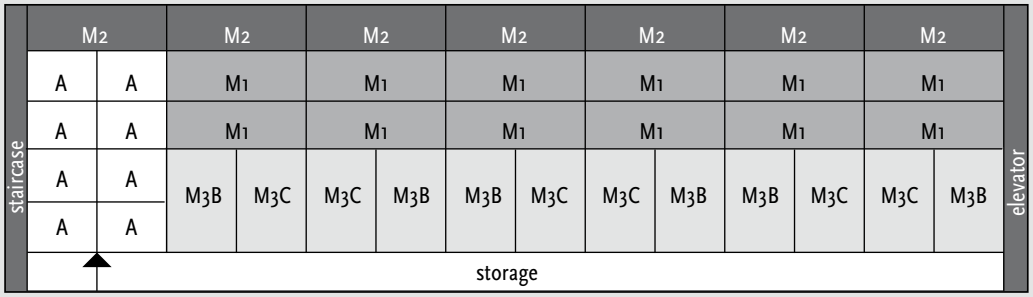
The study on housing transformation concentrated on a single building block consisting of four storeys. Storage is provided mid-way. The building block contains the following number of dwellings: 24 individual dwellings containing three rooms each (type B), 24 dwellings containing two rooms each (type C), and 8 dwellings containing five rooms each (type A). Most dwellings are very small, varying from 44 to 67 m^2. The current scheme is shown in Figure 6.6. It turned out that the building blocks provide good opportunities for transformation. The load-bearing structure and dimensions do not preclude implementing new technical solutions to attract new target groups. One possible new scheme is shown in Figure 6.7. The building block can be extended by one storey, and adding an elevator would be feasible, thus transforming the three upper storeys to accommodate the elderly. To carry out this scheme will require that the existing storeys of every two houses will have to be joined

Figure 6.6 Current differentiation scheme in Morgenstond Midden



Source: Klunder, 2005

Figure 6.7 New differentiation scheme in Morgenstond Midden



Source: Klunder, 2005

horizontally (M1). The new storey can be built similar to the existing ones (M2). The lower two storeys can be joined vertically in maisonettes for people just entering the housing market (M3B and M3C). There is no need to perform major interventions in the five-room dwellings. This is the only type that has future value as it is.

New differentiation of the housing stock naturally results in new floor plans and facade arrangements. The quality of the transformation is improved by adding individual entries en enlarging outside spaces. Transformations have to compete with new construction and comply with building regulations for new construction. This means that thermal and sound insulation will need to be improved and the installations to be renewed.

In the transformed and new building a low-emission and high efficiency combined boiler for heating and hot water replaces the old conventional boiler and the gas water heater. Mechanical exhaust ventilation is also applied, which is common in new Dutch buildings. Lowered ceilings and facing walls will be used for horizontal and vertical soundproofing.

Poptahof

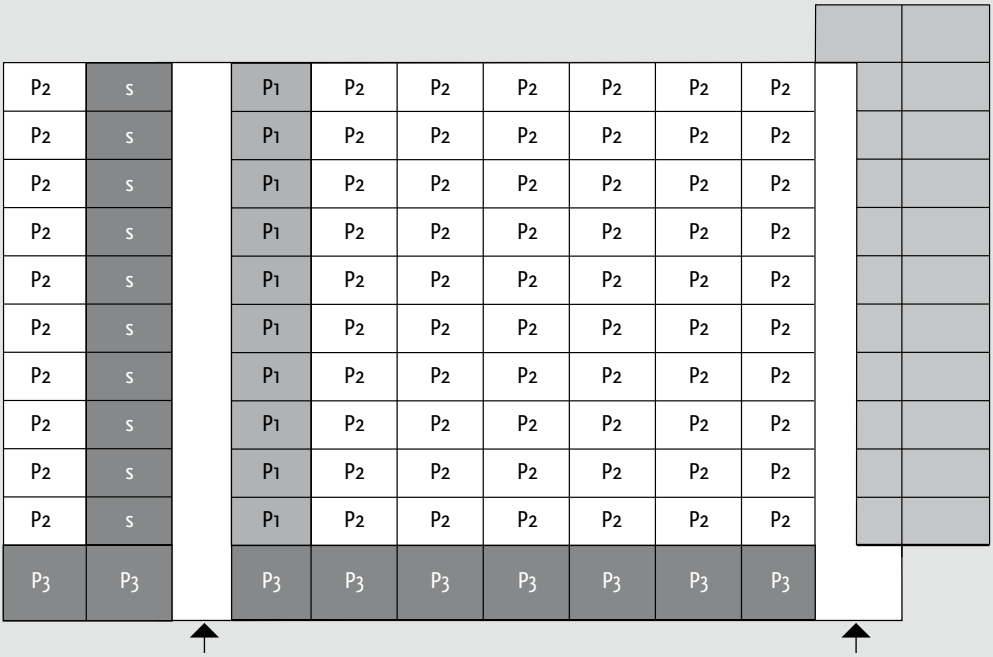
Poptahof is a neighbourhood consisting mainly of gallery flats. It was built in the 1960s. There are 1,011 houses in eight building blocks of eleven storeys, six building blocks of four storeys, and four building blocks with single-family houses. The urban renewal programme consists of demolition for the four-

Figure 6.8 Current differentiation scheme in Poptahof

B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
B	C		A	A	A	A	A	A	D
storage			storage						

Source: Klunder, 2005

Figure 6.9 New differentiation scheme in Poptahof



Source: Klunder, 2005

Table 6.1 Floor areas and service life for both case studies

	Morgenstond Midden (service life 100 years)		Poptahof (service life 90 years)	
	Maintenance/ Consolidation	Transformation/ Rebuilding	Maintenance/ Consolidation	Transformation/ Rebuilding
Net floor area (m^2)	3,016	3,765	6,319	6,319

storey blocks and single-family houses and renovation of the eleven-storey blocks (Delftwonen *et al.*, 2003).

The study on housing transformation options concentrated on the eleven-storey blocks. Each block contains 99 dwellings, 77 of which contain four rooms each (types A and B), 11 contain two rooms each (type C), and 11 contain three rooms each (type D). The size of the individual dwellings varies from 61 to 73 m^2. Storage is on the ground floor. Figure 6.8 shows the current scheme of differentiation. In general size, gallery dwellings from the sixties are more appropriate than are tenements from the fifties. Notwithstanding the load-bearing wall in the dwellings, hallway sizes offer good opportunities when transforming the building blocks. A new scheme is shown in Figure 6.9 (Architektenburo voor Woningbouw & Stedenbouw Henk van Schagen, 2000). The first space that must be addressed is the very anonymous ground floor. Maisonettes for families can be created (P3) by joining part of the storage areas on the ground floor to the first storey. In addition, part of the storage areas can be replaced by the small two-room dwellings next to the elevator(s). This makes the dwellings at the other side of the elevator suitable for renovation for the elderly (P1). Dwelling and storage areas comply with the requirements for this type of housing. A new entrance with an additional elevator reduces the load on the galleries. The new scheme also calls for turning the four-room dwellings into three-room types (P2).

The building block of the Poptahof is always connected to the available district heating system, which obtains its energy from industrial waste heat. A low emission and high efficiency boiler replaces the gas water heater. Mechanical exhaust ventilation is used here too.

In both case studies the primary energy use for lighting is kept constant throughout the interventions (56 kwh/m^2/year), as well as the number of toilets and bathrooms and the water flow rates of the taps.

6.5 Results of the case studies

Results are presented according to the following environmental effects: quantities of material, energy and water used, waste, and environmental impacts. The environmental effects are given per square meter gross floor area per year of the total service life of the building. Service life and net floor area are given in Table 6.1.

Quantities

Figures 6.10 and 6.11 show the relative values of the operational water and energy use and the quantities of material embodied in the building for the

Figure 6.10 Morgenstond: average quantities of embodied materials and energy and water use per m² per year (average for 100 year)

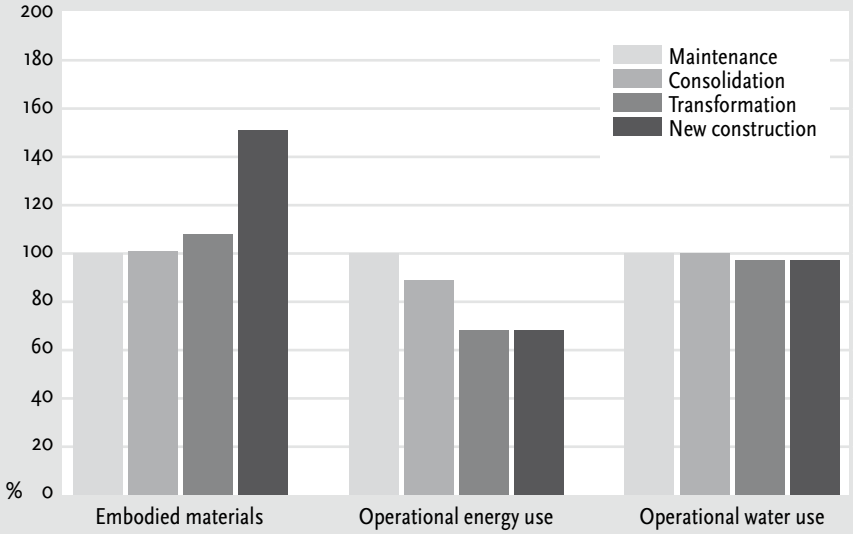
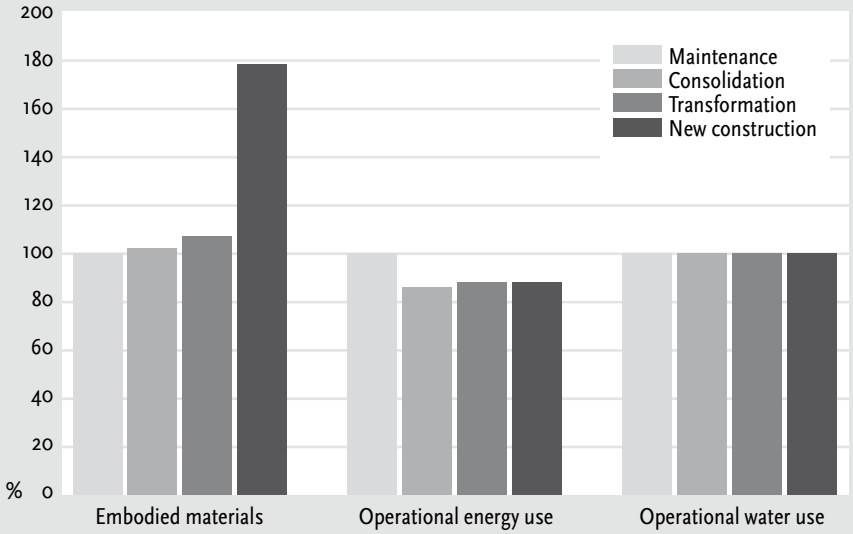


Figure 6.11 Poptahof: average quantities of embodied materials and energy and water use per m² per year (average for 90 year)



four options studied. The values obtained for the maintenance option have been set at 100 per cent. The figures show an average value per year, taking into account the entire life span of the building. The operational water use is identical in all cases, because this was assumed in the calculations. The operational energy use is identical for both transformation and new construction, because the level of insulation is the same and the same installations

Figure 6.12 Morgenstond: total quantity of material embodied in the building per m²

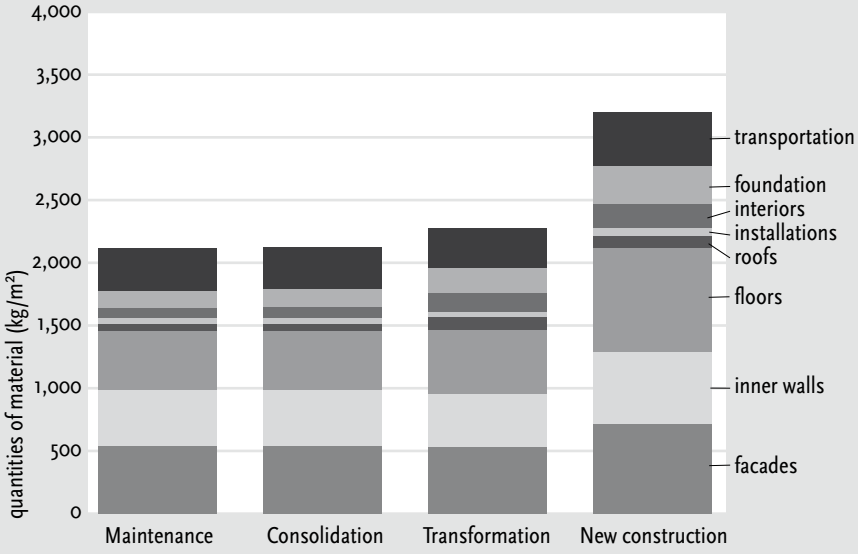
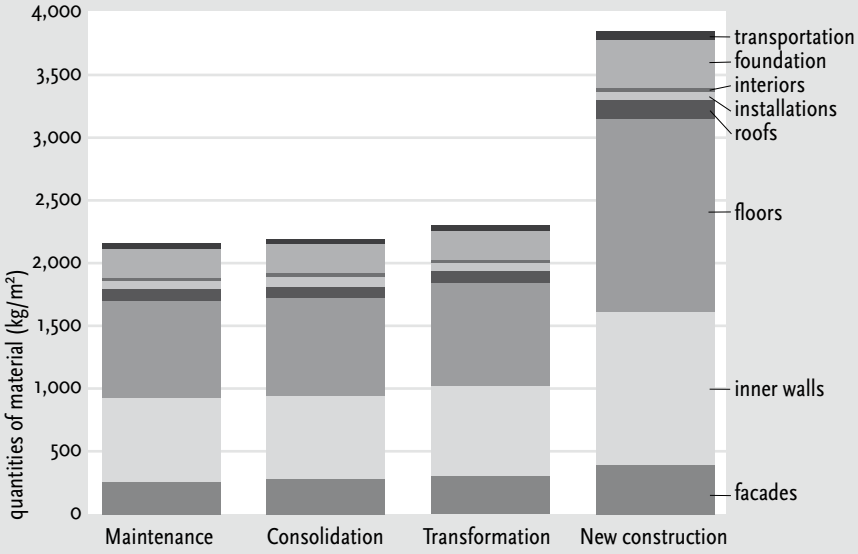


Figure 6.13 Poptahof: total quantity of material embodied in the building per m²



are used. In Poptahof, the operational energy use in the option of consolidation is slightly lower than in the other options, because no mechanical exhaust ventilation is used, and the heat generation and hot water systems are identical. In Morgenstond, the operational energy for transformation and new construction is much lower than for consolidation, because the heating and hot water systems are more efficient. The most operational energy is used for

Figure 6.14 Morgenstond: demolition waste per m² in intervention year (year 50)

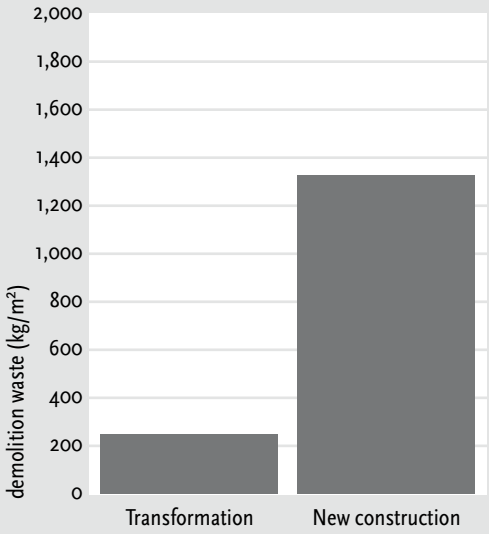
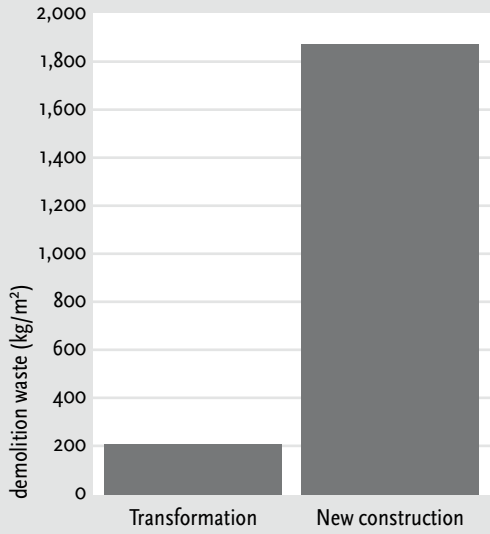


Figure 6.15 Poptahof: demolition waste per m² in intervention year (year 40)



maintenance because of the poor insulation. The average quantity of materials embodied is highest in new construction (as expected). Transformation uses embodied materials very effectively: almost 60 per cent less than demolition and rebuilding.

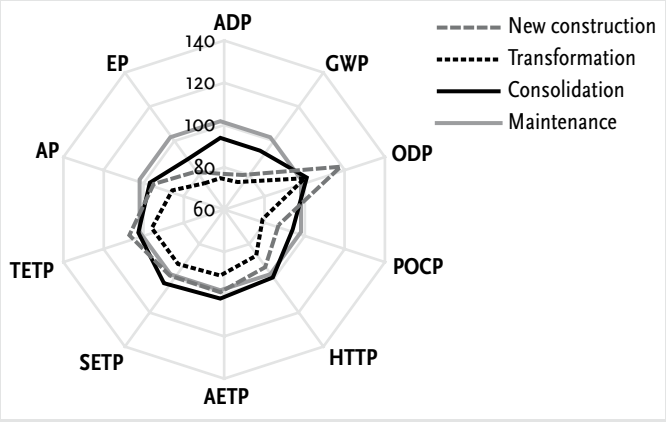
Figures 6.12 and 6.13 show the distribution of embodied materials among the different building components. Foundations, floors, inner walls, and facades are responsible for 90 per cent of the materials used in Poptahof. For Morgenstond, transportation also plays a role because of the large number of stairs. Roofs and installations only play a minor role. In Poptahof, the changes to the inner walls are responsible for the increased materials used in transformation. In Morgenstond, the changes to the interiors and roofs are responsible for the increased materials used. Floors and inner walls contribute the most in the new construction scenario. In the section on environmental impact, we will show that the quantities of materials do not necessarily reflect real environmental impacts.

Figures 6.14 and 6.15 illustrate one of the main advantages of transformation over demolition and new construction. The quantity of demolition waste generated in transformation is far less than that generated in demolishing the old building. The amount of demolition (materials) waste created by transformation is only 19 per cent in Morgenstond and 11 per cent in Poptahof of the waste created by rebuilding the housing blocks. Possible recycling of materials was not taken into account here.

Environmental impacts

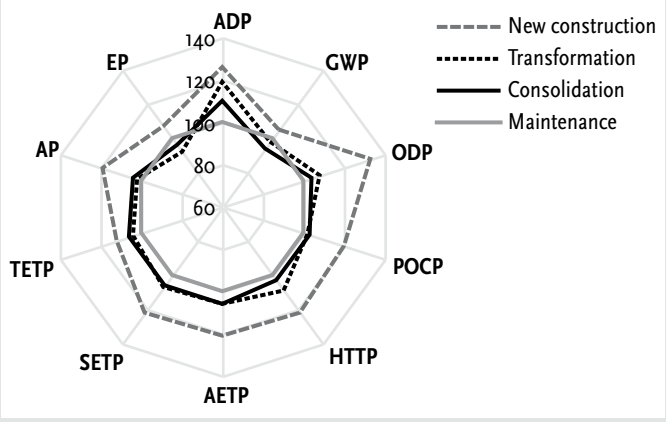
The effects of the four scenarios on the ten types of environmental impact calculated by EcoQuantum have been plotted in Figures 6.16 and 6.17. The effect of operational energy and water use is included. All values for the maintenance option have been set at 100 per cent. The differences in both dia-

Figure 6.16 Morgenstond: environmental impacts per m² per year



ADP depletion of abiotic resources
GWP global warming
ODP ozone depletion
POCP photo-oxidant formation
HTP human toxicity
AETP aquatic ecotoxicity
SETP sediment ecotoxicity
TETP terrestrial ecotoxicity
AP acidification
EP eutrophication

Figure 6.17 Poptahof: environmental impacts per m² per year



ADP depletion of abiotic resources
GWP global warming
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HTP human toxicity
AETP aquatic ecotoxicity
SETP sediment ecotoxicity
TETP terrestrial ecotoxicity
AP acidification
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grams show that it is not easy to draw general conclusions. One reason why the maintenance option does not show as favourable a result as the other options on the environmental impact in Morgenstond, but does better in Poptahof, is because parts of the old building have been used to create more floor area in transformation and new construction. The energy use was also greatly reduced. Hence, the average environmental impact per square meter is less. The main result these diagrams show is that transformation seems to have fewer environmental impacts than does new construction. The explanations for this can be found in Figures 6.18 and 6.19.

Energy use

The primary energy use for both building blocks has been plotted in Figures 6.18 and 6.19 as a function of time. Until the intervention (year 50 in Morgenstond and year 40 in Poptahof), the primary energy use was identical for all options. The vertical lines represent energy embodied in the building and the diagonal lines represent the operational energy use. There is almost no energy embodied in consolidation (only insulation materials), but this increases for transformation and new construction. In Poptahof, the diagonal lines for operational energy use for the three options have the same slope because the same level of insulation has been assumed. In Morgenstond, the

Figure 6.18 Morgenstond: embodied and operational energy use as a function of time

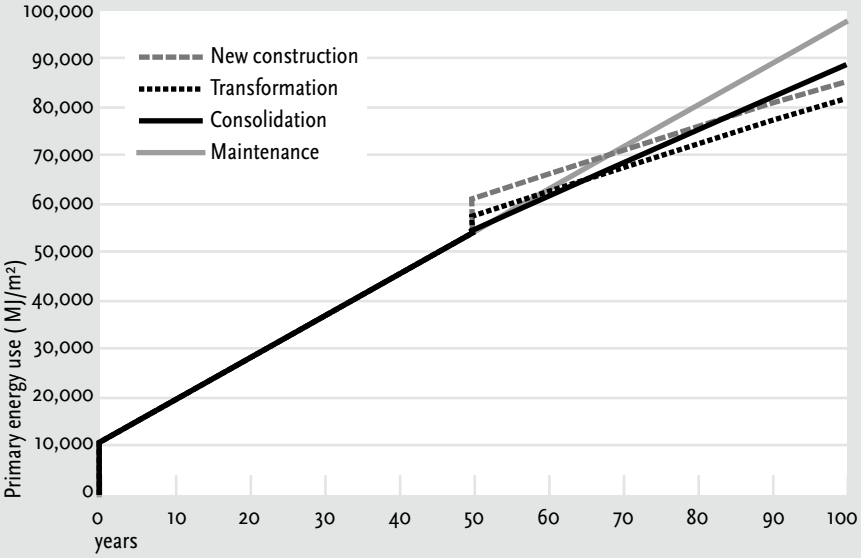
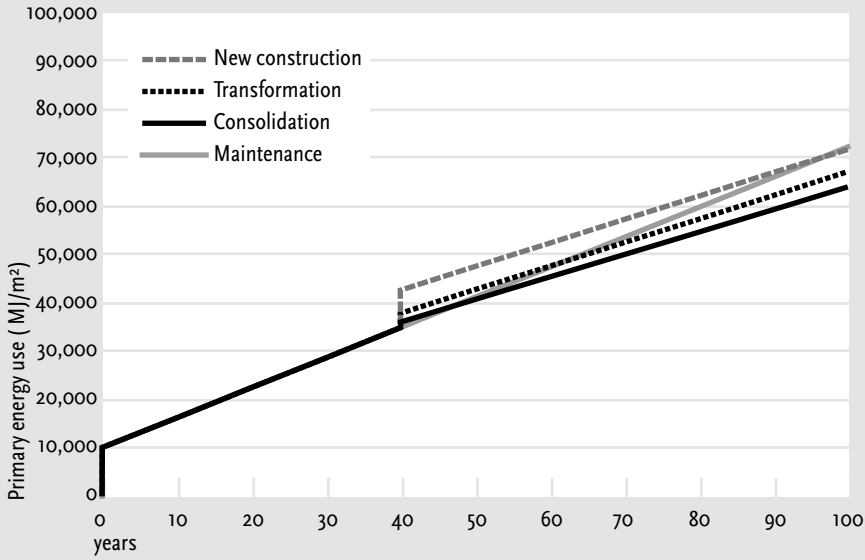


Figure 6.19 Poptahof: embodied and operational energy use as a function of time



slope of the consolidation line is different because there is less floor area. The slope of these lines is less than for maintenance, which requires less insulation.

In Morgenstond, consolidation pays off immediately in energy use. For Poptahof, this takes about 7 years. Transformation always saves more energy than does new construction.

Consolidation is better than transformation for Poptahof, but for Morgenstond, transformation pays off over consolidation after 15 years. Compared to maintenance, transformation pays off in 10 years for Poptahof and 25 years for Morgenstond. The new construction scenario pays off over maintenance after 18 years for Morgenstond and 55 years for Poptahof. The embodied energy represents about 10 years of operational energy in Morgenstond and about 18 years in Poptahof, which is about 20 per cent of the total primary energy use in a life cycle of 50 (or 40) years. Treloar (2000) found comparable results for an Australian house. In his study the embodied energy represented about 14 years of operational energy use.

6.6 Conclusion

A comparison of the environmental effects of two housing blocks was conducted for four scenarios: ordinary building maintenance, consolidation (insulation measures), transformation (change of floor plan to accord with new needs), and rebuilding (demolition of the old building and reconstruction with a new floor plan). We used several methods to quantity environmental effects: material use, energy and water use, demolition waste, and the impacts on the environment as defined by LCA.

We are able to draw one clear conclusion from this study: transformation is a much more environmentally efficient way to achieve the same result than are demolition and rebuilding. But transformation must be possible, which means that the building must have a certain degree of flexibility. Thus, our study confirms the insight that newly designed buildings must be flexible, in order to allow relatively easy transformation interventions. This can be facilitated by using a structure that does not depend on load-bearing inner walls, enabling the walls to be removed easily. Significant space between load-bearing elements and floor height also facilitate redesign of housing blocks and buildings. One of the most immediate advantages of transformation on rebuilding is that it minimises construction waste. Based on these two case studies, transformation is better than new construction within the following limitations:

- the operational energy use in transformation is equal to (or less than) in new construction;
- the quantity of materials used in transformation is less than in new construction;
- the building method used in both is identical.

This chapter did not investigate the effect of the building method itself, as the same building method was used for all scenarios. This is an important restriction because new building construction often offers more possibilities for

using environmentally friendly methods than renovations (Durmisevic, 2006). The embodied energy was about 20 per cent of the total primary energy use of the building for a life cycle of 50 years. When the life cycle would be reduced to 35 years, which is not unusual in Dutch urban renewal, this embodied energy could amount to 30 per cent of the total primary energy use. This means that it is worth using construction methods that reduce embodied energy use.

Changes in the housing market can lead to different life spans. Demographic changes might lead to a reduction of the housing demand in the coming decades. This will have much impact on the calculations of the environmental impact of different strategies.

The real environmental problems are not material or energy use, but depletion of natural resources, ecotoxicity or another environmental impact studied with the LCA's methodology. Examining these impacts may lead to different conclusions. While interiors and installations do not contribute significantly to materials used, their environmental impact is far from negligible. In fact, we suggest that the total environmental impact be investigated for the relative values of the embodied environmental impact and the operational environmental impact. This would enable researchers to see how efficient the measures taken actually are. When taking energy-saving measures, for instance, it is important to check the effect of extra material use on the environment. In Poptahof, these energy-saving measures are offset by the quantity and effects of materials used for the transformation.

To perform calculations on the relative values of embodied and operational environmental impacts (that is, to calculate how long it would take for each measure to have a significant effect on the environment), changes to the structure of the data in the LCA databases are needed, as well as to the presentation of results, which should be disaggregated as time functions. As we outlined at the beginning of this chapter, this is a result of the dynamic and changing character of buildings. For the determination of the environmental impact of a building, the whole life span and all the interventions together should be considered. There is much uncertainty of how this will develop. Therefore it is in a way difficult to consider a building in this respect as a 'product', it could more or less be approached as a 'process'.

Such an environmental analysis should also be linked to a cost analysis to allow for a real value analysis of several intervention scenarios. This type of study will also need to adjust for the uncertainties in the data available. Finally, it is important to keep in mind that for anything as quantifiable as energy use and life span of components the values found for a building can easily vary by a factor two, depending on the behaviour of the household.

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7 The Eco-costs of housing transformation

Tim de Jonge

7.1 Introduction

The ecological impact of (fossil fuels for) heating and air conditioning is generally considered as an important factor in the environmental burden of houses (Sunikka, 2006). However, the expectations of the possibilities for improving the energy performance of existing houses seem to be limited. Research by the Dutch building industry concerning innovations aimed at sustainable housing focuses much more on new construction than on renovation.

This raises the question: Under which conditions is renovation and under which conditions is demolition and new construction the more promising approach for improving the ecological sustainability of the housing stock?

Comparing the sustainability of renovation to demolition and new construction, we at least have to consider the following problems:

- Energy use for heating and air conditioning may be important as related to the ecological impact of houses, but the effects of emissions and material depletion, related to the construction of new houses or to the renovation of existing houses, are not negligible.
- New construction and renovation usually result in very different accommodations in respect of housing qualities as perceived by the residents. That should be taken into account when the ecological impacts of both approaches are compared.

For good decision-making in this respect, a model is needed, which can compare various forms of ecological burden and – at the same time – can weigh ecological burden against the varying results, which are produced by the concerned interventions in the housing stock. The model of the Eco-costs/Value Ratio (EVR) is such a model (Vogtländer, 2001).

For the determination of eco-costs the presented research focuses on integrating different existing instruments into one model: LCA instruments for the construction industry on the one hand and operational costing tools of the Dutch building development practice on the other hand.

The Value aspect in the EVR model consists of the value of houses as perceived by residents connected to the value of houses as real estate objects, in particular to the development of this value in the course of time. In this part of the research, the concepts of Quality Dimensions (Garvin, 1988) and the Customer Value Model (Gale, 1994) have been introduced in order to relate value to building characteristics.

The developed EVR model for housing has been applied to a number of case studies. Eco-costs and eco-costs/value ratios related to the production phase have been calculated for 14 recently completed building projects concerning

both new construction and renovation.

Finally a case study has been executed, which investigates the eco-costs and eco-costs/value ratios concerning (the whole life cycle of) 4 intervention strategies for an obsolete apartment building. This case is based on a renovation project of several apartment buildings in Nijmegen (De Jonge *et al*., 2003a and b).

First, this chapter shows how the model of the EVR has been elaborated for houses. And next, the application of the model in a number of case studies will demonstrate that – under most conditions – renovation offers the best chances for a sustainable solution, even if only limited improvements of the energy performance can be obtained in existing houses.

7.2 Eco-costs of housing

LCA-based approaches

The most systematic method for quantifying the ecological burden of building projects is the LCA, the Life Cycle Assessment (ISO, 1998). More than other methods in this field, LCA provides a systematic approach to measuring resource consumption and emissions associated with products, processes and services (Vogtländer, 2001). However, the traditional LCA is often considered to be too complicated and specialized to serve as a decision-support tool in development projects. Only environmental experts are able to interpret them, and even their complex decisions are not easy to communicate to the stakeholders in the projects. Therefore, in literature (e.g. Bauhaus-Universität Weimar, 2001, RMIT University, 2001 and Vogtländer, 2001) several models can be found that express the ecological burden of buildings in one single indicator. The various models have slightly different goals and scopes. Whereas the LCA results may differ for different regions (Lützkendorf *et al*., 2002 and NDRC, 2004), for the Dutch situation, the emphasis should primarily be on West European models. This leaves only three LCA-based models, which are to be considered for sustainability related decision-making in building projects: Eco-Quantum (IVAM, 1999 and MRPI, 2003), Green-Calc (Van der Linden *et al*., 2002 and Haas, 1997) and the model of the Eco-costs/Value Ratio, the EVR (Vogtländer, 2001).

The Eco-costs/Value Ratio

Eco-Quantum and Green-Calc express the ecological burden of a building by comparing it to the burden of a reference building. This implicates that these concepts are not able to compare buildings to other products or service systems (De Jonge, 2005). The concept of EVR is independent from the type of product of which the ecological burden is assessed. The EVR is an LCA-based assessment model that expresses the ecological burden of a product or service in 'eco-costs'. The ratio compares these eco-costs to the value of the prod-

uct or service. A low EVR indicates that the product is fit for use in a future sustainable society. A high EVR indicates that the value/costs ratio of a product might become 'less than one' in the future, if the 'external' costs of the ecological burden will become part of the 'internal' cost-structure. This means that there is no market for such a product in the future (Vogtländer, 2001). In principle, EVR supports assessments of all kinds of buildings, as long as the values of the buildings are comparable. Moreover, on that very basis, it allows comparing new construction to renovation or maintenance. In particular this last characteristic is required for a decision-support tool concerning interventions in the existing housing stock.

One of the central concepts of the EVR model is defining eco-costs as the costs of technical measures to prevent pollution and resource depletion to a level, which is sufficient to make society sustainable. These measures have been based on well defined and well assessed operational processes. More specifically, the eco-costs that are used in the model, have been based on the "virtual pollution prevention costs '99" being the sum of the marginal prevention costs of the depletion of materials, energy consumption, toxic emissions, labour and depreciation related to the production and use of products and services (Vogtländer, 2001). Like all models based on LCA do, the EVR model includes the whole life cycle of a product. For houses the ecological burden is considered to refer to the materials depletion, energy consumption, emissions, labour and depreciation involved with the following aspects:

- in the production phase: construction (either new construction or renovation);
- in the operating phase: maintenance, energy for heating, air conditioning, lighting and hot water supply, (and for rented houses)management and administration involved with letting activities;
- in the end of life phase: demolition and recycling of the obsolete dwelling.

Production phase

An important characteristic of building projects is that every project consists of a combination of semi-finished products, which are assembled at the building site. Therefore, the environmental burden (the eco-costs) of a building in the production phase can be considered as consisting of the eco-costs of those semi-finished products plus the eco-costs of the assembling activities (including all additional works like preparation works, building site facilities and management). So, in principle it is possible to estimate the eco-costs of a building applying 'eco-cost unit prices' of building elements. As is done in a traditional cost estimate based on unit prices, the composition of the concerned elements is determined in terms of quantities of characteristic semi-finished products and assembling activities. For these products and activities, the emission and depletion data, which serve as a basis for eco-costs assessments, can be found in data bases like Idemat (DUT, 2002) and Simapro (Pré Consultants,

2004). Hence, the eco-costs per unit of building element can be determined by inserting the eco-costs of the semi-finished products and the assembling activities into the recipes of the elements. Finally, the elemental bills of quantities (for estimating traditional economic costs) can be transformed into eco-costs estimates by substituting eco-cost unit prices for the traditional economic unit prices. According to this approach, eco-costs have been implemented in the materials database of an estimating system, which is used to produce elemental bills of quantities for the construction costs of new construction and renovation projects (Winket, 2006). This way a tool has been composed for estimating eco-costs in the production phase of these kinds of projects.

Operating phase

In the operating phase, a dwelling cannot be considered to be an addition of semi-finished products any more. The characteristics of a dwelling are not just determined by the characteristics of the components, but indeed also by the specific way in which they are assembled. The lay-out of a house, for instance, may be of more importance than the exact number of square metres of floor space, the orientation of a window may influence the appreciation of a room more than the size of the window. In the operating phase, a dwelling as a whole is understood as a system, which provides services on the one hand and needs energy and maintenance to do so on the other hand. As stated before: in this research, maintenance, energy demand, management and administration are considered to be factors of ecological burden related to housing in the operating phase.

To support decisions in the design stage, related to the energy demand, an existing model has been used: 'Rekenprogramma EPC en kosten' (Calculation Model for the Energy Performance Ratio and Costs) (DGMR, 2004). Architects can estimate the energy demand of residential buildings (in the Netherlands) with this model. It requires limited input, related to the main formal characteristics of the buildings, which enhances its applicability for decision-making in design. The energy demand estimating facility of this model can easily be integrated in the EVR approach. In recent years, several management models for maintenance have been developed in the Netherlands. However, these models seem to be too complicated for use in (early) design stages. In these stages, elaborated calculations of maintenance efforts are very unusual. At Delft University of Technology, an estimating model was elaborated for investigating the impacts of design decisions on the maintenance costs of residential buildings. Because of its basic structure and its connection to the Dutch Standard for Construction Cost Classification (NEN, 2002), this model can be suitable for application by (Dutch) architects in early design stages. It has been integrated in the EVR assessment approach. In the housing sector, the nature and the extent of management and administration activities are usually rather independent from the specific building design. For estimating the

related eco-costs, these costs can be considered as mainly related to 'labour in offices'.

End-of-life phase
The end-of-life of a building is in fact a complicated concept. Many buildings may be renovated several times before they are demolished completely. Should only the final demolition be considered as the end-of-life of the building, or should every transition to the next renovation be considered as the end-of-life (of the operative function)? Whatever the definition, the involved eco-costs are related to demolition activities, separation, re-use of building parts or materials, upgrading, recycling, incineration (with or without energy recovery) and land fill (Vogtländer, 2001). In both traditional cost and eco-cost calculations – concerning renovation as well as (final) demolition – these cost items should be dealt with correctly.

In the Dutch situation, legislation concerning demolition and waste has effectuated that the prevention costs in this respect have partly been integrated into traditional economic costing. Separation, re-use of building parts, upgrading and recycling is stimulated. These approaches of processing waste have become more or less common practice (Ministry of Housing, Spatial Planning and the Environment, 2001), as far as they are feasible in the traditional economic sense.

Essentially, demolition and separation of waste are covered by traditional economic costing. The eco-costs of the concerned activities can be estimated without considerable problems in the same way as the eco-costs in the production phase. The eco-costs of recycling or upgrading are assigned to the new products emerging from these processes. In fact they are accounted for in the production phase. So, all eco-costs in the end-of-life phase after the separation of waste are related to the waste fraction that is not fit for upgrading or recycling. This waste fraction is disposed of either by incineration or by application as land fill. Consequently, these processes should be charged with 'eco-costs of incineration or land fill'. In (the Dutch) practice however, disposal of building and demolition waste is taxed to an extent that these eco-costs can be considered to be integrated in the demolition costs accounted by traditional economic costing (Vogtländer, 2001).

Integration through Discounted Cash Flow calculation
In renovation and new construction projects in the Dutch (social) housing sector, investments of alternative strategies are compared to the expected revenues of the according operations. This happens of course in terms of traditional economic figures. Strategies, which are expected to be clearly less profitable (as compared to the possibilities related to the intended target-group), are usually abandoned. Comparing investments and operating results is in most cases computed according to the Discounted Cash Flow (DCF) calcula-

Box 7.1 The eco-costs attributed to the rent of a dwelling can be calculated according to the following formula:

$$\Sigma[PV(EC_{rent})] = EC_{production} + \Sigma[PV(EC_{operation})] - PV(EC_{exit})$$

In this formula:

$\Sigma[PV(EC_{rent})]$	=	the sum of the present values of the eco-costs attributed to the rent
$EC_{production}$	=	the eco-cost of the production phase
$\Sigma[PV(EC_{operation})]$	=	the sum of the present values of the eco-costs related to the operating phase
$PV(EC_{exit})$	=	the present value of the eco-costs attributed to the structure, which remains at the end of the concerned operating phase and can either be renovated or demolished

The eco-costs of the production phase and the operating phase can be computed as discussed in Section 7.2. In the EVR model the eco-costs are allocated according to the basic methodology for allocation problems in Life Cycle Assessments (ISO, 1998). In this case, this means that the eco-costs are allocated in line with the present value of the rent and the present value of the exit value. However, the land costs part of the exit value is not charged with eco-costs in order to assign all eco-costs to the building (structure) during the time it is in use.

tion technique. The allocation of eco-costs related to the discerned phases in the life cycle of houses can take place in line with common economic principles. I.e. in line with the DCF calculation, accounting can be executed on the basis of the Present Value of eco-costs in the various stages of the life cycle of the building (Further explication of this principle can be found in Box 7.1). At the end of a certain operating term, a building will either be renovated or demolished. This means that either the building or the land will be taken into a new operation. Consequently, the exit value at the end of the first operating term will be transferred to the next operating term (as part of the investment). According to the EVR model, the building structure takes its 'fair' share of eco-costs to the operating term of its new function.

Eco-costs of housing expenses

In the previous section, essentially all eco-costs related to housing have been integrated, except the energy use for heating, air conditioning, lighting and hot water supply. In the EVR model, the ecological burden of housing in terms of eco-costs per year can be found by simply adding the eco-costs of the yearly energy consumption (or demand) at the eco-costs assigned to the rent. This makes the EVR model a rather simple tool for assessing the ecological burden of housing projects. However, to evaluate whether the ecological burden of a certain housing project is to be considered as high or low, the eco-costs should be compared to (divided through) the value of the project.

7.3 The value of houses

Several approaches of value

The model of the Eco-costs/Value Ratio (EVR) is meant to be a decision-sup-

port tool referring to the design and development of interventions in the housing stock. Whereas in the housing sector many different methods are applied for assessing value, the question arises which determination of value is meaningful in this specific context. In the (original) EVR model, the value – the amount for which a product or service can be exchanged in an open market – is identified by the 'sales price' within the business chain and the 'fair price' in the consumer market. For commodity goods, of which many items are sold and bought on a day-to-day basis, the value of products can be determined by observing sales prices. In real estate and housing markets, however, it is much less easy to establish the value of products by observing sales prices (e.g. Stahl, 1985).

The value of houses relates to many different factors, which can be summarised in the following statements:

1. The value of houses is essentially determined by (the discounted cash flow of) future profits (Seijffert, 2002 and 2003; De Jonge, 2005).
2. The value of existing houses is related to the (actual) all-in building costs of new houses (Seijffert, 2002).
3. The value of houses is related to desirable characteristics/performance (De Jonge, 2005).
4. The value of houses is gradually diminishing due to innovations (De Jonge, 2005).
5. The value of houses is fluctuating by a combination of maintenance and loss of performance (Vroman, 1982).
6. The value of houses is related to their location in the context of trade-offs based on status and the social acceptability of dwelling quality (Phe and Wakely, 2000).
7. The value of houses is influenced by housing market factors such as general shortage of housing, and other economic factors such as interest levels (e.g. Boelhouwer and De Vries, 2004).

Essentially, all these statements can be considered to be valid. However, not all of the concerned relations have the same importance in the context of the EVR.

Value and quality

As decisions in design processes mainly refer to the physical building characteristics of houses, research for the subject in question has been directed towards determining a relation between these characteristics and the value of houses. In other words, the statements 3, 4 and 5 above have been researched in more detail. In that context, Garvin's ideas concerning quality dimensions (Garvin, 1988) have been – tentatively – elaborated for the Dutch housing sector (De Jonge, 2005). Essential for these quality dimensions is that they are determined by product characteristics 'as perceived by the customers'. In the

Table 7.1 'Customer value model' for a newly constructed apartment

	Importance score	Q rating	Weighed score	Fair rent in euros
Product quality				
Size and lay-out	15%	8.1	1.2	105
Structure	25%	8.4	2.1	183
Type	10%	8.4	0.8	72
Fitting and finishing	15%	7.9	1.2	104
	65%		**5.2**	**464**
Service quality				
Mainenance	7%	8.4	0.6	57
Custumer care	2%	10.5	0.2	14
Options	4%	7.6	0.3	24
	13%		**1.1**	**95**
Image				
Dwelling/block	4%	7.0	0.3	30
Surroundings	14%	7.7	1.1	102
Reputation	4%	7.9	0.3	27
	22%		**1.8**	**159**
Total score	**100%**		**8.1**	**718**

idea of Garvin, quality can be judged by the customers only. In sectors other than housing, the 'Customer Value model of Gale' is used to quantify the value (as perceived by the customers) of a product-service system in order to be able to analyse the competitiveness of a product portfolio of a company (Gale, 1994). Applied to a situation in the market for rented houses, this model could produce a survey as shown in Tables 7.1 and 7.2 (De Jonge, 2005). The technique to use this model is that the customer (tenant) is asked to estimate the value of the house in which he/she is living, in terms of the fair price for it. In the table this fair rent is expressed as a monthly rent. Next, the tenant is asked to rate the various quality dimensions by report-marks (which in the Netherlands, are ranging from 1, very poor, to 10, excellent). Of course, in advance, the tenant is informed about the meaning of the discerned quality dimensions. Finally the tenant is asked to indicate the importance (to him/her) of the quality dimensions. Here, the total amount should be 100 per cent for all quality dimensions together. Based on the figures, which have been indicated by the tenant, now the fair price for the discerned quality dimensions can be determined by calculating the weighed averages of the ratings and assigning the corresponding portions of the total fair price to the quality dimensions.

The application of this approach offers two options to achieve a high 'relative quality', being a high quality at the right price: the company can either improve the quality/price ratio of the quality dimensions which are important to the customers or try to influence the customers' preferences in the direction of those quality dimensions of the company's products which are relatively high in comparison with the competitors. A few experimental assessments have been executed to explore this approach for housing. However, further research will be needed to test the operational applicability of this

Table 7.2 'Customer value model' for same apartment (as in figure 7.1), 30 years later

	Importance score	Q rating	Weighed score	Fair rent in euros
Product quality				
Size and lay-out	15%	5,4	0.8	69
Structure	25%	4,5	1.1	97
Type	10%	4,2	0.4	36
Fitting and finishing	15%	3,9	0.6	52
	64%		**2.9**	**254**
Service quality				
Mainenance	7%	7.0	0.5	43
Custumer care	2%	5.2	0.1	7
Options	4%	2.5	0.1	12
	14%		**0.7**	**62**
Image				
Dwelling/block	4%	4.7	0.2	15
Surroundings	14%	7.7	1.1	102
Reputation	4%	7.9	0.3	27
	22%		**1.6**	**144**
Total score	**100%**		**5.2**	**460**

approach in the fields of housing and business accommodation on a broader scale.

Value and time

It is reasonable to assume that people do not want to continue living in houses they judge as being insufficient; at least if they can make a choice. If a landlord is reluctant to improve his houses, tenants often make improvements at their own expenses, unless they have other options, like moving to (affordable) houses that provide better living conditions. Suppose, in a 30-years-old house, refurbishment has been planned. At the moment right before the refurbishment, the tenants' appraisal of the building parts, which are to be renewed, does not equals 'zero'. Probably the value rates of the affected building parts equal 5 or 4 points (out of 10), which is approximately 50 per cent of the valuation of comparable new building parts. If the valuation had been higher, refurbishment would not have been rational. If the valuation had been lower, tenants probably would have moved or they would have made improvements at their own expenses in earlier days. According to the 'customer value model of Gale', the (affected part of the) fair price is in proportion to the weighed quality rating as given by the tenant. Table 7.1 shows in an imaginary case, the assumed distribution of importance and rating of quality dimensions for a newly built apartment. The rating affirms, what can be expected for new, well-designed apartments. The total fair price represents a monthly rent, which is considered to be reasonable for a new apartment in this category. Note, however, that the general price level of the (total) rent is neither determined by the quality rating, nor by the importance score. So, the model of Gale does not explain the general price level of (a certain type of) houses, it just clarifies the relation between what is perceived by the customer as a fair

price and the various quality dimensions. Table 7.2 shows the scores that can be expected for the same apartment after an operating term of 30 years.

The assumptions concerning the value development are based on Brand's indications referring to the renewal of 'services', 'space plan', 'skin' and 'site' (Brand, 1994) and on Thomsen's remarks referring to the development of the amount of living area used per person and to the replacement capacity of the construction industry (Thomsen *et al*., 2002). The importance scores have been deduced from the indications given by the respondents interviewed in the test assessment as mentioned above. Due to the proportions of the importance scores, the total weighed score for quality dimensions of the 30-years-old apartment approximately equals 65 per cent of the total score of the new apartment. In accordance with that quality development, the customer value, expressed by the fair price rent, is also reduced to that level (represented in euros at the same price level in terms of purchasing power). If the relative importance of all 'site' and 'structure' related quality dimensions (which are diminishing in a slower pace) had been assessed at half the per centage as assumed in the tables, the value after 30 years would have been reduced to approximately 55 per cent. If the relative importance of the 'site' and 'structure' related quality dimensions would have been doubled, the value after 30 years would have been reduced to approximately 75 per cent. So, the value of a 30-years-old house for the tenant can be expected to be somewhere in between 55 and 75 per cent of the value of the same house when it was new (measured in purchasing power). Meanwhile, the tenant is likely to judge a considerable part of the quality dimensions of the house as being insufficient. At the same time he/she may have to pay a rent that is rather high as compared to the (perceived) customer value. The estimated value development of housing services based on this model is concluded to be consistent with other findings referring to the aging of houses in the Dutch rental sector (Conijn, 1995).

Location aspects

Modification in the housing status of a particular location (Phe and Wakely, 2000) may interfere with this value development. However, since most houses in the same neighbourhood usually have more or less the same level of physical quality, this interference will hardly affect the relative value (i.e. market position) of the aging houses within that particular neighbourhood.

The value of houses that need reinvestment

The value of a dwelling as a real estate object for the landlord equals (the discounted cash flow of) the net future profits of that object (statement 1 in the beginning of this section). It is recommended that these net future profits are estimated, considering the above explained reduction of the quality rate for the housing services, which are provided by the dwelling. Setting the rent in accordance to the so calculated value development would diminish the risk

Box 7.2 Formula for exit value

The exit value can be expressed in the formula:

$$V_{exit} = V_{renewed} - C$$

In this formula:

V_{exit} = the exit value of the existing building (dwelling)
$V_{renewed}$ = the value of the new building (dwelling) created by the intervention
C = the all-in construction costs of the intervention.

of vacancies at the end of the operating term. However, it should be kept in mind that after a term of approximately 30 years, the quality of the dwelling will be perceived (by the customers) as being insufficient, and a reinvestment is probably required for further operation. The exit value at the end of the operating term can be calculated as a residual value. This calculation is produced by the difference of the value of the building after an intervention at the end of the concerned operating term and the (all-in) construction costs of the very intervention.

The value of the dwelling after intervention ($V_{renewed}$) and the all-in construction costs of the intervention (C) should relate to the intervention with the highest V/C ratio (i.e. the 'best opportunity'). The character of this intervention can be deduced from the expected reduction of the various quality dimensions of the provided housing services (using the model of Gale) and the possibilities of recovering quality, and value, by applying refurbishment, extensive renovation or new construction.

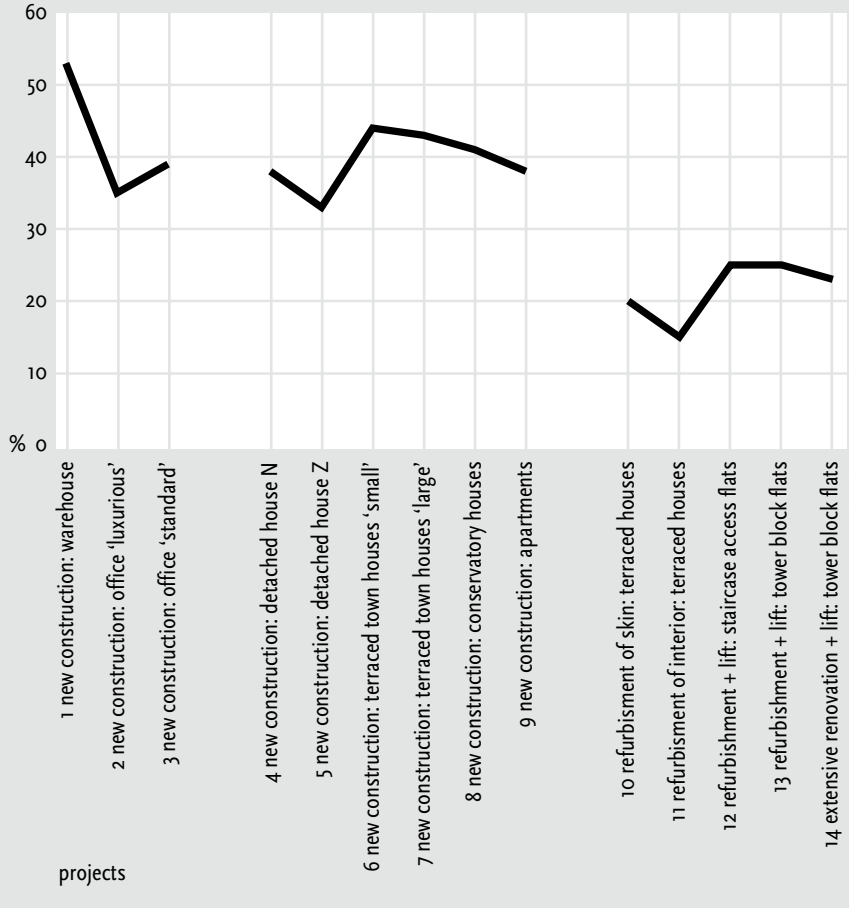
7.4 The Eco-costs/Value Ratio of alternative interventions

Eco-costs/Value Ratio on investment level

The developed EVR model for housing has been applied to a number of case studies. Eco-costs and eco-costs/value ratios related to the production phase have been calculated for 14 recently completed building projects concerning both new construction and renovation. The emphasis in these projects is on housing, i.e. new construction as well as renovation. However, some non-residential projects are added in order to get a (preliminary) indication of the position of the housing sector as related to other building categories.

The results of these calculations are presented in Figure 7.1. This graph shows that new construction of both houses and offices have eco-costs/value ratios on similar levels. Renovation projects have significantly lower eco-costs/value ratios than new construction. Analysis of the calculation results indicates that this difference between new construction and renovation is mainly related to the combination of the relatively high ecological burden of substructure, structure and skin elements of buildings in the production phase, and the fact that these elements have different approaches in new construction and renovation projects. Analysis of the calculation results also indicates that the greater part of the eco-costs of buildings in the production phase can be traced back to a relatively small group of materials (De Jonge, 2005).

Figure 7.1 Eco-costs/Value Ratios on investment level in several projects



Four strategies for intervention

The following case study demonstrates how the model of the Eco-costs/Value Ratio can be applied in practice. A housing association is the landlord of an estate that consists of several apartment blocks with clear obsolescence problems. What can the association do to cope with the situation? In view of the unpopularity of the apartments hardly any demand can be expected if the apartments are put up for sale. Especially, because of the large number of the apartments the expected selling proceeds are rather low. Moreover, the landlord does not consider selling these unwanted flats in line with its objectives as a housing association. Therefore, the possibility of selling is not taken into consideration. In principle four strategies – i.e. four types of interventions – remain possible for the apartment blocks:

1. *Continued operation.* Any feasibility study should start with analyzing the result of an unchanged continuation of the existing situation. So, first of all, the economic consequences of continued operation are mapped out.
2. *Refurbishment.* In case of refurbishment, improvements of the apartments are executed without major changes in the existing lay-out. In this case, refurbishment consists of replacing windows and external doors, thermal

insulation of elevations, adjusting roof covering and edges, enlarging balconies, improving kitchens, adjusting electrical and mechanical systems, and major repair of common areas.

3. *Extensive renovation*. Extensive renovation is an intervention that is considered to improve the building to a level that is similar to new construction. Maybe some quality dimensions are slightly inferior, but other dimensions may even be better than can be obtained by new construction. In practice, the feasibility of extensive renovation is related to the possibilities for changes in the lay-out offered by the existing structure of the apartment block (Andeweg-van Battum and Thomsen, 2003). Usually, these changes in the lay-out are intended to enlarge the apartments produced by the extensive renovation. After the intervention, the block will contain a reduced number of bigger apartments. In the case study, the extensive renovation consists of the same interventions as the refurbishment and, on top of that, the lay-out of the flats will be changed completely. Of course, all fitting and finishing will also be replaced.
4. *New construction*. This strategy can achieve qualities that are beyond the possibilities of renovation. For instance, the lay-out of the site can be rearranged and car parking can be accommodated in the basement of a new apartment building.

Primary decision-making

First of all, the housing association should consider what purpose the intervention is aimed at. Which target group is going to be accommodated with the renewed estate? What kind of dwelling type is needed? How much can the new tenants afford to spend on rent? It is clear that – if an estate consisting of single-family houses with access at ground level is wanted – the only option is demolition followed by new construction. In many cases, however, good housing accommodation can be obtained by refurbishment or renovation in a more or less extensive form. In this study, all considered strategies are assumed to result in a more or less break-even operation (in the context of providing housing facilities for different target-groups). This assumption allows us to investigate the results of eco-cost estimating for all the strategies. It implicates that the building values produced by the discerned interventions approximately equal the investment-costs. Under these conditions, balancing eco-costs to value can be executed by balancing eco-costs to investment-costs.

Costs and Eco-costs of housing expenses

Now, Eco-costs/Value Ratios on the level of housing expenses (per year) can be assessed by allocation both traditional economic costs and eco-costs of investments and operation. This is simply done by computing the (cost-price) rent for all strategies based on both types of costs. The housing expenses (rent as well as energy costs) that follow the discerned interventions can be compared as in

Figure 7.2 Costs and eco-costs of housing expenses (per dwelling) at several intervention strategies

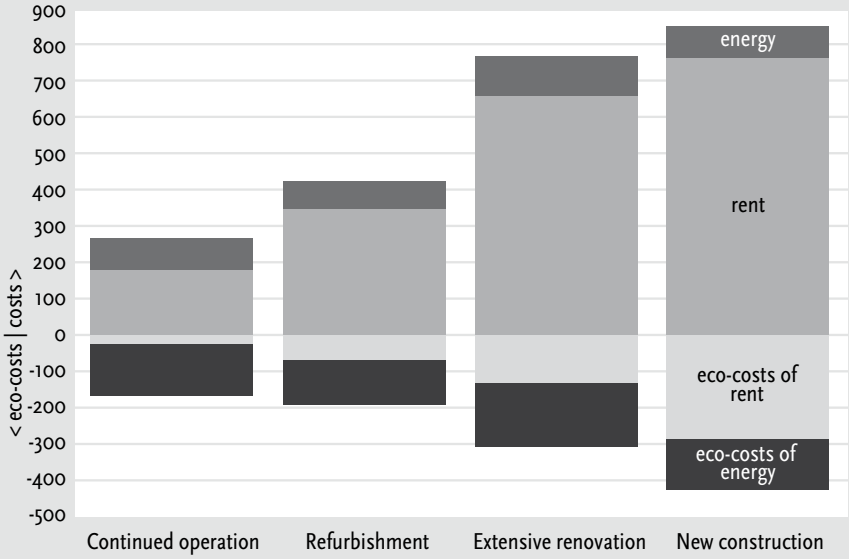


Figure 7.2. In this figure, along the positive Y-axis, the (traditional economic) costs of both the rent and the energy (per dwelling) are depicted, while the eco-costs of the rent and the energy are 'mirrored' along the negative Y-axis.

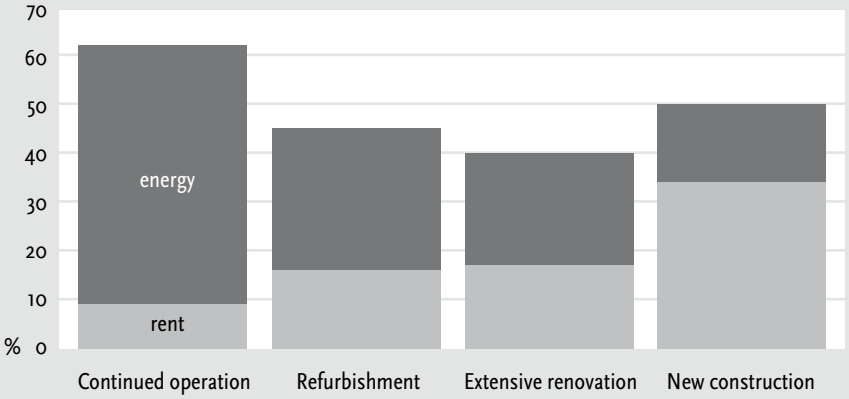
Figure 7.2 shows that the (cost-price) rents following extensive renovation and new construction are clearly higher than the (cost-price) rent following refurbishment. A close look at the graph also shows that extensive renovation produces the highest energy costs. The energy efficiency, which can be obtained by thermal insulation in refurbishment and renovation scenarios, is supposed to be inferior to the possibilities of new construction in this respect. Consequently, the energy costs of refurbished and renovated apartments are assumed to be higher than the energy costs of newly-built apartments in the same size category.

However, per dwelling, refurbished apartments have lower energy costs, because of their smaller sizes compared to apartments that result from extensive renovation and new construction. Along the negative Y-axis, the eco-costs indicate the importance of the varying energy demands in respect of the involved ecological burden.

EVR of housing expenses

Provided that all of the considered approaches produce good value for money, the Eco-costs/Value Ratios of the discerned strategies can be computed by dividing the involved eco-costs by the corresponding traditional economic costs. This action results in Figure 7.3, which shows that, in the studied case, extensive renovation produces the lowest EVR, and by consequence the lowest ecological burden. So, if the considered approach of extensive renovation provides the wanted housing quality, this approach can be considered to be the most sustainable intervention in the case.

Figure 7.3 Eco-costs/Value Ratios of housing expenses at several intervention strategies



In the cases of refurbishment and renovation, a relatively larger part of the expenses consists of energy costs than in the case of new construction. These energy costs raise the Eco-costs/Value Ratios of refurbishment and renovation. However, they remain clearly below the EVR of new construction. Figure 7.3 also shows that, if refurbishment or renovation is at stake, the mayor opportunities for ecological improvement can be found in optimising energy efficiency. In case of new construction, however, ecological improvement should be found in applying less or different building materials.

7.5 Conclusions and evaluation

Under which conditions is renovation and under which conditions is demolition and new construction the more promising approach for improving the ecological sustainability of the housing stock?

The Eco-costs/Value ratio of demolition and new construction versus renovation

Energy use for heating and air conditioning may be important for the ecological impact of houses, but the effects of emissions and material depletion, related to the construction of new houses or to the renovation of existing houses, are not negligible. In order to quantify and weigh all involved ecological impacts the model of the Eco-costs/Value Ratio (EVR) has been elaborated for housing projects and the model has been applied to a number of case studies. The case studies show that in renovation and refurbishment projects, the eco-costs are mainly due to the alleged inferior performances of the buildings related to the energy consumption in the operating phase. The EVR of refurbishment, which emphasises on thermal insulation of the skin of the building, turns out to be lower than the EVR of an unchanged operation. In the case of extensive renovation, the housing expenses – on the one hand – sharply increase and are almost on the same level as the expenses in case of new construction. On the other hand, a larger part of the housing expenses of renovation is still related to energy consumption. The energy costs raise the EVR of

extensive renovation. Yet, it remains far below the EVR of new construction. Consequently, the primary conclusion of this research is that – if renovation can offer a convenient housing accommodation for a particular target group – this approach has better chances than new construction in the context of improving the sustainability of the housing stock.

Improvement of ecological performances of demolition and new construction versus renovation

New construction on the one hand and renovation and refurbishment on the other hand need different approaches as for improving their ecological performances .

In new construction projects, the eco-costs are primarily caused by the construction materials in the production phase. So, the application of alternative materials or the improvement of the production of materials that have a high EVR is indicated in these projects. In renovated and refurbished houses, the major part of ecological burden is due to energy consumption in the operating phase. So for these projects, more emphasis on measures that can reduce energy consumption in that phase is needed. Meanwhile, the larger part of the costs being energy costs offers the tenant a firmer grip on his housing expenses. He can decide to be economical with heating if financially necessary. Moreover, eco-costs connected to operating expenses and energy costs, in a way, imply opportunities for intermediate measures in the field of 'cleaner energy'.

The value of renovated and new constructed houses

Since new construction and renovation usually result in very different accommodations in respect of perceived housing qualities, a study has been conducted that investigated the possibilities to obtain an insight into the relations between building characteristics and quality as perceived by the residents. In practice, the value of refurbished and renovated houses is usually considered to be lower than the value of newly-constructed houses. However, the value also depends on the perception of the quality dimensions in the various categories by the customers/residents. In order to be able to develop strategies for optimising the quality dimensions that can be obtained by the various interventions, further research of 'customer quality' is advised.

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8 Conclusions

Reinout Kleinhans, Henk Visscher and Vincent Gruis

Large-scale restructuring of post-war neighbourhoods is gearing up to become a major challenge in the decades ahead. Various kinds of interventions are necessary to extend the physical, social and economic lifespan of these neighbourhoods. At present, demolition and replacement of the existing housing stock is a prominent strategy in Dutch urban restructuring programmes. Many social landlords, particularly in the less popular post-war social housing estates, undertake extensive demolition projects, usually in the hope that they will create a better social mix between 'poor' and 'better-off' households, enhance the general quality of the housing stock, achieve a financially viable restructuring programme, and increase home-ownership. In general, the intention behind demolition and replacement programmes is to strengthen various aspects of sustainability in neighbourhoods. However, it is difficult to ascertain if and how demolition and replacement strategies really contribute to sustainable neighbourhoods. Sustainability can be viewed from different perspectives that can also colour the conclusions that one reaches. We therefore chose to explore the effects of demolition and replacement on neighbourhood sustainability from different perspectives. This book includes a collection of analyses conducted at Delft Research Centre of Sustainable Urban Areas (DRC SUA), all relating to the question of how neighbourhoods can be transformed in order to generate a more sustainable housing stock and living environment. All the analyses paid particular attention to the role of demolition and replacement in comparison with other transformation strategies. In this conclusion we reflect on all the chapters in relation to the central question posed by the book: What role can demolition and replacement strategies play in creating sustainable neighbourhoods in terms of the different perspectives and in comparison with other strategies? We have organised our conclusions according to the four perspectives on sustainability which are applied at DRC SUA: people (social quality), project (spatial quality), planet (environmental quality) and profit (economic quality) (see Duijvestein, 2004).

Kees van der Flier and André Thomsen presented an analysis of demolition strategies in the Netherlands. They provided a general, quantitative background to the overall theme of the book, focusing primarily on the demolition strategies of Dutch housing associations, the main providers of rented housing in the Netherlands and also the main demolitionists. They relate their quantitative analysis to an analysis of the demolition motives of Dutch housing associations and their implications for the lifespan of dwellings. The overall picture indicates that roughly 0.2-0.3 per cent of the Dutch housing stock is being demolished and that the demolition figures in the Netherlands are rising more sharply than in the surrounding countries. Van der Flier and Thomsen have examined the motives of the landlords and real estate manag-

ers and the underlying factors and found a relationship between the year of construction, the technical/physical quality of dwellings and the demolition rate, which is in line with more common technical lifecycle theories. However, they found no clear relationship between the demolition figures for housing associations and other variables such as demand, tenure and asset management. Hence, there may be other reasons behind demolition. Van der Flier and Thomsen suggest that 'endogenous' factors play a strong role and refer specifically to the ideas of housing association managers on how to create economically and socially sustainable neighbourhoods. This said, we continue our conclusions from the viewpoint of the sustainability perspectives.

Project (spatial quality)

Houterman and Hulsbergen explored demolition and replacement as (part of) a strategy for sustainable neighbourhood transformation from a spatial perspective or, more specifically, from an urban planning and design (urbanism) perspective. Urbanism contributes to sustainable transformation by designing the spatial framework and the specific interventions that are needed to keep pace with changing economic and social demands. Houterman and Hulsbergen showed that urban planning and design – most importantly, the spatial-functional structure of a neighbourhood and its spatial and functional position in the urbanised area – are essential pieces in the transformation jigsaw and should be included in the problem definition from the start. Restructuring that explicitly includes urban planning and design can take account of the quality of the urban structure of the neighbourhood, which is one of the determinants of its social and economic performance. The inclusion of urbanism can also make people think more carefully about the (re)design of the – sometimes outdated –public space in post-war neighbourhoods. In addition, urbanism extends beyond the scale of the neighbourhood itself and seeks to improve the relationship between the neighbourhood and the surroundings, again improving its quality.

According to Houterman and Hulsbergen, urban planning and (architectural) design arguments that support the demolition of post-war housing estates usually follow two lines of reasoning. The first maintains that modernist urban planning and architecture is problematic because it causes social problems. The second says that the lay-out of the areas no longer works in modern society. Aside from the discussion on the housing opportunities offered by the neighbourhoods, this critique focuses specifically on the structures of public space and property. However, it can be regarded as one-sided as an explanation for the downward spiral in the post-war housing estates. Though bad planning and design (structure, scale, location, urban integration, monofunctionality) certainly have an adverse effect on the performance and image of housing estates, the demolition of a physical area is not enough, especially if barely any attention is paid to the social problems that happen to be located

there. Thus, according to Houterman and Hulsbergen, demolition and replacement should be used as a strategic instrument within restructuring. By 'strategic' they mean that the intervention should solve a specific problem and, at the same time, trigger, stimulate or support other necessary developments. Restructuring, from the urbanism perspective, is about the spatial-functional structure of an area and involves far more than just housing and housing markets. However, as stressed by Houterman and Hulsbergen, the current demolition practices in post-war housing estates are based mainly on arguments relating to management of the housing stock. This immediately sets constraints on the problem analysis at the start of regeneration processes as the views of other disciplines such as urbanism, are not properly considered.

People (social quality)

The chapter by Ouwehand picks up on the latter point by Houterman and Hulsbergen and explores how neighbourhood transformation strategies can incorporate social and spatial activities in a comprehensive manner. He maintains that neighbourhood transformation is not a purely physical or spatial phenomenon. Like urban life and housing in general, it is always linked to social and economic motives and results. But despite the interconnection between physical, social and economic factors, it is not certain that urban renewal will benefit all three at one and the same time. Indeed, the social revenue from urban restructuring has frequently been contested. According to Ouwehand, it is just as fallacious to think that the renewal of the housing stock will solve the social problems, as it is to criticise demolition programmes because they aim to bring about a better social mix in a neighbourhood. The relationships are more complex and need to be analysed separately, but within an integrated strategy geared to the problems and perspectives of the neighbourhood. On the basis of positive experience, Ouwehand argues for programmes to tackle the social as well as the physical problems of the neighbourhood and for short- and long-term action, followed by design and implementation. This approach will contribute to a more sustainable form of urban renewal and prevent disappointment and the displacement of problems to other areas – that later on will need renewed as well. In this way, we see that a joint physical and social transformation takes account of the three different angles in the literature on urban studies: intervention in the built environment by renovation, maintenance, demolition and new building goes hand in hand with analyses and measures to strengthen the social structure, while allowing residents a say in the renewal process.

Although a comprehensive approach is clearly recommendable, only physical restructuring in itself can have social impacts. In Chapter 4, Kleinhans explored the impact of demolition and replacement primarily from a social perspective. He examined the impact of restructuring measures on the social capital of the neighbourhood residents, referring to the benefits of incidental

interaction, shared norms, trust and collective actions. Kleinhans concludes that urban restructuring has a positive influence on several preconditions for the (re)production of social capital. By changing the population composition of a neighbourhood, restructuring has certain indirect effects on levels of social capital. First, contrary to what one might expect, newcomers seem to enjoy (access to) relatively high levels of social capital compared to stayers and movers. Home-owners, couples with children and middle or higher household incomes in single-family dwellings score relatively high on social capital. They are socially upward mobile households who consciously opted to live in the restructured areas. Exactly this type of household is most represented among the newcomers, and relatively underrepresented among the stayers. Furthermore, when it comes to socio-economic and household characteristics, the newcomers are the least heterogeneous of all the resident categories. This encourages public familiarity, mutual understanding – however fleeting and superficial – and gives newcomers with middle and higher household incomes a 'headstart' over the low-income groups in terms of social capital. On the other hand, there is a strong positive relationship between place attachment and the (perceived) physical quality of the neighbourhood on the one hand and the social capital of the residents on the other. Paradoxically, this finding could easily cast doubt on the value of restructuring as a means of stimulating social capital. One could argue that proper maintenance of the dwellings and public space would have beneficial effects and thereby spare the expense of demolition and new construction. However, good management alone is probably sufficient to improve the perceived quality of the post-war housing estates. Attracting and retaining better-off households is virtually impossible without attractive housing career opportunities, especially new, single-family, and owner-occupied dwellings.

Planet (environmental quality)

Itard, Klunder and Visscher explored the impact of demolition and replacement from a more 'traditional' perspective on sustainability, i.e. the effect on the environment. They compared the environmental implications of two apartment blocks in four scenarios: ordinary building maintenance, consolidation (insulation measures), transformation (change of floor plan to accord with new needs), and rebuilding (demolition of the old building and reconstruction with a new floor plan). Itard *et al.* conclude that transformation offers a much more environmentally efficient route towards the same result as demolition and replacement. One of the most immediate advantages of transformation as opposed to rebuilding is that it minimises construction waste. Obviously, transformation must be realisable, so the building needs a certain degree of flexibility. The conclusions were drawn on the assumption that the operational energy consumption in transformation is equal to (or less than) in new construction, the quantity of materials is lower than in new construc-

tion, and the building method in both cases is identical. The latter constraint is particularly important, as new building often offers more possibilities for environmentally-friendly methods than renovation. The real environmental problems are not the consumption of materials or energy, but the depletion of natural resources, ecotoxicity and other environmental impacts covered by LCA. An examination of these impacts may lead to differing conclusions. Though interiors and installations do not contribute significantly to the consumption of materials, their environmental impact is far from negligible. When energy-saving measures are adopted, it is important to check the environmental effect of extra material consumption. Itard, Klunder and Visscher stress that it should be borne in mind that, in anything as quantifiable as energy use and component lifespan, the values for a building can easily vary by a factor two, depending on the behaviour of the household.

Profit/prosperity (economic quality)

Finally, De Jonge combined the environmental perspective of Itard *et al*. with an economic perspective. He argued that in order to draw a more comprehensive comparative evaluation between demolition and refurbishment, one should not only look at the environmental impacts of energy use and material depletion (the 'environmental costs') but also at how the users perceive the quality of the housing (the 'economic value'). New construction and renovation usually deliver very different results in the residents' perception of the housing quality. This should be taken into account when comparing the ecological impacts of the two strategies. De Jonge therefore used the Eco-costs/Value Ratio (EVR) model. In line with Itard *et al.,* he concluded that, if renovation can offer convenient housing for a particular target group, it has a better chance than new building of improving the environmental sustainability of the housing stock. De Jonge's case studies further show that the eco-costs in renovation and refurbishment projects are due mainly to the alleged poor energy-consumption performances of the buildings in the operating phase. In new construction projects, the eco-costs are primarily incurred through the materials used in the production phase. So, alternative materials or improvements to the production of materials with a high EVR are advisable in these projects. As energy consumption in the operating phase is responsible for the bulk of the ecological burden from renovation and refurbishment, these projects need to pay more attention to energy-saving measures in this phase.

Taken together, the conclusions presented in the various chapters paint a mixed picture of demolition and replacement as a strategy for sustainable neighbourhood transformation. Demolition and replacement can have positive social as well as physical impacts. Nevertheless, it is argued that they should be weighed very carefully against other alternatives at various levels. At the level of the dwelling, it seems that refurbishment is often a better option from an environmental and economic perspective. At neighbour-

hood level, demolition and replacement can have positive social impacts, particularly if combined with a social strategy. But, to enhance spatial quality, it is important to view demolition and replacement strategies not only from a housing or welfare perspective, but also to look at their potential effects on urban quality at neighbourhood level and above. All the authors seem to agree on the role of residents in restructuring programmes. In the words of Houterman and Hulsbergen: sustainable building at neighbourhood level implies that the residents appreciate the qualities of their neighbourhood as a living environment, and want to ensure its durable – or better still – sustainable continuation.

These mixed conclusions should not be interpreted as a plea for the large-scale application of demolition and replacement strategies. The findings in the different chapters by no means clearly point to these measures as the most sustainable options. From this viewpoint, it is quite remarkable (as shown by Van der Flier and Thomsen) that demolition in the Netherlands is relatively high compared with other European countries. This could indicate that knowledge of the benefits and (prudent) application of demolition and replacement strategies compared with alternatives is not widespread in practice. We hope that this book will help to bridge this gap.

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