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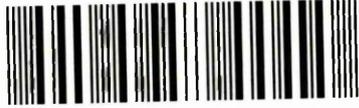
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Criteria for Success in Developing Sustainable Neighbourhoods

Athina Zisi

**A thesis submitted in fulfilment of the requirements of
Sheffield Hallam University
for the degree of Doctor of Philosophy**

March 2015

Abstract

The lack of clarity and preciseness behind the definitions of the term “sustainability” has made its integration in current planning policy a problematic issue, not so much at the building scale but especially at the scale of neighbourhoods and towns. This research is aimed at discovering what the potential might be within the development of a common framework for sustainable development, which will provide a comprehensive guide for local councils and practitioners in the field of built environment.

The case studies research was based on a broad literature and research review and case studies of selected projects in Germany and the UK. These were Kronsberg, Vauban, New Islington and Upton. The mixed methods approach followed allowed for a holistic appreciation of the subject that involved a combination of both qualitative and quantitative treatments. The sources of data that formed the empirical heart of the research were interviews with key stakeholders, aiming to gauge their perceptions over the success of the projects, and questionnaires to residents, aiming to measure their overall satisfaction with living in their newly developed neighbourhoods.

This type of research of best practice projects has provided an opportunity for the comparison of the successful development strategies that have been followed in the different settings. Weaknesses and strengths have been enumerated and analysed, the different cases have been evaluated, and the positive elements amongst them have been pinpointed and reviewed to allow for the final checklist of criteria to be determined.

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Abbreviations

AHP	Analytical Hierarchy Process
ASCOT	Assessment of Sustainable Construction and Technology cost
BEQUEST	Building Environmental Quality Assessment for Sustainability through Time
BREEAM	Building Research Establishment Environmental Assessment Methodology
CABE	Commission for Architecture and the Built Environment
CED	Community Economic Development
CHP	Combined Heat and Power Plant
CLG	Communities and Local Government
CRISP	Creating Innovative Sustainability Pathways
CSD	Commission on Sustainable Development
DECERNS	Decision Evaluation in Complex Risk Network Systems
DPH	Dwellings per Hectare
ECOSOC	Economic and Social Council
EIA	Environmental Impact Analysis
ENVI	Environmental Indicators
EP	English Partnerships
EPI	Environmental Performance Index
EU	European Union
EXPO	Exposition
HCA	Homes and Communities Agency
HMG	Human Macroecology Group
ICLEI	International Council for Local Environmental Initiatives
IFEU	Institut für Energie und Umweltforschung
IMD	Index of Multiple Deprivation
INDI	Indicators Impact
LA21	Local Agenda 21

LEED	Leadership in Energy and Environmental Design
MCDM	Multiple Criteria Decision Making method
MLSOA	Middle Layer Super Output Area
MMC	Modern Methods of Construction
NAHP	National Affordable Housing Programme
ODPM	Office of the Deputy Prime Minister
OECD	Organisation for Economic Co-operation and Development
ONS	Office of National Statistics
PPG	Planning Policy Guidance
PPH	Persons per Hectare
PROMETHEE	Preference Ranking Organization Method for Enrichment of Evaluations
RAD	Radius
RDAs	Regional Development Agencies
SUSI	Self-organized, Independent Settlement Initiative
SCI	Statements of Community Involvement
SUDS	Sustainable Urban Drainage System
TOPSIS	Technique for Order preference by Similarity to Ideal Situation
UDC	Urban Development Corporations
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNSD	United Nations Division for Sustainable Development
VEC	Valued Ecosystem Components
WHO	World Health Organisation

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Chapter 1. The scope, aims, objectives and significance of the study

1.1 Introduction

This chapter provides an introduction to the main focus of this research. Alongside a discussion of the research problem, the aims and objectives of the study will be outlined and, finally, the significance of the research will be pointed out.

1.2 The scope of the study

1.2.1 Environmental, social, and economic pressures on the 21st century cities.

The irreversible environmental damage being done to the planet is according to scientists the result of human activities (Gauzin, 2002). The world's population is growing at a rapid rate and, according to scientific predictions, over two - thirds of us will be living in urban areas by the end of the first half of the 21st century. On the one hand, cities unquestionably have comparative advantages over the rural areas since they offer better opportunities for employment, leisure and socializing. But on the other hand, the way they are currently developed entails the extensive use of natural raw materials and fossil fuels, and produces congestion, noise and pollution. Furthermore, the current problematic economic climate is creating social imbalances, as well as failing to support the population's expectations, and societies, suffer from alienation, high crime rates, unemployment, and outward migration. These problems are particularly visible in the inner city areas and need to be tackled in the future.

1.2.2 Sustainable development: concepts, theory, and differing perceptions.

Sustainability emerged as a theoretical concept in the literature of the 1980s as a way of securing the liveable future of the cities around the world. Despite international workshops, summits and extensive research, which have each clearly highlighted the importance of sustainable development, it still remains a rather controversial phrase. The on-going debate concerns the interpretation of its true meaning. Literature suggests that this could be related to the paradoxical way in which the contrastive principles of environmental sustainability and economic development are combined in

the phrase (Aarts & Nienhuis, 1999). According to ecologist Peter Brandon, this could also be the result of the lack of public debate around the definition of the term or the widening of the debate, wherever it exists, to include political and socio-economic issues (Brandon & Lombardi, 2011).

Accordingly, the evaluation of development plans in terms of sustainability, although theoretically it has already become a central part of the development process, proves difficult to implement. This is partially the outcome of a lack of resources, manpower skills and expertise available to screen development proposals against sustainability measures set out in the plans (UNSD, 2005). Improving society's education over sustainability issues and advancing the skills of the professionals that are involved in the development of the urban environment should be a priority of all countries. Based on the technological advances of our times, international information networks should also be established (Dale & Newman, 2006). These should constantly keep abreast of the developments in sustainability issues and should provide accurate information to all parties concerned.

As a result of the differing perceptions and implementation issues, even though in theory sustainable development has to fulfil all social, economic and environmental criteria, in practice the phrase usually mirrors either anthropocentric or eco-centric concerns (Barton, 2000). Because of the fact that the planning system has a particularly discrete nature, it can be easily carried away in devaluing environmental and social aspects, and overvaluing economic considerations (UNSD, 2005). The concept of sustainable development should therefore be a matter of constant debate and negotiations over a wide range of policies. This is how progress and success can become reality.

So far, the most well-known and internationally accepted definition of sustainable development has been people-centred: *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (WCED, 1987). However it does not provide detail on what to sustain, to what extent and on what time scale.

1.2.3 The need for sustainable neighbourhoods

The problem of implementing sustainable development is particularly perceptible at the intermediate spatial level of the neighbourhood or town.

Sustainability principles may have been already embedded in policy at the international and national levels and sustainability assessment methods may have already been applied on buildings, however, the incorporation of sustainability principles at the level of the neighbourhood has proven to be particularly demanding (Choguill, 2008). Despite the daunting nature of the task, numerous scholars have stressed out, the importance of taking action at the local level as many of the problems encountered at the macro-city scale are usually cumulative consequences of poor planning at the micro-neighbourhood level (Engel-Yan *et al.*, 2005). Furthermore, research has proved that the analysis at the neighbourhood level develops more efficient and sustainable local urban infrastructure, including buildings, transportation, urban vegetation, and water (water and waste management, pedestrian networks, etc.). Encouraging findings were also presented by CABE & DETR in 2001, in a report that clearly denotes a positive association between the implementation of sustainable urban design principles at the local level and better quality of life (CABE & DETR, 2001).

The first attempts to redirect the practical implementation of sustainable development principles from the global to the local level were with the Local Agenda 21 action plans that were embraced by a large number of small communities worldwide. Local Agenda 21 was at first considered to be something of a Pandora's Box for the local governments (Selman, 1996), since the "active partnership" theme it promoted would be hard to establish. The local authorities were faced with the challenge of balancing the need for political legitimacy and fairness with real ownership of the process by local people. Despite the doubtful prognoses however, the localities that accomplished very satisfying levels of participation in the decision making processes were not few after the LA21 programme was launched in 1992.

In practice the implementation of sustainability rules in the whole process of the development of a project proves to be very complicated in most cases. Even with the

legislation and the regulations in place, the administrative system's resistance to change in accordance with the new environmental, economic and social realities counts against the successful implementation of sustainable development. However, local authorities are being allocated increasingly more responsibilities and, due to their small scale, a greater degree of flexibility is allowed. It is exactly this flexibility that is necessary for new concepts of sustainability to be materialised in accordance to the changing environmental, social and economic conditions. Therefore, the actions that take place at the intermediate local level are of paramount significance (Gauzin, 2002).

Ideas and thinking about sustainable development at the local scale have permeated over the last decades into most disciplines and sectors (Turcu, 2012). The different terminological perspectives, however, have resulted in varying interpretations on how sustainability can be grounded in an urban setting. The debate has inspired a range of initiatives across the world namely Millennium Communities, eco-villages, healthy cities etc. Have those interventions though really helped communities to become more sustainable? How is success and progress towards sustainability measured? Is there a recipe for sustainability?

When trying to answer these questions, it is useful to look at the ways in which sustainable development interventions have tackled or prevented issues of neighbourhood decline in practice. It is also of pivotal importance to define the characteristics of those successful communities as some of their features might be applicable in different settings. Most of our knowledge around success and progress though comes from the top down perspective of area statistics which usually focuses on physical attributes and disregards important aspects, such as community satisfaction or quality of life. This builds a strong case for more research on both sustainable initiatives and communities in decline to define key contrasting aspects. It is, actually, usually the case that sustainable neighbourhood initiatives often influence Government policy and the governments have tried to associate themselves with innovative paradigms (Lovell, 2007). Such an example is the BedZed project in the UK that received numerous awards and great public and academic attention in the 1990s: A small neighbourhood in London that features pioneering technologies for low-energy housing. The project has not been part of multi-million Government housing scheme

but has, instead, been influenced by entrepreneurial individuals and organisations, with strong green values (Minton, 2002). BedZed has, though, been presented as a case study in government reports (BRESCU, 2003). The reason for this is the radical public policy discourse that has emerged both from within the Government and from internationally (Kyoto Protocol) about climate change. The UK Government's intentions were actually made official with commitment for a 60% reduction in carbon emissions by the year 2050 (DTI, 2003b). Although it has been publicly announced that the goal will not be met (DEFRA, 2006), the low-energy housing niches lend credibility to the Government's radical climate change discourse and, above all, they provide 'ready-made examples for the Government to better communicate its aims.

From the previous discussion it has become apparent that more case studies on sustainable neighbourhood initiatives will be beneficial in the search for criteria for success. Further research is also required because the vast majority of exemplary neighbourhoods have their origins in complex and diverse collaborations between the public sector, private bodies and community associations. The various forces and entities that influence the decision-making process in urban neighbourhood contexts have actually become the focus of academic research suggesting that the institutional dimension is, in fact, the fourth pillar of sustainability (Sharifi & Murayama, 2013).

There is also a need to focus on the study of current unsustainable trends and failed communities. This will enhance problem-based learning by identifying the sources of social, environmental, economic or institutional decline and it is particularly relevant for cases of urban regeneration. According to Stead (2000), strong unsustainable trends require equally strong actions to reverse them. He points out that the most substantial issues related to unsustainable trends are the dispersal of population and activities and the centralisation of services. These trends have led to myriads of problems namely lack of social cohesion, environmental pollution, traffic problems and resource depletion.

Images of neighbourhood decline are easy to observe all across Northern UK. The dramatic shift that took place from the industrialisation to services has been the main cause of a crisis which is evident in the physical (urban) and social environment.

Numerous cities, significant industrial hubs of the past have suffered the effects of de-industrialisation and inner-city decay: Manchester, Liverpool, Leeds, Nottingham just to name a few.

Mansfield, a town located at the north of Nottingham used to be an area where the mining, textile and engineering industries were flourishing. Since the late 1970s, however, the local economy has witnessed a severe decline in every level and by the year 2010 it had ranked 36th most deprived out of 326 local authorities across the country (MPAC, 2013).

Northfield is a neighbourhood situated to the north west of the town and it is the most deprived community in Mansfield. High levels of unemployment, low rates of economic activity, education and skills and a large proportion of vacant housing stock have created a run-down environment (Team Northfield, 2005). The economic decline the area has experienced since the 1970s has created a snowball effect generating social issues such as drug abuse, crime and lack of provision for young people (Syrett & North, 2008). The first attempt to reverse this image of profound depression took place in 1990 with the establishment of Mansfield 2010, a (public/private) partnership of over 150 businesses and public sector organisations. The organisation was promoting socially and environmentally sustainable economic development for the district and pursuing national and EU funds for physical infrastructure. Several other local agencies and public organisations have partnered up since then in an effort to set priorities for development and renewal towards a more sustainable future for the community. Team Northfield, the district's strategic partnership brings together representatives from the community, private sector and public service providers and has development improvement plans for the foreseeable future (Team Northfield, 2005). The initiatives have attracted inward investment to former coalfield places and there has been progress in terms of public infrastructure (Bennet, Beynon, & Hudson, 2000).

The discussed examples of failure and success feature alternative paths in terms of the hybrid partnerships between diverse organisations that can bring about substantial progress in neighbourhood development and regeneration. They also feature different interpretations of what constitutes success and raise questions as to what constitutes

appropriate politics for regeneration and development. What is evident though is that when imagination, innovation and local enthusiasm are abundant, change towards a more sustainable future cannot be achieved.

This section has discussed the importance of the neighbourhood scale for the successful implementation of sustainability principles. What is needed at the moment though, are robust technical plans, and specific processes that ensure success in fulfilling social needs, in sustaining the environmental capacity and in satisfying economic needs. And this has to be done in quantitative terms. Policy pronouncements, such as UK Government's Sustainable Communities plan ("Building for the Future"), set out programmes of action that are usually ambitious in their goals but are usually qualitative in nature; failing in delivering concrete plans of action.

1.2.4 Research Problems

The literature review identified the following problems with regards to sustainable neighbourhood development.

1. The vast body of literature on sustainable urban development that has flourished over the last two decades has inspired a range of neighbourhood development schemes across the world, that aim at improving the quality of people's lives while creating a viable environment for future generations. Yet, the conceptualisation of those projects has been based on different interpretations of sustainability and, different sets of targets on what we should be aiming to achieve. There is, therefore, an urgent need to define the characteristics of communities that have failed as well as aspects of communities that have proven to be successful in meeting sustainability criteria.
2. Whereas a variety of different frameworks, checklists and indicators exist throughout Europe, these mainly refer to the scales of buildings or town and not to the intermediary scale of the neighbourhood (HQE2R, 2004). Consequently, although the focus has been placed on the local scale, and on a bottom up approach, there is a lack of common frameworks, indicators and checklists that

can describe the aims of sustainable development in quantitative terms. This is the reason why the successful implementation of sustainable development is hampered at the neighbourhood scale.

3. Furthermore, the existing frameworks and systems of indicators often focus more on a particular area of sustainable development at the expense of others. For instance, a framework or a set of indicators may place a focus on environmental features while another may focus more on community participation (Massart and Matthews, 2007). Sustainable development is not achievable unless it is regarded as a three dimensional issue. Spatial problems are non-linear and as a result their economic, social and ecological facets must be solved simultaneously (Williams, 2007).

1.3 Research Hypothesis

The research hypothesis has been built on understanding the impediments to the successful implementation of sustainable development at the neighbourhood scale, as these were outlined in the previous introductory section.

The research hypothesis that defines the scope of this study is therefore the following:

The development of a common checklist of criteria, accompanied by a set of indicators that will focus on both quantitative (technical), and qualitative (non-technical) aspects within the context of sustainability, will facilitate sustainable neighbourhood development.

1.4 Aims and objectives of the research

1.4.1 Aims

From an academic perspective, this research is primarily looking at establishing an academically sound process that enables bottom up decision making for the sustainable development and regeneration of urban neighbourhoods.

From a methodological perspective, this research will be comparing sustainable development strategies that have delivered successful projects, to determine what

opportunities may exist for collaboration/integration of these strategies, when developing sustainable neighbourhoods.

The strategies will be compared against certain elements that have been viewed as integral to the development of sustainable neighbourhoods. These elements have emerged through the process of an extensive literature review outlined in Chapter 2 and are the following: Energy Considerations, water management, waste management, building design and materials, transportation, urban structure, preservation and revitalization of the natural environment and landscape, social sustainability and economic considerations.

The research also focuses on the investigation of inconsistencies and gaps in current practice and policy that need to be bridged if sustainability at the neighbourhood scale is to be achieved. Therefore, institutional, legal and policy issues that surround the successful implementation of sustainable development will be extensively examined.

In line with the aforementioned, this research aims to identify criteria for success and develop associated indicators in promoting sustainability at the spatial context of the neighbourhood.

1.4.2 Objectives

To meet the defined aim of the research, seven consequent objectives are identified as follows:

- 1. To undertake a theoretical exploration of key sustainable development concepts emerging from literature.** In order to develop criteria for sustainability, it is necessary to first explore the theoretical discourse through which the concept has evolved. In Chapter 2, definitions of the term will be outlined and specific themes, concepts and objectives of sustainable development will be identified.
- 2. To use the list of concepts as criteria to identify exemplary sustainable neighbourhood initiatives to be used as case studies.** The concepts identified

will be utilised in a search for best practice, an investigation of what innovative eco-neighbourhoods currently exist, how they are being developed and what levels of success they have achieved. A number of exemplary projects will be selected for further investigation according to criteria of scale, location, stage of development and progress towards sustainability.

3. **To investigate the case studies selected to determine the key goals and objectives that were used to achieve a significant level of progress towards sustainability at the neighbourhood scale.** This step of the research involves an exploration of the decision-making and development processes that have led to the success of the projects selected and will be based on project documentation, interviews, and resident satisfaction surveys.
4. **To cross compare the case studies selected in a qualitative and qualitative manner to gain an insight on the contributing factors to their success and to investigate themes in which there is room for progress.** This objective involves the cross-comparison of frameworks, indicators and assessment methods that were used to ensure sustainability in the projects investigated. Through the cross-comparison process this research endeavours to identify key lessons for future sustainable neighbourhood development as well as to highlight aspects that require further progress.
5. **To identify key factors that influence variations in performance.** Key constraints and implementation barriers will be identified and outlined for the consideration of future sustainable neighbourhood initiatives.
6. **To revise the initial checklist of criteria identified in the literature review to include new themes and additional criteria deriving from the analysis of the case studies.** Following the identification of further themes and concepts of sustainable development, the checklist of criteria used for the selection of the case studies will be amended and will evolve into a matrix that holistically

addresses the concept of sustainability and provides guidelines for the practical processes required to achieve sustainable neighbourhood development.

7. **To develop a method for the ranking of the criteria, suitable for a group decision environment, to enable the setting of clear priorities and benchmarks for future progress.** As the matrix will include a large number of criteria, it is necessary to develop a multi-criteria decision-making approach to tackle problems of choice and prioritisation. This stage of the research will, therefore, aim at exploring ways in which a scientifically robust multi-criteria evaluation method can be used by a group of stakeholders to facilitate a bottom-up approach in the formulation of the decision hierarchy.

8. **To identify whether the final matrix can be applied on similar initiatives in different settings and to explore potential key application problems.** This objective involves the exploration of the opportunities that may exist for applicability of the proposed integrated matrix in different contexts. This step of the research will therefore establish conditions necessary to ensure that the proposed matrix can fulfil its purpose, which is to be utilised in practice, either as an inventory for new development, or as an assessment and monitoring tool.

1.5 Research significance

The research will inform the local authorities' policy and practice through providing practical guidance on creating a more sustainable urban form. Checklists and indicators should be the main reference for any public or private body that wants to ensure the economic, ecological and social viability of a planning application or a project.

The importance of such research has been highlighted in numerous international publications and declarations, launched by the United Nations as well as by other major international organizations that aim at promoting sustainability.

At the Bristol accord in 2005 it was clearly stated that: *'Economic, social and environmental objectives must be fully integrated and reconciled in the development policies of urban areas, as reflected in the concepts of the healthy city and the ecological city'* (ODPM, 2005).

Furthermore, according to HQE2R's case study, experience in everyday practice of urban neighbourhood development the concept of sustainability is still somewhat unknown for the actors involved. *"The complexity of issues and their interrelation on the one hand and the usually limited resources (time, budget, manpower) together with the urgency of problems on the other often take effect in favour of routine decisions and actions. In this context, assessment tools, checklists of criteria for success and systems of indicators should support engaged actors in their decision making towards sustainable development."* (HQE2R, 2004)

A study of exemplary projects will show what the main steps are during the conceptualization and the development of a project that constitute success. According to the 'Energie cites' association of local authorities *"Some initiatives are showing us the way forward... However, these examples are still isolated. We are facing a big challenge where there is consensus that change is necessary but the level of involvement remains far from being sufficient to have any impact at National or EU level"* (Energie Cites, 2008).

Such research has been undertaken recently by the VivaCity2020, a university-led consortium that investigated the design and delivery of sustainable urban environments within the British territory. The aim of the programme was to *"develop an in-depth understanding of human behaviour in urban environments and to create new practical resources to support urban design professionals with sustainable decision-making"*. After 5 years of systematic case study research, they concluded that *"The ability of decision-makers (e.g. city developers, residents and workers) to make more sustainable decisions relies upon them having accurate and relevant information. It is currently quite difficult to access this information..."*. It is obvious that there is

currently an urgent need for research in the field of sustainable urban development in order for the concept to be applied in the mainstream processes.

Sustainability criteria and indicators will also be useful in the case of neighbourhood renewal. The viability of urban areas that are currently deprived needs to be assured so that no one is seriously disadvantaged by where they live. The English Government's 2001 action plan, "A new commitment to neighbourhood renewal", stressed the importance of renewal for existing neighbourhoods, looking 20 years ahead. The action plan was followed by the 2003 "Sustainable Communities Plan", which was designed to deliver sustainable communities in towns, cities and country areas. The ODPM five year plan - "Homes for All" - built on its success and provided further commitment to invest over £1.25 billion in areas suffering most from low demand for housing, giving those communities a future.

While it appears as if case study research involving exemplary projects may be on the rise, to the author's knowledge, little or no academic research has been conducted that reveals the possibility of collaboration between best practice development processes of sustainable neighbourhoods. According to the literature review the philosophy that underpins the development of each project may differ greatly from case to case. As was discussed previously, some projects are developed on an eco-centric, basis while others have a more anthropocentric focus. Subsequently, it can be suggested that sustainability can be perceived in several different ways, but literature has revealed that the lack of the holistic appreciation of the concept is a key constraint.

This lack of universal guidelines can hypothetically be resolved with the integration of the most successful aspects of best practice neighbourhood development projects into one general strategy, that envisages all three pillars of sustainability in a more holistic and coherent way. This latter statement reflects the main scope of this research, which aims at developing a checklist of criteria that will form a solid technical foundation and fortify sustainable development initiatives in the future.

Chapter 2 that follows will analyse key concepts of sustainability, review existing tools for sustainable development and will discuss key criteria for success deriving from relevant literature.

1.6 The structure of the thesis

The thesis has been divided into 12 chapters. The first three primarily concern the focus of the study and the literature review. More specifically, Chapter 1 has outlined the scope of the research, research problems, aims, objectives and the research significance. In continuation, Chapter 2 identifies sustainability themes and, terminological ambiguities and, examines a number of tools associated with the practical implementation of sustainable development. Chapter 3, features a comprehensive review of literature regarding the neighbourhood as a unit of urban planning and design.

The methodological issues are then explored in Chapter 4. This chapter thoroughly discusses the methodology followed to complete each step of the research and identifies ethical issues and limitations.

Chapter 5 provides a historical review of the conditions and processes that shaped the urban planning realm in the two countries this research focuses on; Germany, and the UK. It is a necessary introduction to the more thorough analysis of specific case studies that follow.

Chapters 6, 7, 8 and 9 investigate and analyse the four case studies selected for this study: New Islington, Upton, Vauban and Kronsberg.

In the thesis chapter that follows (10), the findings from the analysis of the project are gathered to create an informed checklist of criteria for sustainable development at the neighbourhood scale.

In Chapter 11, the four case studies are compared in a concise manner, using a Multiple Criteria Decision Making (MCDM) method. The purpose of this cross-comparative analysis is to identify factors affecting performance to provide some

valuable insight on sustainable neighbourhood development that is meant to assist similar initiatives in the future.

The final chapter of the thesis, attempts an evaluation of the findings, outlines key contributions and limitations and suggests a number of ideas for future research.

Chapter 2. Sustainable development and urban neighbourhoods: theory and terminology contradictions

2.1 Introduction

Although sustainable development is a matter that has penetrated contemporary policy formulated at a European and global level, many of the problems and their solutions have their roots in local activities. Focus on the local level is linked to the sustainable development motto “think globally, act locally” and is reflected in Chapter 28 of Agenda 21, which deals with the introduction of local Agenda 21 initiatives by local communities (UNCED, 1992).

There are both ecological and sociological reasons for putting an emphasis on the local characteristics of sustainable development. From an ecological perspective, we must ensure that development does not exceed the carrying capacity of the local ecosystem. On the other hand, we must ensure that social divisions cease to exist within the localities and that the development in urban areas takes place in a way that it ensures the ecological, social and economic sustainability of all places within a given region (Devuyst, 2001).

Moreover, *“local governments are the level of governance closest to people, so they play a vital role in educating, mobilising and responding to the public to promote sustainable development”* (UNCED, 1992, pp. 28.1 - 28.7). Therefore, local authorities and regional authorities and the actions that take place at the intermediate local level are of paramount significance.

Sustainable development, however, cannot be limited strictly to the local level. A synergy between local and global initiatives is essential. Local authorities should cooperate with all different levels of authority and have a global outlook on problems facing the Earth. The decisions of global institutions inevitably have a tremendous effect on the lives of hundreds of millions of people. The European Commission, the International Monetary Fund (IMF), and the World Bank are some of them, and they are responsible for formulating policies that all states around the world have to comply with. According to Devuyst (2001), acting globally means to make all these institutions

accounting for policies and programmes that create ecological harm and human misery. Ultimately, what is needed is to *demand that future policies are geared towards the needs of the people of the world and to the globe's fragile ecologies, rather to the interests of central banks, treasury ministries, and privately owned financial monopolies* (Faucheux & O' Connor, 1998).

The "GEO-1 Global state of the Environment report 1997" of UNEP (1997) had pointed out that continued preoccupation with immediate local and national issues and a general lack of sustained interest in global and long-term environmental issues remained major impediments to environmental progress internationally back in 1997. Although there has been progress over the years, the matter is still causing concern. In GEO-4, (UNEP, 2007) it is clearly stated that that unfair globalisation practices export their harmful side effects to countries that often do not have effective governance and so a global partnership for development should be developed. The broad goals should be selected at an international level, but these should be based on priority challenges for each region.

The *European Charter of Local Self-Government*, which was signed by the member states of the council of Europe in 1985, emphasised the role of the local and regional authorities for sustainable development within the limits of the national and international law¹. The aim of the charter was to protect and further develop the rights and fundamental freedom of local authorities. It explicitly states that the powers given to the local authorities should be full and exclusive and that they shouldn't be limited by any other central or regional authority. The charter also empowers the role of the citizens and enables them to participate in taking the decisions which affect their everyday environment, and it guarantees the political, administrative and financial independence of local authorities (COE, 1985).

The manifesto for a new urbanity, an update of the first European Urban charter, was adopted by the congress in 2008. *"It aims to establish a body of common principles and*

¹ According to the third article of the charter, "*Local self-government denotes the right and the ability of local authorities, within the limits of the law, to regulate and manage a substantial share of public affairs under their own responsibility and in the interests of the local population* (COE, 1985)".

concepts, enabling towns and cities and their inhabitants to meet the current challenges facing urban societies” (COE, 2008).

The manifesto not only emphasises the need for the towns and cities to protect the local environment, but it also highlights the major role the localities should play in protecting, restoring and managing the global environment.

It guarantees that all European local elected representatives are committed to promoting sustainable development by taking measures for sustainable mobility, prevention of urban sprawl, higher densities, reduction of energy consumption and waste, a greater public participation in decisions, social diversity and equality, and economic viability (COE, 2008).

2.2 A theoretical approach

2.2.1 Definitions of sustainable development

In every introduction to official documents or academic writings, one can find a different definition of the term Sustainable Development. In Barbara Ward’s writings, the term was used for the first time in the mid-1970s (Holmberg & Sandbrook, 1992). What has become the standard definition of sustainable development, though, is the one that was formulated by the Brundtland Commission (The World Commission on Environment and Development) in 1987: *“A development that meets the needs of the present without jeopardizing the ability of future generations to meet their own needs”* (UN, 1987). The reason for the popularity of this definition is the fact that it effectively merges people’s needs with bio-physical environmental management goals through economic development (Vallance, Perkins, & Dixon, 2011).

Wheeler and Beatley, in the book *The Sustainable Urban Development Reader* (Wheeler & Beatley, 2004), enumerate several other definitions of the term, based on its different contexts, from various international sources:

“Sustainable development ensures a better quality of life for all, now, and into the future, in a just and equitable manner, while living within the limits of supporting ecosystems” (Agyeman, Bullard, & Evans, 2003).

“Sustainable development is any form of positive change which does not erode the ecological, social, or political systems upon which society is dependent” (Wheeler, 2004).

“Sustainability is the fundamental root metaphor that can oppose the notion of continued exponential material growth” (Ecotopia author Ernst Callenbach).

“Sustainable development seeks to respond to five broad requirements: 1. Integration of conservation and development, 2. Satisfaction of basic human needs, 3. Achievement of equity and social justice, 4. Provision of social self-determination and cultural diversity, and 5. Maintenance of ecological integrity” (International Union for the Conservation of Nature, 1986).

All these definitions, however, seem to be inadequate in explaining the true meaning of the term. Moreover, although the Brudtland definition is the most widely accepted and it often appears as a reference in most official documents and papers, it does not provide detail on what to sustain, to what extent and upon what time scale.

2.2.2 What is unsustainable?

Given the ambiguity of the term sustainable, it would be useful to identify the unsustainable characteristics of urban settlements that need to be reversed, as well as exactly what kind of human practices hinder progress with regards to sustainability.

Reversing the Brudtland definition, when a development does not meet the needs of the present and jeopardizes the ability of future generations to meet their own needs it is considered unsustainable.

A more eco-centric definition, given by Robert, describes *“non-sustainability as a systematic degradation of the ecosphere’s ability to sustain productivity and biodiversity of ecosystems, and thereby the inability to sustain society with its demands for services and resources” (Robert, 2000).*

Since the beginning of the industrial revolution, *the relationship between mankind’s economic expansion and environmental preservation has been fundamentally contradictory (Novek & Kampen, 1992).* Humanity’s occupation on this planet has

been *unsustainable, primarily concerned with growth and profit and distorting the form of nature* (Mohan Das Gandhi, Selladurai, & Santhi, 2006). The accelerating growing trend of the population, combined with changes in consumption patterns has led to impacts that exceed the carrying capacity of the ecosystem and threaten future economic expansion and environmental preservation. The population is growing at the rate of 1.10% per year (UN, 2011), and social problems related to poverty, income disparity, political instability, economic inefficiency and social inequity are multiplying.

What is more, governments have always had a short-term stance on environmental issues up until the emergence of the ecology movement that influenced policy makers (Palmer, Cooper, & Van der Vorst, 1997). Since then, more weight has been assigned to the integrity of ecosystems; however, future considerations have remained secondary concerns.

In recent anthology unsustainable trends have been associated with capitalist development worldwide. Natural resources are depleted in line with the commands of the capital and there is no compensation for the damage caused to the environment (Fernando, 2003). Profitability, rather than availability of natural resources, is the sole driving force for production. Overconsumption, and its continuous expansion, is the vital essence of the capitalist system, while the expansion of the productive capacity of the Earth or of technology is a secondary concern (Naess, 2006).

The aforementioned arguments could be potential hazards for the capitalism itself, since the resource depletion could destroy the possibility of continued economic growth. However, the solution hardly lies in its condemnation, especially given that an equally powerful alternative does not currently exist. On the contrary, the direct engagement of sustainable development with the capitalist forces is even more essential now than it ever was in the past (Fernando, 2003). This process of the transformation within our current economic system, according to Naess, entails institutional learning, technological development, legislation and market forces, and it will influence an analogous societal transformation (Naess, 2006).

The adverse effects of unsustainable, capitalist, market-orientated policies can be easily identified in the smallest nucleus of the urban territory: the neighbourhood. Whether it is economic restructuring processes or defective welfare policies that cause it, many inner-city neighbourhoods, especially in countries that went through extensive deindustrialization and suburbanization periods, become 'pockets of poverty' (Andersen, 2002). The housing system created, over the years, marginal locations with a concentration of the very poorest; usually these are the least popular council estates from the period of large-scale mass housing production (Brindley, 2003). *The increased deprivation, stigmatization and decay has led to middle class people moving away and being replaced by poor and excluded families* (Andersen, 2002). *These poor families do not have the resources to maintain or repair their homes* (Grigsby, Baratz, Galster, & Maclennan, 1987). As a result, the poor living conditions, and the reduced public sector expenditure for neighbourhood housekeeping, social services and maintenance of infrastructure, cause the phenomenon of urban decay in the whole community. Stigmatization and bad reputation hinder the attraction homeowners; a situation that results to a large number of vacated properties. With no management mechanism existing to maintain those vacated properties, they end up derelict, offering nothing but poor living conditions and social decline.

The aforementioned characteristics of unsustainable communities have been defined and classified into three categories: physical, economic and social by Ekins and Cooper. According to their thesis an unsustainable community is described as:

1. A physical environment which has degraded and become polluted, with an overloaded or degenerating and inefficient infrastructure, which is unacceptably detrimental to human well-being;
2. An economy that has ceased to be able to support the population's expectations for either 'wealth creation' or 'quality of life'; and
3. A social environment that has become dysfunctional, resulting in increased stress and fear of crime, alienation, high crime rates and subsequent outward migration (Ekins & Cooper, 1993).

If sustainability is essential for the survival of humanity and the ecosystem, then the built environment that affects and is affected by the latter needs to become more sustainable accordingly. As Faber *et al.* argue, human behaviour determines the behaviour of artificial systems, such as regions, cities, and neighbourhoods (Faber, Peters, Maruster, Van Haren, & Jorna, 2010). The continuation of unsustainable market-orientated strategies will result in the perpetuating appearance of the same problems we discussed earlier. *Parts of cities will continue to be unused resulting in radical, resource intensive redevelopment surgeries* (Curwell & Cooper, 1998). The evidence of unsustainable trends has been identified in detail in contemporary literature and reversing those trends will require sustainability principles to be deeply embedded in policy and practice. In continuation, a number of tools for the assessment and the facilitation of sustainable development in different spatial scales will be briefly discussed, compared and contrasted.

2.3 The tools

The contradictions in theory explained above indicate that there is certainly a need for a common understanding of sustainable development and for frameworks that will clearly indicate the characteristics of a sustainable built environment. In other words, two questions seem to evolve from the aforementioned issues: First of all, what are the characteristics of the complex urban context that are to be improved or developed in order to ensure sustainability? And secondly, in what ways will we be able to assess and measure the progress?

It is commonly accepted that there are three domains we need to focus on to achieve a sustainable future; the Environmental, the Social, and the Economic. However, because of the fact that the planning system has a particularly discrete nature, it can be easily carried away in sliding of environmental and social interests in favour of economic considerations (UNSD, 2005). Addressing this challenge calls for political leadership and citizen engagement, especially in developed countries that have the knowledge and technical capacity to involve a wide range of disciplines in negotiations

and integrate all sustainability domains in decision-making (Drexhage & Murphy, 2010).

The “Triple Bottom Line” theory is directly linked to the concept of the “three pillars” for sustainability and has increasingly been used to promote the use of impact assessment as a means of directing planning and decision-making towards sustainable development (Hacking & Guthrie, 2008). The initial idea, formulated by Elkington, describes how organisations can either create or destroy value in the economic, social and environmental spheres (Elkington, 1990a). Although the theory emanated from the business world, it has been applied in various fields related to urban planning (business, community development, Mega-Event management). The theory has inspired the development of auditing and reporting frameworks for sustainability that require the measurement of community well-being, environmental impact and economic vitality (Rogers & Ryan, 2001). Those frameworks with their associated indicators give a better understanding of the field of action in decision making and provide orientation and scoping in the development process (Blum & Grant, 2006).

Accuracy of information is of utmost importance, since countries have to comply with international regulations and achieve specific targets for sustainability set by the EU. The achievement of these goals can neither be based on observations nor on emotion. What is therefore required is comprehensive frameworks and regular monitoring of the impacts of strategies and policies to allow for adjustments to be made if necessary (Streimikiene & Gintautas, 2008). Drivers and underlying pressures should be addressed systematically within frameworks that refer to the development process as a whole and aiming at long term sustainability (Munasinghe, 2010). Conceptual frameworks for sustainable development help focus and clarify what to measure, what to expect from measurement and what kind of indicators to use. A framework is therefore the background of the development process that serves as a reference to the basic concepts of sustainable development and provides the means for structured communication between the different stakeholders.

What is more, descriptive, performance, efficiency and total welfare indicators are important at the national level to develop long term approaches of monitoring future change. Not only do they monitor future change, but they also provide detailed data, widely available for the society to be accurately informed, of what challenges the environment and humanity face, and of the improvements that occur at all levels.

Some indicative tools that represent different approaches to sustainability are briefly discussed in the next section.

2.3.1 Frameworks for sustainable development

a. Definition

With the contradicting multidisciplinary literature and the complexity of the built environment field it is highly important to have a rationalised instrument that specifies the operational particulars for a sustainable development strategy.

A framework for sustainable development is a tool that clarifies sustainable development goals. Conceptualising generic targets for Sustainable development by means of a specific framework can assist in selecting the appropriate set of indicators that are most representative of the specific aspects of sustainable development enumerated in the framework (Becker, 2007).

There are numerous different types of Sustainable Development Frameworks that appear in the literature on sustainability. Some of them tend to emphasize solely on one facet of sustainability, while others are following a holistic approach, incorporating all three pillars of sustainability in all stages of the planning process, at all spatial levels, and allocating responsibilities to the various bodies involved in the development process.

b. Review of Frameworks

Within the last 20 years there have been several organisations, academics and governmental bodies that have investigated the conceptualisation of frameworks and

their implementation on real projects. These frameworks differ both in the way they address the different attributes of Sustainable Development as well as in the outcomes they attempt to achieve.

In 2001, the UN Department of Economic and Social Affairs published a key document that proposed a generic framework to assist countries in formulating policy for the implementation of Sustainable Development. The framework included 15 themes and 38 sub-themes, under the four pillars - social, environmental, economic and institutional – each designed to guide national indicator development (Figure 1). This generic framework was based on consultation with countries, agencies, and indicator experts. In comparison to the original framework proposed in 1996, the number of indicators has been reduced from 134 to 57 in order to overcome the difficulties associated with duplication, lack of relevance, and absence of tested and widely accepted methodologies (Division for Sustainable Development, 2001). In the related paper it is suggested that countries in the formulation of their national Sustainable Development strategies should use the proposed framework, however, it acknowledges that not all of the indicators associated with the framework will be of equal relevance to all countries.

SOCIAL			
Theme	Sub-theme	Indicator	
Equity	Poverty (3)	Percent of Population Living below Poverty Line Gini Index of Income Inequality Unemployment Rate	
	Gender Equality (24)	Ratio of Average Female Wage to Male Wage	
Health (6)	Nutritional Status	Nutritional Status of Children	
	Mortality	Mortality Rate Under 5 Years Old Life Expectancy at Birth	
	Sanitation	Percent of Population with Adequate Sewage Disposal Facilities	
	Drinking Water	Population with Access to Safe Drinking Water	
	Healthcare Delivery		Percent of Population with Access to Primary Health Care Facilities Immunization Against Infectious Childhood Diseases Contraceptive Prevalence Rate
		Education Level	Secondary or Primary School Completion Ratio
Education (36)	Literacy	Adult Literacy Rate	
Housing (7)	Living Conditions	Floor Area per Person	
Security	Crime (36, 24)	Number of Recorded Crimes per 100,000 Population	
Population (5)	Population Change	Population Growth Rate Population of Urban Formal and Informal Settlements	
ENVIRONMENTAL			
Theme	Sub-theme	Indicator	
Atmosphere (9)	Climate Change	Emissions of Greenhouse Gases	
	Ozone Layer Depletion	Consumption of Ozone Depleting Substances	
	Air Quality	Ambient Concentration of Air Pollutants in Urban Areas	
Land (10)	Agriculture (14)	Arable and Permanent Crop Land Area Use of Fertilizers Use of Agricultural Pesticides	
		Forests (11)	Forest Area as a Percent of Land Area Wood Harvesting Intensity
		Desertification (12)	Land Affected by Desertification
	Urbanization (7)	Area of Urban Formal and Informal Settlements	
	Oceans, Seas and Coasts (17)	Coastal Zone	Algae Concentration in Coastal Waters Percent of Total Population Living in Coastal Areas
Fresh Water (18)	Fisheries	Annual Catch by Major Species	
	Water Quantity	Annual Withdrawal of Ground and Surface Water as a Percent of Total Available Water	
Biodiversity (15)	Water Quality	BOD in Water Bodies Concentration of Faecal Coliform in Freshwater	
	Ecosystem	Area of Selected Key Ecosystems Protected Area as a % of Total Area	
	Species	Abundance of Selected Key Species	
ECONOMIC			
Theme	Sub-theme	Indicator	
Economic Structure (2)	Economic Performance	GDP per Capita Investment Share in GDP	
	Trade	Balance of Trade in Goods and Services	
	Financial Status (33)	Debt to GNP Ratio Total ODA Given or Received as a Percent of GNP	
Consumption and Production Patterns (4)	Material Consumption	Intensity of Material Use Annual Energy Consumption per Capita Share of Consumption of Renewable Energy Resources	
	Energy Use	Intensity of Energy Use	
	Waste Generation and Management (19-22)		Generation of Industrial and Municipal Solid Waste Generation of Hazardous Waste Generation of Radioactive Waste Waste Recycling and Reuse
		Transportation	Distance Traveled per Capita by Mode of Transport
INSTITUTIONAL			
Theme	Sub-theme	Indicator	
Institutional Framework (38, 39)	Strategic Implementation of SD (8)	National Sustainable Development Strategy	
	International Cooperation	Implementation of Ratified Global Agreements	
Institutional Capacity (37)	Information Access (40)	Number of Internet Subscribers per 1000 Inhabitants	
	Communication Infrastructure (40)	Main Telephone Lines per 1000 Inhabitants	
	Science and Technology (35)	Expenditure on Research and Development as a Percent of GDP	
	Disaster Preparedness and Response	Economic and Human Loss Due to Natural Disasters	

Numbers in brackets indicate relevant Agenda 21 chapters.

Figure 1 CSD Theme Indicator Framework (UNSD, 2001)

Other researchers have investigated the conceptualisation of frameworks for purposes of assessing the effectiveness of sustainable development initiatives. Hugentobler and Brandle Stroh, for instance, in a project funded by the Swiss Federal Institute of Technology (ETH) and the government of the city of Zurich, devised a framework for sustainable development which they then used to evaluate six local sustainable development initiatives in the city of Zurich (Hugentobler & Brändle-Ströh, 1997). Their framework encompassed six levels of systems; cultural, social, human, biological, chemical and physical, and addressed their qualitative and quantitative properties (Figure 2).

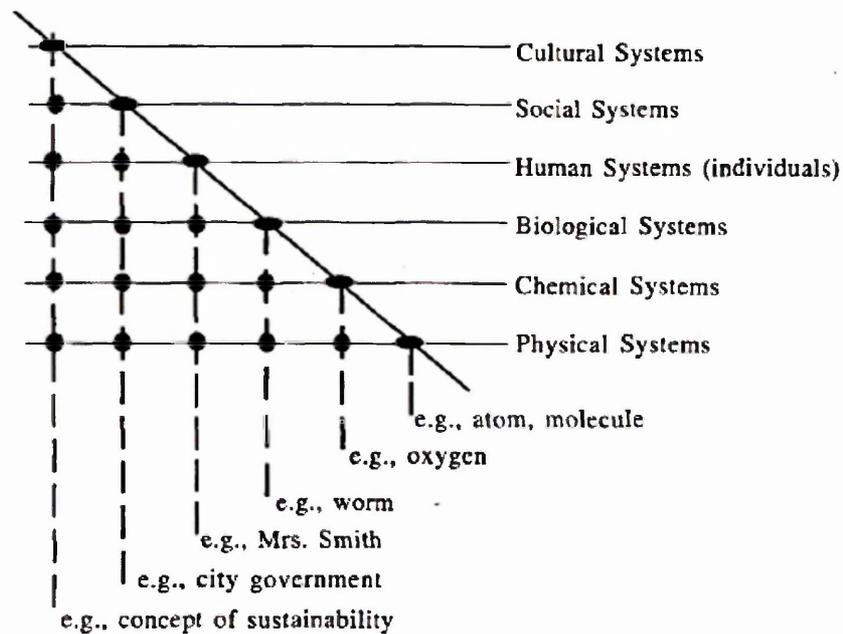


Figure 2 Hugentobler & Brändle-Ströh's six levels of Systems (Hugentobler & Brändle-Ströh, 1997)

This universal categorisation enabled the research team to conceptualise a set of questions, each for every system, to assess the effectiveness of developments. Their framework was deliberately vague because they believed that setting targets and benchmarks for a notion as ambiguous as sustainability requires constant negotiation, between a wide range of disciplines, and is therefore something that cannot be prescribed (Hugentobler & Brändle-Ströh, 1997).

The formulation of this generic set of questions was followed by the assessment of six projects in the city of Zurich. With regards to the *cultural system*, the projects were assessed on the extent to which they supported or enhanced agreed upon values and

norms. On the topic of the *social system*, the projects were evaluated in the ways in which they sustained or improved social systems and the development of social justice. The projects' contribution to the *human system* was associated with the degree to which it sustained or enhanced the satisfaction of human needs. With regards to the *biological system*, the projects were assessed according to the way they sustained and enhanced biodiversity and protection of natural habitats. Finally the projects' support of the *chemical* and *physical systems* was measured in relation to the reduction of emissions and the use of non-renewable natural resources.

In summary, the framework explained above was successful in evaluating sustainable development initiatives from a systemic perspective. However, it lacks sustainability targets and it cannot be used to measure the sustainability of a project in quantitative terms. Nevertheless, it succeeded in what was initially intending to provide: a useful tool for experts in various fields to investigate the effects of policies and interventions they promote.

Another promising approach in the formulation of a framework for Sustainable Development has been investigated by BEQUEST (Building Environmental Quality Evaluation for Sustainability over time). BEQUEST is a network of academics and practitioners that is partly supported by the European Commission and focuses on the operational issues of putting sustainable urban development into practice².

With reference to the BEQUEST approach, in the future, urban development should be based on *ecological integrity, equity, public participation and futurity* (Curwell, Deakin, & Symes, 2006). The first principle, *ecological integrity*, is a state where renewable resources are not consumed faster than the rate at which they are renewed; non-renewable resources are not consumed at a rate faster than they can be substituted by a renewable resource and; waste substances are not discharged to the environment

² "The BEQUEST framework establishes an organizational basis for the urban development activities, issues, level and scales of analysis which should be taken into account when setting out the protocols to be followed in assessing the sustainability of urban development". It is already used as a structuring device by the European Green Building Forum (EGBF 2001) and in a project known as CRISP which explores the range of construction and city related sustainability indicators (CRISP 2001).

faster than it can assimilate them without impairment of ecosystem function. The second principle, *equity*, refers to a state where vulnerable people have a satisfactory quality of life, better access to resources and development opportunities, and freedom from threat. *Public participation* helps achieve a balance between competing demands placed on space. Finally, *Futurity* is a principle that relates with the continuous, long-term, successful application of all the aforementioned and is particularly crucial nowadays, when the future of natural and human systems seems uncertain.

According to the framework, the *activities* that form the urban development process (planning, property development, design, construction and operation) are linked (influenced) with the *environmental* (consumption of natural resources, waste/emissions, bio-diversity of habitats), *economic* (financing of infrastructure, transportation systems and utilities or employment of resources in the urban development process), *social* (equity, access, safety, security of cities/health and well-being of citizens) and *institutional* structures (governance/public participation, justice, ethics) that characterize the sustainable urban development.

The *futurity* of the city depends on whether or not the decisions, taken by the parties involved in the urban development process, enhance sustainability.

The impact of the urban development can be on several different *spatial levels* (city, district, neighbourhood, estate, building, component, material) and its *duration* varies (short, medium, long-term). Figure 3 below, illustrates the BEQUEST framework.

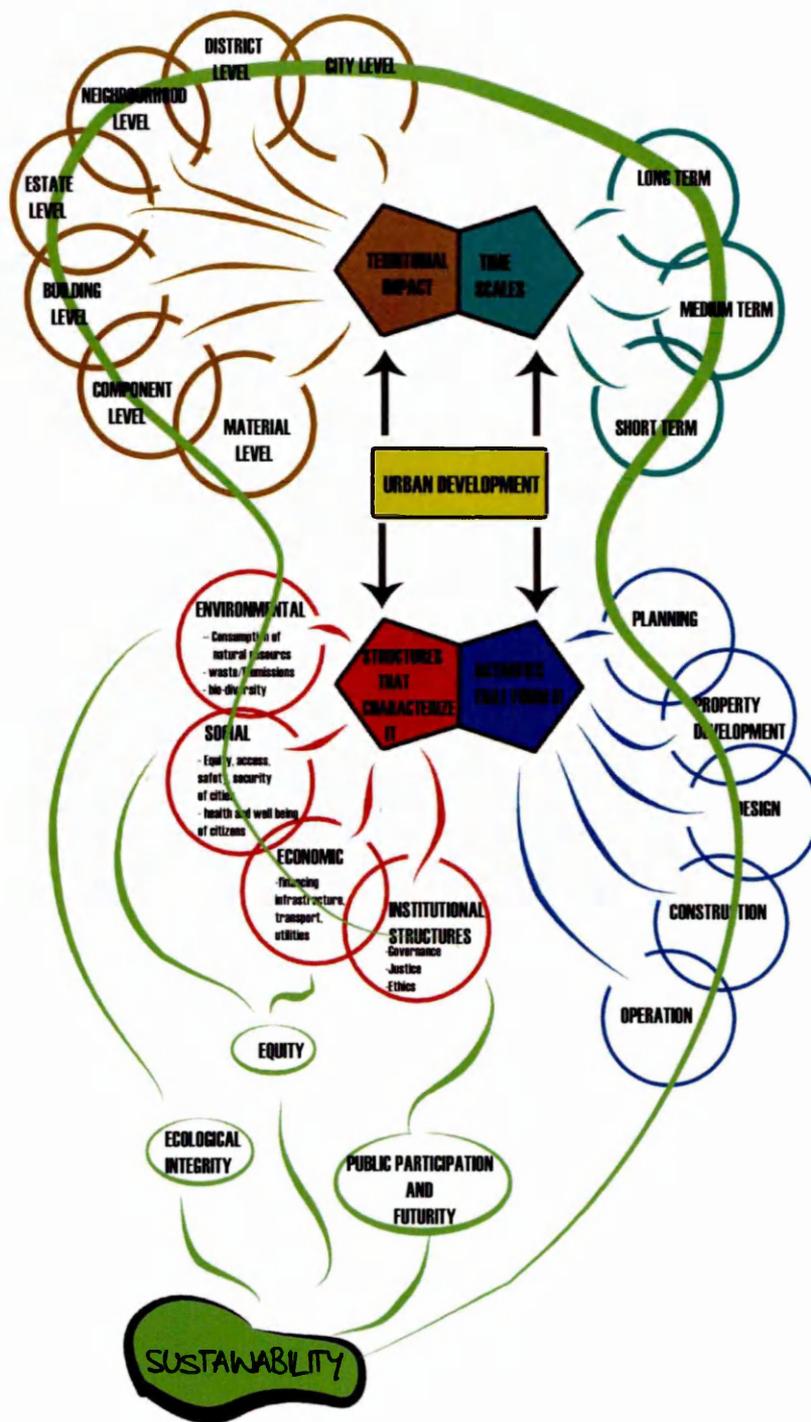


Figure 3: The BEQUEST Framework (Illustration created by the author)

The BEQUEST framework represents a holistic approach to sustainability and provides a decision support toolkit for the promotion or assessment of sustainable development (Deakin, Curwell, & Lombardi, 2001). Nevertheless its complexity could be a barrier in its widespread use. For experts who have the background knowledge of

the urban life-cycle and are aware of the terminology related to sustainability the BEQUEST framework might be invaluable. However the use of such a complicated tool in decision-making could hinder meaningful public participation, running the risk of transforming decision-making into an elitist process, where only the privileged expert class will have the knowledge capacity to be involved (Elgert & Krueger, 2012).

2.3.2 Indicators for sustainable development

a. Definition

The importance of indicators for sustainable development³ was officially recognised in Chapter 40 of Agenda 21, where it was also suggested that they should be developed at multiple spatial levels of the planning process (UNCED, 1992).

Sustainability indicators are very important tools, because complicated ecological, social, cultural and economic phenomena need to be considered in decision making of all levels (Rio Summit, 1992). According to the Organisation of Economic Cooperation and Development (OECD) *indicators are values that give information about the situation of a system, and simplify the communications of its components* (Kemmler & Spreng, 2007).

Assessing the ecological, environmental, societal and cultural facets of urban communities contributes in improving the quality of people's lives. These different facets of the built environment are nowadays affected by contemporary challenges linked to the depletion of natural resources, the deterioration of air quality, waste treatment, economic problems, unemployment, deterioration of infrastructure, environmental loads of construction, socio-cultural aspects, etc. Indicators can address those challenges and it is therefore of crucial importance that they become embedded into the policy mechanisms.

³ *"Indicators are simple figures or other signs, with the help of which the information on a complicated phenomenon like environmental pressure is simplified in a more easily understandable format."*(CRISP, 2001)

Sustainability Indicators enable monitoring, assessment and comparison of progress (Harger & Meyer, 1996) and can be grouped into two different categories. Firstly, there are those that are *locally unique* and are devised to serve local purposes, and secondly, there are *the standardised indicators that are imperative to evidence-based, global system of governance* (Elgert & Krueger, 2012).

At the global scale, different Standardised Indices of indicators aiming at increasing awareness of global environmental problems often produce contradictory results. In a research conducted by Wilson, Tyedmers, & Pelot, the sustainability of different countries was assessed using different measures such as the ecological footprint, the wellbeing index and the environmental sustainability index. The comparison of the results showed that each country's score depended to a large extent on the system of measurement. It is therefore clear different theoretical understandings of sustainability can lead to alternative ideal indicators and metrics (Wilson, Tyedmers, & Pelot, 2007).

Despite the lack of consensus regarding the best approach, the use of Sustainability Indicators is considered to be very important for the identification of progress in environmental activities in both developing and developed countries (Harger & Meyer, 1996).

There are numerous models of indicators that deal with various domains of sustainable development. Further on, a number of such coordinated initiatives are explored and described.

b. Existing sets of indicators

b.1 The ecological footprint

One of the most revolutionary and attractive methods with which to measure sustainability of particular places is the ecological footprint analysis. Developed by Professor William Rees (1962), this method is based on a very simple idea: The calculation of the land area that would be required to cover the resource needs and offset the pollution of individuals, entire cities, regions or nations (Wackernagel & Rees, 1962, p. 11). In the case of an individual for example, a list of various consumption categories is checked with reference to the corresponding land-use categories. In other words it assesses the biologically productive land and marine area required to produce the resources a population consumes and to absorb the corresponding waste, using prevailing technology.

In order to calculate the ecological footprint of an individual for example, the consumption categories would include food, housing, transportation, consumer goods and services. On the other hand, the corresponding land-use categories would include following: the fossil energy consumed, the degradation of the environment, gardens that were used for the production of food, cropland, pastures for dairy, meat and wool production and forest area. The consumption-land use matrix that we just described, gives a clear picture of the human's dependence on nature. The numbers that are put on the matrix represent hectares and reveal the quantity of land that is required to support any specified lifestyle indefinitely.

A number of websites allow estimation of an individual's, a business', a nation's or the whole world's ecological footprint (e.g. www.footprintstandards.org). The calculation of the ecological footprint can assist in educating people about issues such as carrying capacity and over-consumption.

Although useful as an educational tool, Ecological Footprint Analysis has certain disadvantages. Quoting Wheeler and Beatley, *"Researcher's efforts to calculate extremely detailed footprints for some cities and nations, run into the problems that most ecological economies encounter, such as how to place a value on social and*

environmental costs in terms of either dollars or land area". (Wheeler and Beatley, 2004). In addition, there is a lack of ecology in the ecological footprinting procedure. The concept of energy in the theory formulated implies that in a sustainable world energy would be obtained from fossil fuels but the latter would be burned - in any given country - in such quantities as to permit the resulting carbon dioxide emissions to be absorbed by vegetation within the country (Ayres, 2000). This would be a false assumption, firstly because there are other ways to absorb carbon dioxide (e.g. carbon dioxide liquefaction) and secondly because there are other ways to generate energy that does not produce carbon dioxide (wind, tide, solar plants, nuclear energy). Furthermore, the theory focuses on carbon dioxide only while neglecting other greenhouse gases such as methane, sulphur and nitrogen emissions. The latter has actually important ecological consequences, including the possibility of eutrophication (Howarth & Marino, 2006). Other academics criticize the theory for not capturing other important issues of sustainability such as land degradation (Van Kooten, Cornelis, & Erwin, 2000). The ecological footprint actually addresses the topic but, it does so, in the opposite direction we would like as it assumes that a country will look positive when it has a very high rate of land degradation, consuming land faster and in more harmful ways than countries that are more careful with the land (Fiala, 2008).

Despite the aforementioned flaws in theory and application, the concept of Ecological Footprint is a useful one which has become increasingly popular in environmental policy and environmental planning work. This type of analysis, though, cannot on itself provide ready policy solutions and it runs the risk of leading to poor policy pointers if poorly interpreted (Mc Manus & Haughton, 2006).

b.2 The HQE²R (Sustainable Renovation of Buildings for Sustainable Neighbourhoods) project

HQE²R, a project which was partly funded by the European Union, was the product of co-operation between 14 neighbourhoods and 10 research institutes in 7 European countries. The aim of the project was the promotion of sustainable development through four phases. It was based on a set of sustainable development targets, a set of

indicators, and 3 assessment tools. The project used the 14 neighbourhoods as test case studies for the methodology and tools.

The summary presented below indicates the dominant objectives along with the related sub categories.

TO PRESERVE AND ENHANCE HERITAGE AND CONSERVE RESOURCES

- 1 - To reduce energy consumption and improve energy management
- 2 - To improve water resource management and quality
- 3 - To avoid land consumption and improve land management
- 4 - To reduce the consumption of materials and improve their management
- 5 - To preserve and enhance the built and natural heritage

TO IMPROVE THE QUALITY OF THE LOCAL ENVIRONMENT

- 6 - To preserve and enhance the landscape and visual quality
- 7 - To improve housing quality
- 8 - To improve cleanliness, hygiene and health
- 9 - To improve safety and risk management
- 10 - To improve air quality
- 11 - To reduce noise pollution
- 12 - To minimise waste

TO ENSURE DIVERSITY

- 13 - To ensure the diversity of the population
- 14 - To ensure the diversity of functions
- 15 - To ensure the diversity of housing supply

TO IMPROVE INTEGRATION

- 16 - To increase the levels of education and job qualification
- 17 - To improve access for all residents to all the services and facilities of the city by means of easy and non-expensive transportation mode
- 18 - To improve the integration of the neighbourhood in the city by creating living and meeting places for all the inhabitants of the city
- 19 - To avoid unwanted mobility and to improve the environmentally sound mobility Infrastructure

TO REINFORCE SOCIAL LIFE

20 - To reinforce local governance

21 - To improve social networks and social capital

For each of the 21 targets, specific indicators have been introduced in order to add practicable value to the project.

According to HQE²R, the assessment of the initial state of a place with regard to targets and objectives of sustainable development is of particular importance before any action plan is to be introduced. Three assessment models have therefore been proposed: The INDI (INDicators Impact) model, the ENVI (ENVironmental Indicators) model and the ASCOT (Assessment of Sustainable Construction and Technology cost) model. The combination of these is said not only to achieve the sustainability assessment of a particular place but also to give an overview of the global cost of the technologies adapted to buildings. Moreover, different scenarios can be evaluated in terms of their contribution to sustainability of a neighbourhood.

In summary, HQE²R provides a very comprehensive checklist of indicators for the effective assessment of the sustainability of a place. Although it allows for some degree of flexibility as to what local needs and priorities might be, it is supported by a set of pre-defined (indisputable) core indicators (Martin & Blum, 2002). That entails some degree of subjectivity as to which kind of indicators to use, and could hinder the toolkit's universal application. However, it is very effective as a "Tool to Talk" about a concept as young as sustainable development (Blum & Grant, 2006).

b.3 Environmental Performance Index (EPI)

The Environmental Performance Index (EPI) is another tool, developed by the Yale centre for environmental policy and law and the Columbia University and "*it provides a valuable summary measure of environmental performance and a counterpart to yardsticks of human development and economic wellbeing*".

Through the 21 indicators of environmental sustainability that are introduced a comparison across a range of issues becomes possible. Five broad categories of issues were used to describe the essence of environmental sustainability:

- *Environmental Systems.* The maintenance of a country's vital environmental systems at healthy levels and the improvement of them should be a basic priority.
- *Reducing Environmental Stresses.* Stresses on the environment caused by human activities should be controlled, so that environmental systems are not endangered.
- *Reducing Human Vulnerability to Environmental Stresses.* Human wellbeing should not be affected by environmental disturbances.
- *Societal and Institutional Capacity to Respond to Environmental Challenges.* Institutions and underlying social patterns of skills, attitudes, and networks should be used by the countries to respond more effectively to environmental challenges.
- *Global Stewardship.* Cooperation with other countries is of utmost importance since environmental problems are common in many different places all over the world.

To make the 25 indicators comparable, each metric was converted to a measure with a range of 0 to 100. The score that each country achieves indicates its ability to maintain favourable environmental conditions into the future. EPI, therefore, provides assistance in environmental analysis and decision-making at the national policy level although in a more substantial base than other methods, since it is based on a quantitative approach. Policy progress can be evaluated and each country may compare its results to the ones the other countries have achieved ("*relative rankings*").

The 2008 EPI has been a very credible source for data but the method still faces constraints because of the difficulty of acquiring qualitative and quantitative data for many of the countries throughout the world. As a result, of a possible 238 countries, only 149 of them were included in the 2008 EPI. The top five countries in the 2008 EPI, were Switzerland, Sweden, Norway, Finland, and Costa Rica.

Although EPI has gained widespread acceptance, it needs to be combined with equivalent economic and social sustainability indices so that a complete system of measuring of sustainability can be created.

b.4 The European Common Indicators

The Commission on Sustainable Development (CSD) was created in December 1992 to monitor and report on implementation of the Earth Summit agreements at the local, national, regional and international levels. The CSD is a functional commission of the UN Economic and Social Council (ECOSOC), with 53 members.

CSD has worked out a list of Indicators for Sustainable Development. Countries from all over the world may choose from this list according to national priorities, problems and targets (General Directorate for the Environment, 2000). The framework which is the background of these is based on three fundamental issues: The *Driving Force*, the *State* and the *Response*.

- *Driving Force* indicators indicate human activities, processes and patterns that impact on sustainable development.
- *State* indicators indicate the "state" of sustainable development and
- *Response* indicators indicate policy options and other responses to changes in the "state" of sustainable development (UNSD, 2005).

The European Common Indicators provide a good basis for comparisons between countries or cities. They do however belong to the group of top-down interventions to apply priori plans and could possibly have counterproductive effects (Innes & Booher, 2000). More specifically, response as one of the core activities of the framework only refers to policy interventions as per the changes in the state of development identified. Before that stage, there seems to be no citizen participation, and no feedback from stakeholders whatsoever. Public discussion is only possible at the last stage, where policy is formulated. A set of principles and metrics are therefore fed into a system without taking into account the system's unique qualities, cultures and problems; a fact that makes their long term use problematic (Innes & Booher, 2000).

Although limited in the way it holistically engages all actors of the development process in decision-making, the European Common Indicators Index is still a helpful tool for providing a comprehensive overview of the sustainable development process and could be a very good starting point for discussion.

2.3.3 Strengths and weaknesses of existing frameworks and systems of indicators

The literature review so far has shown that the definitional ambiguity of sustainability as a policy term has resulted in different interpretations of what targets, criteria, and indicators should be used to promote and assess sustainable development. It is often the case though that certain aspects of sustainable development are prioritised at the expense of others making the achievement of the appropriate balance a demanding task over the years. More specifically, indicators of economic and ecological subsystem are theoretically the most important ones, at least at the national level (Golusin & Ivanovic, 2009). Wuelser, Pohl, & Hadorn suggest that the cause for that tendency is the complexity of the built environment as a transdisciplinary area of interest. The contribution of various different disciplines to the research of sustainable development often runs the risk of inadequately simplifying sustainability problems (Wuelser, Pohl, & Hadorn, 2012). However, they also explain the positive aspect of that. They argue that *“although research normally focuses on one type of knowledge, it automatically builds on knowledge or assumptions belonging to the other types”*.

What is, therefore, crucial is to relate and adapt different forms of knowledge to each other. Wuelser *et al*, propose a framework that shows the interlinkages between the different research approaches and can equitably indicate the way in which research outcomes in one discipline can have an effect in another (Wuelser, Pohl, & Hadorn, 2012). The proposed model promises to ensure that no attribute of sustainability is accentuated in comparison to others.

A promising way to integrate the different domains of sustainable development can also be based on a system-orientated-analysis that focuses on the interactions and

feedback mechanisms between the different subsystems (Malkina - Pykh, 2002). Through the systems approach causal relationships are identified and the changes in the structure and dynamics of the systems are understood and identified.

Drexhage and Murphy highlight two particular limitations of tools that promote sustainability which mainly stem from terminology inconsistencies. Firstly, in research and practice of the last 20 years, sustainability has been compartmentalised as an environmental issue, despite the fact that, according to the Brundtland definition, it is multidimensional in principle. Secondly, it is the context of development that is often perceived as equivalent to economic growth (Drexhage & Murphy, 2010). This latter limitation that refers to the unorthodox merging of sustainability and development has also been examined by other researchers (Kay, 1991).

Frameworks and indicators can be powerful tools for stakeholders and policy-makers since they reduce the degree of subjectivity and they simplify the complex domain of sustainable development (Singh, Murty, Gupta, & Dikshit, 2012). According to Robert, one of the most important benefits of using a framework as a tool for development is the fact that it is very generic, and as such, it can be used for giving a comprehensive overview of planning, as well as showing how sustainability can be embedded in the process (Robert, 2000). Not only do frameworks simplify a very complex procedure but they can also do so for any activity, at any scale.

Furthermore, when specific targets have to be met and when progress has to be effectively measured, a framework can be used as a tool for the selection of relevant quantitative variables to monitor progress (Becker, 2007). The alignment of metrics (indicators) with the general aims (framework) is very important to check whether the targets are met (Robert, 2000). When a framework is flexible enough to adapt to the evolving nature of sustainability it allows for easy adjustments regarding the set of indicators that accompany it.

While frameworks provide a background for the better understanding of Sustainable Development, indicators represent a factual contribution to decision-making and

urban development. They are effective in assessing and evaluating performance, they provide information on improvement or declining trend, and can be a rich source of information to decision-makers. They are powerful tools for the formulation of strategies, and for the communication of achievements to the various stakeholders (Singh, Murty, Gupta, & Dikshit, 2012).

An issue of concern is the subjective way in which framework and indicator formulation is conducted (Singh, Murty, Gupta, & Dikshit, 2012). Again, because of the complexities of the field, tools of that sort are often dictated by perception, favouring certain attributes and often degrading the importance of others. Therefore the optimum improvement path can sometimes completely omit important elements (Deakin, Curwell, & Lombardi, 2001).

Another critical issue with frameworks for sustainable development is oversimplification. More specifically, although they encompass different attributes of sustainable development they paradoxically usually use a simplified cause and effect trajectory. However, the built environment is a complex system, and therefore its components cannot be assessed by the use of that kind of trajectory.

Generalisation is another weakness, especially with regards to policy frameworks that are outcomes of international agreements entailing a top-down approach. They often fail to consider national visions as an input to their policy-making procedures, a fact that makes their application in different localities problematic (Meyar-Naimi & Vaez-Zadeh, 2012).

The emphasis on the dissemination of sustainability values, and the obstinate effort for the enhancement of their integration into policy, inexplicably contradicts the optional nature of the instructions. It is common for frameworks not to form regulatory requirements, and therefore their application and the standards that accompany them are very variable across different nations (Curwell & Cooper, 1998). Although these diverse methodologies bear certain similarities in the sense that they include some

basic core of criteria, the differences between them are so vast, that broad international acceptance of a universal checklist of criteria would be very difficult.

An excellent example of how, despite terminological ambiguities, sustainable neighbourhood development has formed part of the planning legislation is the UK Localism act (2011) that encouraged a bottom-up approach in decision making for neighbourhood development plans. The plan derived from The Neighbourhood Renewal National Strategy Report (2001) that posed the focus on the neighbourhood scale. The document states that, although there is no exact definition of a neighbourhood, it can be defined by natural dividing lines such as roads and rivers, changes in housing design or tenure, or the sense of community generated around centres such as schools, shops or transport links. The document also states that statistics from electoral wards are often used (DETR, 2001).

Since defining a neighbourhood can be a challenging task, there is no single definition provided in that document. Instead, flexibility is introduced by allowing the locality itself to define the boundaries of a neighbourhood when a development proposal is submitted. The locality as a legal body is represented by a parish or a town council or, by whichever local organisation the community decides should take the lead on coordinating the local debate, if a town council does not exist. The borough or district council, in turn, is then meant to recognise the area as a neighbourhood and approve or reject the development proposal. This Application for Designation of a Neighbourhood Area required has to include the following (Department for Communities and Local Government, 2012):

- a) map which identifies the area to which the area application relates;
- b) a statement explaining why this area is considered appropriate to be designated as a neighbourhood area; and
- c) a statement that the organisation or body making the area application is a relevant body for the purposes of section 61G of the 1990 Act.

All proposals have to be in line with the Local Council's framework for development and will need to demonstrate their sustainability.

Some of those differences were seen in the indicative examples of tools discussed in the previous sections. Certain tools consist of a very large range of complicated indicators, making their use in reality difficult within the constraints of the limited expert population. On the other hand, more simplified models run the risk of omitting important aspects of sustainability. It is easy to say that the ideal scenario would probably incorporate the best qualities of different tools, but it is a matter of doubt whether different efforts of measuring sustainability could serve supplementary to each other. *Sustainability is more than an aggregation of important issues; it is also about their interlinkages and dynamics inherent in a system* (Singh, Murty, Gupta, & Dikshit, 2012).

Even comparing data produced by sustainability indicators used in different countries is a particularly demanding task, since different sets of indicators use different ways of measuring variables and are often based on different frameworks (UN-DSD, 2005). Even when the same indicator or other sustainability assessment tool is used in different countries, technical issues hinder comparisons. For instance, data availability and quantity are still difficult to tackle, mainly because most countries do not have efficient monitoring mechanisms.

Lack of resources, manpower and expertise is also a weakness in some countries, meaning that they are unable to screen development proposals against sustainability measures set out in the plans (UNDSD, 2005).

For the aforementioned reasons, the implementation of Sustainable Development frameworks and indicators is still, even after 20 years of progress in the stage of experimentation in pilot projects throughout the world. The conceptualisation of a universally comprehensible, and easy to communicate tool is still far from being realised.

An inconsistency, also evident in the analysis of the features of the majority of the models investigated in the previous section is the absence of specific time scales. With the exception of the BEQUEST framework, most of the aforementioned models which have been developed by credible international and other institutions and organisations seem to lack time-scale targets. However, underestimating the issue of time is utterly inconsistent with the term sustainability, which clearly implies strong linkage with the future. As Meyar-Naimi & Vaez-Zadeh argue, system states are subject to temporal trends, so policies should be developed in different time scales; for instance short, medium and long (Meyar-Naimi & Vaez-Zadeh, 2012).

Not only is the association with time is very important, but the use of common sense alongside tools for the assessment of sustainability is of particular relevance. It is often the case that indicators are overestimated or misinterpreted, reducing in that way the value and significance of common sense. As Innes and Booher have successfully put it, *“an indicator may show improvement in community health but this improvement may have nothing to do with the new hospital... They are indicators, not answers”* (Innes & Booher, 2000). Indicators are tools that allow decision-makers to interpret projections, but the complex correlations that play a role in the phenomena to which the projections are related, have to be considered. This is why a model framework has to be associated with any index of indicators; because frameworks address cross linkages between various causes and various effects (Malkina - Pykh, 2002).

To summarise, what is clearly needed is a framework that will manage to do better than remaining in an experimental stage and gain international acceptance. However, progress can only be made if coordinated action of agencies and institutions is accomplished from the global to the sub-national level. Improving society's education over sustainability issues and advancing the skills of the professionals involved in the development of the urban environment should be a priority of all countries to ensure that every decision, policy or action is a product of communication and consensus between everyone involved in the development process. Based on the technological advances of our times, international information networks should be established, keeping constantly abreast of developments in sustainability issues and providing

accurate information to all parties concerned. Further research on the field and coordinated activities is, therefore, essential.

2.4 The basic principles for sustainable development as identified in the review of the relevant literature.

In this section the three different dimensions of sustainable development will be explored, in relation to characteristics of the urban form. We will furthermore focus on the neighbourhood scale that is in line with the aims and objectives of this research project.

a. Social sustainability

Although the literature specifically devoted to social sustainability is limited (Murphy, 2012), there is a wealth of research concerned with the overlapping concepts of social capital, social cohesion, social inclusion and social exclusion (Dempsey, Bramley, Power, & Brown, 2011). Social aspects of sustainability, however, deserve particular attention because of their instrumental and intrinsic relevance (Bijl, 2011).

The survival of humanity and the eco-system with which it interconnects is the primary aim of Sustainable development. Unless the basic needs of society are met, the minimum basic requirement of sustainability does not exist. It is, therefore, imperative that the supply of food, water, health care, shelter and minimum education meets the needs of the population. (Hediger, 2000)

In the context of the community, the social objectives for sustainable development are diversity, integration and stability (Brindley, 2003). More specifically, there is a need for diverse communities in terms of social and age groups, ethnicities, and social classes to avoid social segregation and all its negative effects we discussed in the previous sections. Of equal importance, however, is the integration of those different groups. Specific interventions in the physical layout of a neighbourhood that promote compactness, such as higher densities and mixed uses, have been proven to positively influence social integration. Through this practice, a wider range of of

community services can be supported and social interaction is encouraged in lively neighbourhood streets.

Dempsey, Bramley, Power, & Brown have thoroughly investigated the relationship between the urban form and the concept of social sustainability. In their research, they have identified four dimensions of social sustainability:

- *Social Participation*
- *Participation in collective groups and networks in the community*
- *Community stability*
- *Safety and security*

Underlying the first dimension are the social networks in the community. Although social networks nowadays are not confined within the neighbourhood boundaries, but tend to be more expanded and overlapping, the neighbourhood is still an important arena for social relationships. In high density, mixed use streets with overlooking residences, increased social interaction between the members of the community takes place, allowing local social networks to form and evolve. This kind of frequent interaction can play an important role in the emergence of a wide range of opportunities for local activities that in turn increase social cohesion (Dempsey, Bramley, Power, & Brown, 2011).

The second dimension of social sustainability entails participation in collective groups and networks. A mixed community of people of different ages, incomes and nationalities enhances the potential for the formation of a wide variety of groups and, therefore, increases the opportunities for participation to a wide range of activities and increases the potential for democratic decision-making. This latter democratic principle is deeply embedded in the theory of social sustainability and it becomes truly meaningful at the local level. It is the community's knowledge of local problems at that level that is imperative for the conceptualization of more effective solutions (Leuenberger & Wakin, 2007). What is more, when the knowledge and experience held by the community is combined with professional knowledge in a collaborative process the perfect balance is brought to decision-making (Leuenberger & Wakin, 2007). Davidson, emphasizes on the equation of social sustainability and community

participation in decisions and raises the question “What do we want to sustain?” in the heart of policy conception (Davidson, 2009). That question is of imperative value for sustainable development since it implies a bottom-up approach. Besides, when decision-making follows a top-down trajectory and strategies for sustainable development are imposed by outsiders, it is hard to convince people to carry them through (Pawlowski, 2008). Furthermore, if citizens are not prepared to live sustainably, the necessary social and economic changes cannot occur (Macnaghten & Jacobs, 1997).

The third dimension, as identified by Dempsey *et al.* (2009), is neighbourhood stability. In literature, that concept is frequently linked to the presence of long-term residents who enhance the feeling of attachment to the neighbourhood, and encourage the formation of stable community groups. However, it is not a definite criterion, since stability also depends on individuals’ personal decisions and lifestyle choices to settle in a certain locality, to participate in its local life or to remain inactive. With regards to the physical characteristics of the neighbourhood, when the necessary social infrastructure is in place, and when the quality of the building stock and public spaces is satisfactory, the likelihood for resident mobility decreases. The quality of the built environment (housing stock, public spaces) and the accessibility to key services and facilities are therefore of paramount significance for stability.

Finally, according to Dempsey *et al.* (2009), a prerequisite for social sustainability is the feeling of safety. Crime, unsocial behaviour and disorder can prevent people from participating in outdoor activities. They are also factors that affect the healthy formation of networks and groups; a fact that in turn negatively affects social cohesion.

In addition to the attributes of social sustainability discussed by Dempsey *et al.* (2009) there are a number of points that do not fall into the above categories but have been thoroughly investigated in literature. For instance there is a number of works devoted to the local identity, as a factor that has a positive contribution to social sustainability. Often referred to as local pride or sense of place, the individual’s emotional attachment to the locality is related to the sharing of the local values and norms with

the rest of the community. This feeling of belonging is also connected to physical features of the locality such as buildings, public spaces or landscape features, the aesthetics or symbolic meaning of which contribute to the unique identity of a place. For instance, landmark buildings that have a symbolic character or are associated with the history of the place enhance its uniqueness and distinguish it from other places. Along the same lines, respecting the local vernacular or even replicating traditional styles and ways of construction preserves the local individuality and positively contributes to the community's sense of belonging.

Behavioural resilience with regards to sustainability is also an issue numerous researchers have engaged with. The concept of sustainability does not imply a static situation, but on the contrary, it is an ongoing process. In this process community has a very important role to play and it is, therefore, essential for it to be equipped with the tools and the ability to change according to uncertain and unpredictable circumstances. According to Magis, community resilience is an indicator of social sustainability and the dimensions that define it are community resources, the development of community resources, engagement of community resources, active agents, collective action, strategic action, equity and impact (Magis, 2010).

It is worth noting Vallance, Perkins, & Dixon's investigation of the behavioural changes required to achieve sustainability and the conflicts these entail with the other attributes of sustainability. They argue that people's needs and wishes might not always coincide with what is considered to be sustainable for the environment or for the economy. They distinguish between low-order decision-making that relates to practical consciousness and high order decision making that relates to more drastic behavioural changes. For instance, *it is very easy for people to get trained to not leave the water running while brushing their teeth, however, when it comes to higher-order decision-making* it is more difficult to persuade people to spatially limit their shopping activities (Vallance, Perkins, & Dixon, 2011).

In conclusion, the literature review conducted identified the following domains that are of high priority for social sustainability:

- Meeting the basic human needs

- Community resilience
- Local Identity
- Safety and Security
- Collective groups and networks
- Accessibility and Stability
- Social Diversity and integration
- Social Participation

This compilation of the different attributes that are important to ensure sustainability will be used as a basic framework for the selection of the case studies for this research project. The success of the sustainable development initiatives will be measured according to the extent the projects have met the criteria identified in the literature review. In continuation, a more thorough analysis of the shortlisted projects will be conducted to identify further criteria that constitute success.

b. Environmental sustainability

As we have discussed in previous chapters the global concern over environmental degradation and the rapid depletion of non-renewable energy resources pose great threats for mankind and hinder the prospects of further development. The evidence orientated projections for adverse impacts include pollution of water and other natural resources, higher temperatures, intense floods, sever draughts, sea level rise, and glacier retreat, extinction of flora and fauna species, and spread of climate-sensitive diseases (Katyal, 2009; Meyer & Helfman, 1993).

All human interventions in nature induce minor or major changes to ecosystems (Aarts & Nienhuis, 1999), however, the controversial schema that combines market orientated development and environmental sustainability has grown into a political norm nowadays. The Environmental sustainability argument, as a way to address the daunting future environmental challenges, has become embedded in official policy of all spatial levels to an extent dependent upon the political, economic and social conditions prevalent in different nations (Macnaghten & Jacobs, 1997). Environmental sustainability has numerous different aspects that constitute separate disciplines

within the environmental sustainability domain. A brief literature review of the several components of environmental sustainability has been conducted in the pages that follow.

b.1 Planning

The spatial planning system is the key mechanism influencing urban form and it promotes sustainability by seeking a balance of houses, jobs, and facilities (Herala, 2003). First of all, sustainable planning is promoting compact, mixed urban forms that use the land in an efficient manner, so that further urban sprawl in Greenfield locations is prevented (Herala, 2003). Secondly, higher density developments offer opportunities for the reduction in movement since they provide the population necessary to support local services, cultural facilities, and workspaces. Thirdly, a compact urban pattern utilises the space so that a bigger proportion of land is left undeveloped, preserving the continuity of rural areas and the biodiversity of natural landscapes. Finally, from an energy perspective, dense developments of row houses tend to have lower needs for space heating per square metre than detached family houses (Naess, 2001).

In addition to organising land-use patterns for sustainability, planning can also be a mechanism through which material, waste and water cycles are efficiently managed. Through local land-use planning, cycles of substances can be closed with schemes that promote the recycling of materials, production of local food and water and water utilisation (Naess, 2001).

b.2 Energy

Numerous researchers have demonstrated that one of the critical issues that needs to be addressed with regards to environmental sustainability is energy. The emphasis on energy sustainability lies within its strong connection with human development. History has shown that increasing population and urbanisation is analogous to increasing demands for energy, and gradual depletion of non-renewable resources (Rosen, 2009).

Energy demand is nowadays primarily covered by the exploitation of non-renewable sources (fossil fuels (oil, coal, natural gas) and nuclear fuels), which not only are finite,

but their utilization is often related to increased environmental impact associated with air pollution, ozone depletion and harmful emissions (Muller-Steinhagen & Nitsch, 2005). For these reasons, there is a need for an energy approach that utilises renewable sources and produces energy in a manner that prevents any negative impact on the environment (Omer, 2008).

Renewable energy sources include solar radiation, hydraulic energy, wave energy, wind energy, ocean thermal energy, biomass, geo-thermal energy (ambient and hot) and tidal energy. Alongside the use of renewable sources of energy, the use of sustainable energy carriers is equally important for energy sustainability (Rosen, 2009). Energy Carriers are the energy forms we use and can be material,(fossil fuels, oil products, coal products, hydrogen) or non-material(work, electrical energy, thermal energy) (Rosen, 2009). Over the last decade, hydrogen as an energy carrier has become a suitable medium-to-long term storage solution since it facilitates the use of non-fossil fuels by enabling them to be converted into hydrogen and electricity (Briguglio, *et al.*, 2010) (Koroneos, Dompros, Roumbas, & Moussiopoulos, 2005).

Energy efficiency for reduced exergy losses is also a key consideration and depends upon the availability of efficient technologies and appropriate financing mechanisms, managerial issues, pricing policies for electricity and availability of appropriate information (Dincer & Rosen, 1999). For instance, technologies such as heat pumps, and cogeneration can be particularly efficient, but if the financing mechanisms for their widespread use are not in place, conventional technologies will be preferred. If, however, sufficient technological development and market penetration can be realised, a reliable energy supply both at moderate costs and enough to cover the human needs for the foreseeable future can be guaranteed (Muller-Steinhagen & Nitsch, 2005).

Finally, state intervention to encourage sustainable consumer's choices, in the form of incentives, subsidies, and information⁴, is considered to be a key factor (Dincer & Rosen, 1999).

⁴ *Scientists and educators must use their connections and networks to actively promote knowledge about eco-centric/sustainable community development at all levels and become fully involved in decision-making processes to*

b.4 Biodiversity and nature services

Along with the concerns about energy use and its implications on the stability of ecosystems, discussions about the importance of biodiversity have prevailed in the theoretical discourse about sustainable development.

The ecosystem has material and non-material benefits for humans. On the one hand, it provides food, fresh water and other resources, it regulates the climate and protects against floods and diseases, and on the other hand, it has aesthetic, educational or recreational value (Bol'shakov, Lushchekina, & Neronov, 2009).

For instance, marshes retain large quantities of water and, therefore, decrease the risk of floods while soil systems can detoxify chemicals. Some of those services can indeed be substituted artificially⁵, however, these substitutes represent an enormous tax burden and increased stress on the natural ecosystem that remains (Oriens, 1990). It is, therefore, essential that ecosystem stability, the basic function of an ecosystem to recover to an equilibrium state after disturbance, is retained (Hamilton, 2005).

However, ecosystem stability cannot be retained unless biodiversity is protected. Although it has been proven that ecosystems can still function, even with a limited number of keystone species, a high level of biodiversity is still of paramount importance since the higher the number of species available in an ecosystem, the more resilient the ecosystem can be in withstanding human and natural disturbances (Aarts & Nienhuis, 1999).

There are also considerable psychological benefits from preserving biodiversity and natural habitats. In fact, a substantial body of evidence shows that the need to interact with other species is positively associated with human wellbeing (Fuller, Irvine, Devine-Wright, Warren, & Gaston, 2007). Knowledge that rare species and landscapes exist is also an important factor that enhances aesthetic values.

ensure that factual environmental information is available to the wider community, and that therefore communities can engage with these issues on an informed basis (Gorobets, 2006).

⁵ For example, the instalment of flood control works, water purification plants, etc.

Over the years, the discussion about the sustainability of ecosystems has shifted from holistic ecosystem-orientated approaches to small-scale problems at the level of isolated ecological processes, functional species groups or individual species (Gooley, 1993). Confronting the challenge of Environmental Sustainability requires local ecological knowledge (Meyer & Helfman, 1993). Local ecological knowledge is of imperative importance for the confrontation of environmental challenges since the designing of sustainable systems and strategies cannot be effective if not adapted to local conditions. *The international community must recognize and acknowledge that biodiversity conservation achievements are ultimately context-specific and local* (Ishwaran, 2010). It is important that the necessary quantity and quality of the environmental resources that the community depends on is maintained (Moldan, Janouskova, & Hak, 2012).

Meyer & Helfman suggest that the assessment and management of the environmental complications should initiate from the selection of the Valued Ecosystem Components for every location and they further propose three key questions to facilitate decision – making for environmental sustainability.

- Firstly, what are the priorities that relate to policy making and VEC? VECs should be ranked according to those priorities for preservation.
- Secondly, which are the VEC elements that are sustained and which are the ones that are adversely affected?
- Thirdly, which are the areas that should be allocated the protection of each VEC?

b.5 Waste

According to Seadon, *waste is the result of inadequate thinking* in the sense that *it is conventionally treated as irrelevant to production* (Seadon, 2010). Only when waste disposal impacts affect people, does waste management forms a comprehensive strategy. For a sustainable society, however, sustainable waste management systems that utilise and optimise solid waste flows are vital.

As the predominant method of waste disposal is landfill, several promising technologies have been developed which can be applied in pre-treatment, in-situ

treatment and post-treatment to make it more sustainable. In modern landfills, for instance, waste deposited are pre-treated and separated, while in-situ, technologies such as aeration or flushing can be applied to improve landfill processes (Huber-Humer & Lechner, 2011). According to Wagner, the development of market links to landfill aftermarket products such as compost is also of imperative importance since it is both socially and economically optimal (Wagner, 2011). Another advanced system already being used in some countries is the bioreactor landfill that stabilises the contaminant release of buried waste at a reasonable time-frame (Batarseh, Reinhart, & Berge, 2010). Other methods of waste treatment include composting which is cost effective, environmentally friendly and can also lead to production of organically produced food crops (Taiwo, 2011).

Equally important to sustainable waste treatment is the reduction or stabilisation of the waste generation rate. Recycling and reusing materials that come from the industrial, the construction, demolition, and the domestic sectors positively contributes to minimisation of the flow of waste that end up in waste treatment facilities (Bovea & Powell, 2006). *The use of recycled and reused waste needs to be promoted for the optimal treatment of waste materials* (Del Rio Merino, Izquierdo, & Salto Weis Azevedo, 2010).

Local strategies for the optimisation of the flow of solid waste sent to landfills, recycling and different types of treatment plants need to be agreed upon amongst a multiplicity of decision-makers (Minciardi, Paolucci, Robba, & Sacile, 2008). According to Wagner, a waste management strategy will raise sustainability if 1) Profit from the waste management is the same or greater than what it is currently, 2) ecological health is the same or greater than what it is currently, and 3) Intragenerational social acceptance and intragenerational fairness are the same or greater than what they are currently (Wagner, 2011).

Market-based instruments are not only relevant to the aforementioned energy considerations, but they are equally imperative for the reduction of emissions. Carbon taxes, for instance, have been used both at the international and at the national levels, however, if not implemented alongside other measures (like the removal of energy

subsidies), they are not always effective (Baranzini, Goldemberg, & Speck, 2000) (Ermolieva, Ermoliev, Fischer, Jonas, Makowski, & Wagner, 2010). Furthermore, to satisfy the EU proclamations for reduced CO₂ emissions in the coming years, urban development and the layout of the cities will have to be gradually transformed. Urban Planning and design, as the foremost drivers of urbanisation⁶, can potentially have significant contribution in the reduction of emissions (Torres & Pinho, 2011).

b.6 Water

In addition to the anthropogenic benefits, a comprehensive and holistic strategy for water management is important for the sustainability of ecosystems, especially since future projections foresee raising water scarcity and adverse impacts related to climate change (Banuri, 2009).

Sustainable urban water management functions in different scales, from buildings to regions, and merges the management of potable water, wastewater and storm water (Buller, 1996). At present, the management of potable water for public hygiene is a matter of course in developed countries (Chocat, *et al.*, 2007), however, wastewater and storm water treatment still remain major issues.

A key feature for the optimisation of urban water services is urban drainage. This has acquired a more controlled role in recent years, as opposed to the conventional paradigm of the past that focused on the evacuation of excess water as quickly and efficiently as possible (Vlotman, Wong, & Schultz, 2007). The emphasis has been posed on the natural and artificial infiltration of rainwater volume for the protection of the natural environment and for the minimisation of flood risk. A popular measure for the achievement of the aforementioned goal is the development of grass swales. In addition to the protection of natural permeable areas, grass swales are particularly effective in improving road runoff quality and flow attenuation at the neighbourhood scale. These sustainable urban drainage systems have in recent years become a

⁶ Contemporary literature in the relevant disciplines suggests that the preferred model of a sustainable urban territory requires mixed land uses with medium-to-high densities, developed along public transport corridors to support shorter travel distances and therefore reduced emissions (Banister, 2008).

common landscape feature of modern urban neighbourhood schemes (Vlotman, Wong, & Schultz, 2007).

Meeting the current and future demands also requires innovative approaches and technologies for rainwater and reclaimed wastewater reuse. Many cities in Europe have started adopting sustainable practices that take into account the whole water cycle. For instance, rainwater can be harvested through design features like roofs, streets and courtyards, stored in tanks of various forms, or surface dams, treated using practices like chlorination or filtration (Helmreich & Horn, 2009) and then it can be reused for various purposes (Furumai, 2008). However, although grey water reuse presents a good opportunity for water demand management, a comprehensive local strategy combined with the use of the appropriate technology for filtration are essential to ensure that public health and environmental quality are not compromised (Al-Jayyousi, 2003).

b.7 Local Food

Deep societal concerns over sustainability issues have triggered the emergence of the contemporary social phenomenon of local food movements (Starr, 2010). As opposed to conventional globalised food market patterns, local food is in line with a more romanticized way of thinking, linked to the self-sufficient semi-rural communities of the distant past.

The benefits of local food production have been researched and practiced on an experimental basis in numerous communities throughout the world. According to Stagl (2002), these benefits are associated with the following issues:

- 1. Less transport required*
- 2. The addressing of an array of consumer demands*
- 3. Proximity of producers and consumers which leads to a possibility of consumers to learn about sustainability and which generates trust*
- 4. Offering a variety of products*
- 5. Extending to new consumer groups.*

From an environmental perspective, local food production might not necessarily reduce the greenhouse emissions of industrial operations, but at least if food is

sourced and consumed locally, food miles are minimised, and therefore the carbon footprint of the food chain is reduced. What is more, there are social benefits in local food production. The quality of the food can be evaluated more easily since local consumers are aware of where the food they consume comes from, and of how it is produced. Furthermore, consumers' preferences and decision with regards to the food products can be more easily realised and addressed at the local level (Marsden & Smith, 2005).

Local food markets are also benign to sustainable behaviour patterns. The regular interaction between the members of the community and the local producers encourages local shopping practices and more nutritious eating habits. Through these social relationships, trust is generated and the community tends to develop care about the local market, as they appreciate the transparency of how the local food production system functions. From a nutritionist perspective, local food provides a bigger variety of choices, while organic production methods are more likely to evolve. These improvements have their roots in the process of '*ecological entrepreneurship*' through which key actors in local food networks tend to mobilise other actors and innovate in developing new interfaces between producers and consumers (Marsden & Smith, 2005). The success of this model of local alliance and partnership is highly likely to be supported by the public since there is growing evidence of the negative consequences that contemporary lifestyle and present dietary habits have on human health (Caruso & Notarnicola, 2012).

In conclusion, although it is impossible to completely abandon the globalised operations of food production, we have seen that local markets are gaining growing acceptance by the public, as they constitute healthier alternatives to conventional consumption. It is, therefore, crucial that councils support local food production through programmes and subsidies local food production is supported by local councils through programmes and subsidies.

b.7 Summary

In conclusion, the literature review distinguished the following key points for environmental sustainability:

- A local strategy that encourages the use of renewable sources of energy, discourages the use of fossil fuel and promotes energy efficiency for reduced energy consumption
- Mixed land use and higher density development, sustainable mobility, local food
- Waste management for the reduction of waste output, waste purification, and the reuse of recycled solid waste
- Local sustainable water strategy
- Protection of local environment, enhancement of biodiversity, and consideration of VECs
- Owner and resident training and education

c. Economic sustainability

According to Pawloowski, economic sustainability cannot be investigated in isolation, but it always needs to be linked to the legal dimension of sustainability (Pawloowski, 2008). At the international level, economic instruments like carbon fees and taxes or tradable permits encompass the policy formulated to tackle the carbon dioxide emissions (Sathiendrakumar, 2003). Through the carbon tax, on the one hand, polluters have the option to improve the energy efficiency of their infrastructure, or on the other hand, to pay for the adverse impacts they cause to the environment. Compared to carbon tax systems, carbon dioxide emission trading systems have certain benefits for the industries that can sell their excess permits, and for the authorities that do not have to have any knowledge about the abatement cost of each firm (Sathiendrakumar, 2003). The aforementioned become possible because, as per the Kyoto Protocol, carbon emission allowance has been fixed for each country. Based on those fixed allowance figures, carbon emission permits can be sold by countries with low marginal abatement costs to countries with high marginal abatement cost until the price of the permit is equal to the marginal cost of carbon dioxide emission control (Sathiendrakumar, 2003).

From an entrepreneurial point of view, numerous scholars have pointed out the association between the decline of the natural environment and the market crisis in

recent years. However, sustainable Development and Corporate profits are not incompatible goals. According to Patzelt & Shepherd, some individuals are more likely to recognise a sustainable development opportunity than others, but that always depends on knowledge of not only the natural environment but of other aspects of the communal environment as well within the general pursuit of the common good (Patzelt & Shepherd, 2011). For instance, ApproTEC, a company founded in Kenya, applies inexpensive but highly efficient technology to create value from very limited assets and resources (Seelos & Mair, 2005). For example, the company assists the small-scale farmer to increase farm yields by using specially designed pumps to irrigate land (Seelos & Mair, 2005). By identifying socially sustainable solutions, the company has managed to rapidly expand within a few years (Seelos & Mair, 2005).

What is evident from the aforementioned example is that the investigation of local economies is the best way to identify opportunities for economic success and sustainability. Sustainable local economic development is a theme promoted by businesses, local and national governments, international institutions and organisations, but seldom is it linked to specific frameworks for practical implementation. Newby points out that there are some core principles linked to the benefits of sustainable local economic development and these are the following (Newby, 1999):

- *Quality of life (including linking social, economic and environmental aspects)*
- *Fairness and equity*
- *Participation and partnership*
- *Care for the environment/respect for ecological constraints*
- *Thought for the future and the precautionary principle.*

Depending on the theoretical background, local policies for a resilient local economy can have differing adherence to sustainable development (Hamstead & Quinn, 2005). Liberal community development initiatives are based on the assumption that poor community health results from a malfunctioning process of economic growth, and the solutions are focused on the expansion of the local economy through measures to increase employability or to promote local private entrepreneurship (Hamstead &

Quinn, 2005). Curtis suggests that *eco-localism* is a useful positive economic paradigm that reorganises economic life across the world in a radical way by orientating economic development to a broader range of human needs, values and environmental imperatives (Curtis, 2003).

In other words, sustainable economic development can be addressed at the community level when communities have the capacity to initiate and generate their own solutions to their common economic problems (Roseland, 2000). Theories like those of *eco-localism* and Community Economic Development (CED) have started being practically implemented in local strategies for economic development formulated by public agencies and local councils. The local economy can be stimulated through a variety of tools such as campaigns for the support of local products, giving preference to minority-owned businesses within the evaluation of responses to bids, or by mandating municipal purchasing departments to apply environmental considerations to purchasing decisions (Nijaki, 2012). Examples of sustainable community economic development include sustainable employment plans to create jobs, new product development, increasing affordable housing supply and subsidising community supported agriculture (Roseland, 2000).

The emphasis is also posed on sustainable employment patterns. These contemporary patterns reflect the rapidly increasing global interest over environmental issues and have derived from the recent advances in sustainable technology. Thus new employment opportunities have emerged in domains like recycling, sustainable food and energy production sustainable management of natural resources, sustainable tourism etc. (Roseland, 2000). The possibilities for building community assets for a strong and sustainable economy are limitless and creative solutions can be sought through community-based decision-making.

2.5 Summary

The present chapter has presented a review of current literature to provide an overview of the definition and context of sustainable development.

Although ambiguities in definitions and terminology contradictions were identified and discussed, the need to focus on the local scale was acknowledged as a key priority.

The overview of existing tools rationalising the highly complex context of sustainable development conducted in Section 2.3, demonstrated that they often fail to effectively integrate the different domains of sustainable development and that over-simplification or generalisation can entail significant risks.

Nevertheless, it was also stressed that the contribution of frameworks and indicators for sustainable development lies within their power to assist in the formulation of strategies and to evaluate the effectiveness of specific approaches.

In Section 2.4, a synopsis of the basic pillars of Sustainable Development (Social Sustainability, Environmental Sustainability, and Economic Sustainability) was presented and the significance of each aspect was documented in great detail. The basic sustainable neighbourhood development themes deriving from this chapter's literature review have been summarised in the following table.

Sustainable Neighbourhood Development Themes		
Social Sustainability	Environmental Sustainability	Economic Sustainability
Meeting Basic Human Needs	Environmentally responsible energy strategy	Pollution and Environmental Auditing for businesses
Community Resilience	Environmentally responsible water strategy	Training on sustainability for entrepreneurs
Local Identity	Environmentally responsible waste strategy	Support for community businesses and local cooperatives
Safety and Security	Environmentally responsible selection of construction materials	Sustainable and economically viable transportation solutions
Collective Groups/Networks	Environmentally responsible mobility strategy	Partnerships between local councils/community agencies/private sector
Accessibility	Preservation/Revitalisation of natural landscape	
Social Diversity/Integration	Land use diversity/higher density	
Social Participation	Education on sustainability for residents	

Table 1: Sustainable Neighbourhood Development Themes

The following chapter discusses how those basic sustainable development themes or pillars are closely linked with urban development at the micro scale: that of the urban neighbourhood.

In the section that follows, an overview of the history of the urban neighbourhood will be presented and, a thorough analysis will be conducted on how the core sustainability principles identified in the present chapter have been embedded in neighbourhood development, since the neighbourhood unit was first introduced in the city planning dictionary in 1929.

Chapter 3. Neighbourhood: The origins and the future

3.1 Introduction

Since ancient times, neighbourhoods have been the basic unit of human settlements. The term however has no single or agreed meaning. In the Bristol accord we find a definition which describes a sustainable neighbourhood as *“a mixed use area with a feeling of community. It is a place where people want to live and work, now and in the future. Sustainable neighbourhoods meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services to all.”* (ODPM, 2005). Barton *et al.* provides a more generic definition according to which *“neighbourhood is a residential or a mixed use area around which people can conveniently walk”* (Barton, Grant, & Guise, 2010).

Even if a single definition cannot be agreed upon, neighbourhoods all over the world share some unique common characteristics. These are the following: they have a defined centre; they are walkable (1000m as the key threshold for easy pedestrian access) and have some degree of diversity in terms of building types, people and uses.

A neighbourhood has three different facets (Barton, 2000). From a functional point of view, the locality is seen as the base for home life, and perhaps for educational, retail, leisure and employment activities as well. This is typically a town planner's view of the neighbourhood. Secondly, the neighbourhood forms a specific spatial territory that is aesthetically identifiable and has a specific historical background and a sensuous quality which is linked to the residents' perceptions of “home”. This, according to Barton, is the domain of the urban designer. Lastly, the neighbourhood is seen as the locus for the community. The community, however, may or may not have locally based activities and when that happens, local networks are created and the locality shares a feeling of mutual support.

3.2 The evolution of the neighbourhood concept

Although the basic physical structure of the neighbourhood unit originates from ancient societies, the term first appeared in 1929, when Clarence Arthur Perry introduced it in the Planning Theory and practice. He defined it as the basic unit for Planning, inspired by the New York Forest Hills Gardens scheme. According to his theory, a neighbourhood unit is *a protected residential cell within which the principal destinations of normal families - schools, playgrounds and local shops – can all be reached without crossing a single main highway* (Perry, 1929). Perry's approach influenced significant developments in municipal administration and city planning, particularly in the US, and the neighbourhood movement evolved through the 20th century.

Christopher Silver groups that evolutionary process into four phases (Silver, 1985). Firstly, the Formative one, from 1880 to 1920, that involved the propagation of the neighbourhood idea as a political rallying point for social reform. Settlement workers were back then the initiators of a debate concerning neighbourhood revamp. They were sometimes even involved in neighbourhood improvement plans and they were discussing their aspirations and ideas with city officials. The plans for improvements they were demanding were targeted at the congested inner city neighbourhoods where the changing inward and outward migration patterns had resulted in the degeneration of inner city neighbourhoods' identity and the loss of social cohesion (Cooley, Human Nature and the Social Order, 1902). However, in line with the Neighbourhood Planning Movement's rhetoric, planners translated these ideas into the widespread realisation of the English Garden City paradigm (Silver, 1985). The escape from the overcrowded city centres was motivated by individual land owners' desires to turn profits and was to a large extent unorganised since town planning regulations and social and urban infrastructure were absent (Ryan & McNally, 1995). Eventually, and with a few exceptions of inner city regeneration schemes, Ebenezer Howard's utopian visualisation of Garden Cities was reflected in a widespread residential decentralisation and suburbanisation process that lasted for almost 60 years.

Secondly, Silver discerns the years between 1920 and 1960, during which time, the neighbourhood unit was studied and was recognised as a planning concept. During that period, Perry's contribution to the rhetoric of planning that involved the rationalisation of the neighbourhood as the ideal planning unit advanced and was ultimately rooted into the planning profession (Gillette, 1983). Furthermore, academic research concerned with the neighbourhood idea flourished and apart from design considerations, it also embraced political and social aspects. Debates around the ideal social composition of the neighbourhood unit, the preferred density, the unique identity, and numerous experiments with regards to variations of the original neighbourhood unit plan raised controversy and persisted throughout the 1950s. In the 60s, the neighbourhood unit *became a stock planning item* (Silver, 1985) *since the widespread suburban development was fiscally, politically, and technologically possible and was facilitated with funded federal programmes* (Ryan & McNally, 1995). Neighbourhood units of specific form, social composition and boundaries were being 'implanted' in suburban locations and were separated by highways that were seen as spatial elements used to safeguard the neighbourhood's social and physical integrity. Although the planning procedures of those decades reflect contributions to the solutions of urban problems of the time, the initial concept was eventually distorted, and the outcomes triggered criticism both from within and from outside the planning profession.

In the 1960s and 1970s, former theories were revised to reflect social concerns and contemporary theoretical movements. Jane Jacobs, in her book 'The Death and Life of Great American Cities' appeared as an adversary of the unorthodox typological standardisation of the neighbourhood unit and pointed out the virtues of the naturally evolved human settlements that are not fixed, but rather diverse with regards to community scale (Jacobs, 1961). Her revolutionary ideas about the positive side of returning to the folk, retro-style inner city neighbourhood generated an intellectual debate between practitioners and academics inspired by her, and the advocates of Perry's rationalising approach. Problems that stemmed from suburban development such as traffic congestion, long commute trips, lack of social diversity and destruction

of the natural habitat were evident and they were highlighted by numerous critics of the time (Rohe, 2009).

Furthermore, the Planned Unit Development and the Cluster Development were first introduced in the beginning of the 1960s as a response to the critique about suburban communities that lacked basic amenities and technical infrastructure. Its ethos allowed for some flexibility in incorporating mixed housing types and land uses and in preserving the natural landscape by leaving areas of a neighbourhood in their natural states. However, in practice the *cul-de-sac* paradigm stemming from the Neighbourhood Planning Unit was retained, developments were sometimes lacking pedestrian amenities, and were to a large extent car orientated (Rohe, 2009). Yet the concept was innovative in the sense that the unit for planning was now the integrated community instead of the individual lot. The previous process of subdividing the land and selling the parcels to individual land owners was replaced by the concept of a corporation developing the entire community, and dwellings being sold to individuals instead of land parcels (Ryan & McNally, 1995).

The aforementioned debates were reinforced by social instability activated by the civil rights movement that was opposing proposed slum clearance efforts. The US government responded by building the foundations for the establishment of a local governance system. Neighbourhood planning was gradually realised and became a pinion within the planning mechanism in the United States.

In the 1980s, after decades of research and intellectual debate, Town Planning had become orientated towards the neighbourhood scale but still lacked a strong theoretical basis. Traditional Neighbourhood Development and Transit Orientated Development advanced as concepts and incorporated mixed uses, higher density developments, mixed use neighbourhood centres, grid street layout, front gardens, garages and parking located top the rear of housing units, public spaces distributed throughout the neighbourhood, and close proximity to mass transit (Rohe, 2009). However, they were characterised as anti-urban since they were again being developed in the fringe of urban areas, and as being too prescriptive in the physical sense (Rohe, 2009).

As a reaction, the idea of neighbourhood regeneration as opposed to neighbourhood rebuilding gradually gained support.

In the UK, since the 80's another concept emerged and updated the terminological debate: that of the Urban Village. In relevant literature, an urban village usually has a more defined, usually migrant and low income social composition, the distinct social order of which replicates the qualities of a rural past and possesses a unique identity of place (Franklin & Tait, 2002). Theory, however, does not bear much resemblance to reality since, although the above characteristics usually describe inner city communities in the US, the term has been used as the theoretical background for numerous urban development interventions in the UK. In fact, it was the Planning Policy Guidance (PPG3) that encouraged the planning of urban villages as a preferred form of development. Furthermore, the Urban Village Group presented the key principles and the physical features that bear much resemblance to Traditional Neighbourhood Development. Aldous (1992, 1995) enumerates the following key design principles (Biddulph, 2000):

- *Architectural style to be set by the locality*
- *Focal points, street corners, building lines, visual indicators, enclosure*
- *Mix of uses*
- *Traffic calming, pedestrian friendly*
- *Social mix and consultation*
- *Legibility*
- *Flexibility of buildings and spaces*
- *Bring life to buildings and spaces in front of them.*

Furthermore, each Urban Village should be approximately 100 acres (40 hectares) and have a combined working and resident population of 3,000-5,000. According to Aldous, they should also be forming clusters which would ensure the provision of local complementary facilities, as well as regional facilities on a larger scale (Biddulph, 2000).

When comparing the characteristics of the urban village enumerated above with those of the urban neighbourhood described in the writings of Jane Jackobs, we can see

strong similarities in the physical and social sense. The observation of these similarities leads to the deduction that the term *Urban Village* is being used not so much to physically distinguish between two forms of development, but to invoke emotions of nostalgia. Its use, even nowadays, is mainly intended to empower marketing strategies, or to prove that certain urban interventions are appropriate since the term has been widely used in Planning Policy Guidance and, by intellectuals and practitioners in the UK (Franklin & Tait, 2002; Biddulph, 2000).

Whether the unit is baptised neighbourhood or village, that spatial level has become the primary focus of *'service delivery, regeneration, and moral agendas around citizenship and cohesion'* (Atkinson, Dowling, & McGuirk, 2009). It is at that level where the source of peoples' needs and problems can be identified and the administrative mechanism has been transformed in a way that its functions and programmes are mainly targeted to this particular spatial level.

However both concepts received similar criticism. First of all, the fact the terms were extensively used by the media did not necessarily mean that all schemes that had received the title were necessarily viable communities. Secondly the change in the mobility patterns cancels out the notion that a neighbourhood or urban village can be self-sufficient since most people tend to investigate other possible shopping options outside the boundaries of their communities. Thirdly, the polycentric urban system it implies could be potentially damaging to the cities as it has been suggested by numerous academics and critics.

Following the intellectual debate of the 80s the New Urbanists Movement emerged in the beginning of the 90s and contributed to the neighbourhood planning theory. They were based on the Garden City paradigm, but denounced the destructive effects of the car dependent societies and promoted more compact solutions. More details about issues of morphology will be discussed below.

3.3 Discussion on the design of neighbourhoods (size, form, identity)

Neighbourhoods could be more or less organic in form. Victor Dover (2007) claims that *one should be able to tell when one has arrived in the neighbourhood and when one*

has reached its heart. In many historic towns and cities however neighbourhoods blend into each other as part of a wider urban continuum– the result of many years of development and change. Where one neighbourhood begins and another ends can sometimes be a matter of fierce debate amongst locals.

Perry's original neighbourhood unit design involved a settlement with specific boundaries, with a population size varying from 3000 to 9000 people, sufficient to support an elementary school. In that ideal design, the neighbourhood should not extend more than 0.4 km radius around the school, which would be in the core of the plan, while local shops should be located in the periphery of the neighbourhood (Perry, 1929). Stein and Wright contributed in neighbourhood planning by carrying on Ebenezer Howard's idea of the garden city, and although in their design the neighbourhood was envisaged as a self-contained unit, the different units were arranged in an overlapping manner to support joint use of facilities such as hospitals, high schools and theatres (Patricios, 2002). In their design, series of agglomerations of approximately 20 houses, arranged around a cul-de-sac court for motor vehicles, were constituting superblocks and, at a higher level, agglomerations of super blocks were forming a neighbourhood unit of about 5000 inhabitants, and extending over a 0.8 km radius (Patricios, 2002).

Those original ideas merely evolved around the physical aspects of the neighbourhood unit and they lacked social considerations. Social scientists and intellectuals, following humanistic approaches researched the socio-psychological attributes of the neighbourhood unit theory in the 1920s and 1930s. Judith Tannenbaum in her *Socio-Psychological Analysis* of the neighbourhood proves that neighbourhood theory at the time was largely orientated to physical ends, with social considerations as subsidiary (Tannenbaum, 1948). She suggests that social and physical aspects are interconnected and dynamic in nature, and she strongly opposes class or race segregation and suggests that careful planning of neighbourhoods that takes into account social aspects can lead to the elimination of urban anomie. Even from as early as 1909, C. H. Cooley had been preoccupied with social organisation and the socio-spatial analysis of urban space and emphasised *the decline of mechanical and arbitrary forms of organisation and the rise of a more humane type of society* (Cooley, 1909). The

ignorance of the social realities of the modern world was also criticised by several theorists. Thorns for instance highlights the fact that modern living is associated with dispersed social networks and the neighbourhood unit is far too enclosed and poses limitations (Casey, Coward, Allen, & Powell, 2007).

However, they gained prominence and were applied in practice, either intact, or in different morphological variations in several different cases, especially in the US and the UK in the development of the British New Towns (Patricios, 2002).

Patricios, focusing on the differences between the US and the UK approach explains that in contrast to Perry's formula, in the British New Towns experiment, shops and local facilities were placed in the core of the neighbourhood rather than the fringe. Secondly, the open public space was used as a boundary between the different neighbourhoods, rather than an open space connected with the neighbourhood centre. Lastly, population size in the British interventions was of approximately 10000 inhabitants, which is larger than Perry's model. Furthermore, British Town planners and practitioners took into account studies of council housing estates and made an effort to promote social interaction by experimenting on the ideal location of houses and retail uses.

The intense critique that arose in the 1950s and 1960s, however, condemned the inflexibility of the previously developed physically centred ideas that did not account for the vitality of the social factor and provided the ground for the emergence of the New Urbanists in the 1990s. The sociological theory that represented the movement was that the social and physical layouts of the neighbourhood were interconnected. This was based on research evidence that *planners' manipulations can influence behaviour* (Lee, 1968). The morphology of the Neo-traditional model they proposed was a rediscovery of the Garden City neighbourhood prototype. It referred to a 400m radius unit, with a physically defined centre and edge, a balanced combination of uses and a gridiron network of interconnecting streets, with public spaces and civic buildings in appropriate locations (Duany & Plater-Zyberk, 1993). The difference from the neighbourhood unit design concept was that Neotraditionalists were advocates of through vehicular movement. As a result, *they changed the street design so that it*

would function for the lowest common denominator (Ryan & McNally, 1995). Furthermore, the generic model they proposed was taking into account the formation of social relationships within a diverse 'humanised' neighbourhood territory, and was enforced in reality through design codes. This humanised environment was, to a large extent, encouraged by the mix of uses and tenures. Apart from reducing the concentration of disadvantaged households mixed communities increase social cohesion since they constitute of mainly owner-occupiers and, by having mixed tenures, they increase the scope for housing career moves within the same area (Casey, Coward, Allen, & Powell, 2007).

The careful design of narrow streets that would function as promoters of public life, the high densities that would allow for a mix of housing tenures, and the plentiful transit connections to support the compact development, were some of the prescriptions they transformed into codes (Chang-Moo & Kun-Hyuck, 2003). The codes were private agreements between community developer and individual parcel owners and addressed design, site and planning issues.

It was this codification however that made Neo-traditional developments inflexible and particularly prescriptive, ironically even less flexible than typical zoning or building standards (Furuseth, 1997). Other unwelcome constraints include monotony of architectural styles, control of the evolution of the urban form and, restraining architectural creativity. On the other hand they are comprehensive guides that speed up the development process, and make sure the quality of design is not compromised throughout the development process (Carmona, Marshall, & Stevens, 2006). To summarise, although New Urbanism in theory embraces liveability and humanism, it has been criticised as ironic, as repeating the modernist paradigm and as insufficient to tackle the future challenges. According to Jill Grant, public realm efforts have been orientated to the private investor's interests, they are, to a large extent, elitist, excluding the least powerful, and they are usually implanted in suburban locations, further enhancing urban sprawl (Grant, 2006). It is, therefore, clear that New Urbanism theories need to extend to embrace urban ecology, place-based economics, social equity, as well as broader global concerns and sustainability (Nelson, 2010).

3.4 Emerging movements towards a neighbourhood renaissance

The increasing concern about problems of a growing and ageing population, global recession, climate change, and the projection for depletion of vital resources pose a great challenge for the cities of today and the future. Thus, longevity becomes a key priority and sustainable development a principal policy theme at every urban scale. As the nucleus of a complex urban mechanism, the neighbourhood is nowadays the predominant focus of spatial interventions to achieve sustainability. As Rudlin and Falk have effectively put it, *'successful neighbourhoods are like great forests which outlive even their most ancient trees'* (Rudlin & Falk, 2009). In line with that remark, first of all neighbourhoods should be great places that enhance the well-being of the community. Secondly, although they are products of meticulous planning, they develop naturally, and as such they need to be flexible enough to dynamically attune to changing circumstances. This process of survival and adaptation has many different facets social, economic, and ecological in nature, which have been articulated in the different insights of contemporary academics and practitioners.

In recent years some of the most interesting developments in thinking about the significance of neighbourhood for planning and the environment have been associated with the 'Sustainable Urbanism' movement that combines the New Urbanism theory with sustainability. Hence, it unites all three facets of the neighbourhood by addressing the society's social, economic and environmental needs. Sustainable urbanism is walkable and transit-served urbanism integrated with high-performance buildings and high-performance infrastructure. In that vision for more compact communities social balance and community spirit are acclaimed, and human access to nature is a core value.

In more detail, the theory emphasizes that the personal appeal and societal benefits of neighbourhood-living, and meeting daily needs on foot are greater in neighbourhoods that integrate five attributes: definition, compactness, completeness, connectedness and biophilia (Farr, 2008). In line with that theory, urban neighbourhoods should be properly defined, with a centre and edge (probably in the form of SUDS, or habitat

greenways), should have a walkable size (162-810km²), an integrated network of walkable streets (average block perimeter 460m), and special sites reserved for civic purposes (Farr, 2008). Compactness lies within high urban densities support high-quality transit service, giving people convenient lower-impact ways of getting around within the wider region. Also, urban neighbourhoods should be complete in the sense that they bring all essential human activities within walking distance. Uses should furthermore be diverse in order to support a diverse population mixture. Lastly, biophilia, or being close to nature is of high importance for the community's health and can be supported with parks, plazas, or Sustainable Urban Drainage Systems (SUDS).

Although several academics have, in the years since the concept of neighbourhood was first developed, attempted to describe its physical characteristics, the planning system has failed to provide a concise definition of a neighbourhood. The term, however, is often used in official reports and, it has recently been in the focal scale of sustainable regeneration and development schemes.

The UK Neighbourhood Renewal National Strategy Report suggests that a neighbourhood usually consists of several thousand residents but, regarding its physical attributes, it points at The Office for National Statistics (ONS).

ONS has recently created an internet facility - the Neighbourhood Statistics Service - designed to meet the needs of the National Strategy for Neighbourhood Renewal (Quote doc saved). The resource provides information on demographics and other census data for areas that pertain to different scales. The types of areas included are: Local Authority, Middle Layer Super Output Area, Lower Layer Super Output Area and Ward. LSOAs (around 1,500 people) are areas of small size, which have recently replaced wards while MLSOAs have an average population size of 7,100 residents. The MLSOA geography is probably the closest match to what the academic definitions of a neighbourhood describe.

The tool is an exceptional resource for data pertaining to the scale of the neighbourhood and the website offers instructions on how statistics for different types of areas can be obtained and combined. Based on those scales the multiple aspects of

sustainable development and regeneration can be appropriately addressed by enlisting indices and indicators to assess current status and progress.

An index often used in the UK planning system, is the Index of Multiple Deprivation (IMD), designed for the LSOA geography, which mostly consists of a number of economic and social domains and deriving indicators such as income, employment, education and crime (DCLG, 2011). The environmental aspects, on the other hand, are poorly addressed with only a few indicators assessing the outdoors living environment and only looking at air quality and road traffic accidents. Biodiversity, microclimate aspects or soil conditions, for instance, are not addressed at all. It is, nevertheless, a key report that guides regeneration plans in different parts of the country.

As the previous paragraphs suggest, the planning system has undergone substantial changes in the last few years. These changes have been inspired by an impressive body of literature, aiming at exploring the economic, social and environmental facets of neighbourhood development.

Academics suggest that economic sustainability can be achieved or '*secured by the creation of local or regional self-resiliency, community economies*' (Curtis, 2003). '*Eco-localism*', a term devised by Fred Curtis has the aforementioned argument in its core and seeks to '*establish a healthy community economy*' (Curtis, 2003). Locally adapted businesses, networks, education, banking and investment are prerequisites for sustainability. When goods and services are produced with local needs and consumer desires in mind, local economies may produce higher quality, longer lasting and more locally appropriate and useful products.

Shops are located centrally to reduce the distances separating the position of retail and consumption. Furthermore, when that primary urban unit is of a small size, it allows for pedestrian movement to be preferred over vehicular trips. In that way, transport and infrastructure costs are reduced, and employment opportunities emerge within the local territory. According to C. L. Choguill, the aforementioned imply that the maximum radius should be approximately 1km, and the population should be at least 3,000-4,000 (Choguill, 2008). Furthermore, although it is not always possible, the

growing trend nowadays is home-working. It has the potential to reduce travel, support local services and enhance social interaction (Barton, Grant, & Guise, 2010).

Social Sustainability requires low-level acquaintance, neighbourliness or frequent social interaction amongst the members of the community. By creating opportunities for shared local activities and shared life in the street local contact is maximised and social stability becomes easier to maintain (Barton, Grant, & Guise, 2010). Public participation also becomes easily comprehensible and feasible at the neighbourhood scale since problems of mundane nature such as parking, neighbourly antagonisms or service delivery could be easily resolved locally (Choguill, 2008). Furthermore, a good social balance is a vital factor since a wide range of shops can be supported. (Rudlin & Falk, 2009). In addition, the segregation of social housing units in certain areas should be avoided since it has been associated with high crime rates, and conflicts between the residents of the estates and the residents of adjacent middle and high class estates. In line with policy guidance in the UK, not only should social housing units be mixed in neighbourhoods but they should be pepper potted as well. In addition, it has been proven that owner-occupiers tend to exert a civilising influence on social housing tenants (Rudlin & Falk, 2009).

Many researchers have concluded that length of residence influences social ties among neighbours (Guest, Cover, Matsueda, & Kubrin, 2006). That does is not necessarily the equivalent of a mono-tenure community. On the contrary, having a range of different tenures and affordability levels available within the same neighbourhood makes it more likely for households to move within the same territory in case they develop different property preferences or needs over time. That diversity will ensure stability in the long run.

The majority of published examples of sustainability focus on maintaining or improving environmental conditions in a localised human system (HMG, 2012). These systems are part of larger environmental systems with which they are connected and dependent upon. Environmental sustainability can be achieved at the local scale by ensuring that the neighbourhood provides a pleasant and healthy environment for the community with adequate green and public spaces. They need to be enough in number, and

located in appropriate sites to function as meeting places and to motivate the community to engage with outdoor activities. The existence of local green spaces enhances the microclimate of the neighbourhood and promotes a healthy lifestyle for the public (Choguill, 2008). Furthermore, energy consumption should be tackled at that micro level. Although neighbourhoods can in no way be completely self-sustaining, since they depend in larger systems of energy and material flow, an effort to reduce energy consumption or to increase energy produced by renewable resources can be made at that level.

According to Patricios, however, the principle of fixed size cannot be applied today since new mobility patterns have emerged, enabling children to use public transport to reach educational facilities, and parents to depend their choice of school on quality rather than proximity to residence (Patricios, 2002).

3.5 Summary

This chapter has reviewed the history of the neighbourhood unit. Key design factors and qualitative characteristics were discussed in relation to the different movements that shaped the neighbourhood model since it was first introduced in 1929 and, emerging concepts of neighbourhood development were introduced.

Following this chapter's review, and for the purposes of this research, the neighbourhood unit is considered to be a mixed-use area with the following physical characteristics: an identifiable centre(s) and edge; a population of 5,000-20,000; and an Urban Residential Density (Cardew, 1996) of between 60 units/hectare, the minimum to support a transit service, and 100 units/hectare, which is considered a higher urban density (CABE, 2010).

In the chapter that follows the philosophical foundation of this study will be outlined, the methodological grounding adopted will be elaborated and, strengths and weaknesses of the approach followed will be discussed.

Chapter 4. Research methodology

4.1 Research Paradigm

The research process has three major dimensions: ontology, epistemology and methodology (Terre Blanche & Durrheim, 1999). These have been referred to as worldviews by Creswell and they need to be identified as they largely influence the practice of research.

Ontological and epistemological aspects reflect a person's view of the world and greatly influence one's perception of different aspects of reality. Philosophy in research responds to the concerns about reality and truth and, hence, every philosophical system represents a certain belief about the way in which data about a phenomenon should be collected, analysed and utilised. Philosophy thus possesses the potential to construct a frame of reference for the researcher (Williams & May, 1996, p. 10).

Creswell highlights four worldviews that are widely discussed in literature: Postpositivism, Constructivism, Transformative and Pragmatism (Creswell J. , 2014, p. 6).

Postpositivist views are closely linked to quantitative research and recognise that we cannot be positive about our claims of knowledge when studying the behaviour and actions of humans. Constructivism, at the other end of the research arena, is a worldview typically underlying qualitative research. According to that paradigm, individuals seek understanding of the world in which they live and work and develop subjective meanings of their experiences. The researcher, therefore, is led to looking into the complexity of views rather than narrowing meanings down to a few categories or ideas.

Critical theorists usually support the philosophical assumptions of the Transformative Worldview, believing that research inquiry needs to be intertwined with politics and a

political agenda to confront social oppression at whatever levels it occurs (Mertens, 2010). Finally, Creswel refers to Pragmatism which has many forms but the main belief supported by many is that a worldview arises out of actions rather than antecedent conditions. As Johnson and Onwuegbuzie have put it, Pragmatism prefers action to philosophising which makes it in a sense anti-philosophy (Burke Johnson & Onwuegbuzie, 2004, p. 18).

The primary concern for the selection of an appropriate system of philosophy for this research was its relevance to the research hypothesis⁷ and, the operational implications the selection of a certain philosophical standpoint would entail. The research hypothesis discussed in Chapter 1 prescribes the incorporation of both qualitative and quantitative elements for its confirmation or rejection. The selection of a mixed methods approach was therefore deemed necessary to achieve a more comprehensive account of the subject of sustainable neighbourhood development.

From a traditional philosophical perspective, the combination of qualitative and quantitative, or inductive and deductive, can be seen as inappropriate as, conventionally, the aforementioned approaches are considered to be polar extremes. In the image below, Saunders *et al.* has successfully illustrated how the different philosophies, methodologies and methods are positioned in the wider research spectrum.

⁷ Research Hypothesis: *The development of a common checklist of criteria, accompanied by a set of indicators that will focus on both quantitative (technical), and qualitative (non-technical) aspects within the context of sustainability, will facilitate sustainable neighbourhood development.*

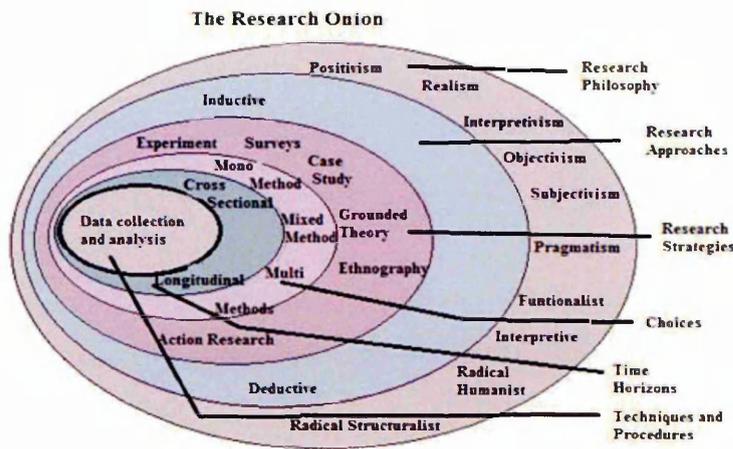


Figure 4: The Research Onion, Saunders, et al. (2009)

The axiomatic selection of one philosophical system over another has important implications on how the data is collected, organised and interpreted.

If, for instance, a research is categorised as ‘positivist’, that would be synonymous to the belief that the world exists externally and, that its properties should be measured through objective methods (Easterby-Smith, Thorpe, & Lowe, 2002). This approach directly links the positivistic epistemology with the investigation of causal relationships between observable phenomena, using quantitative methods and numerical evidence. It then becomes a challenge to use positivism within the social arena as it is, sometimes, extremely challenging to objectively describe a truth. As this research is concerned with success of sustainable neighbourhoods there is definitely a need to engage in quantitative strategies that enable the measurement of progress. Solely relying on qualitative methods though, would be problematic since success in sustainable development has a subjective facet as well, which can only be discovered if the stakeholders’ and residents’ perceptions are explored in depth.

Seeing residents and stakeholders as directly and indirectly contributing to the development of each of the projects investigated, requires a rigorous investigation of their experiences. Since these aspects can only emerge through in-depth interviews, in terms of methods, the research is also directly linked to an interpretivist philosophical stance.

Interpretivists would argue that *the knowledge about the object domain can only be improved by applying the point of view of the individuals who are directly involved in it* (Klein & Hirschheim, 1987). The statement implies the employment of qualitative approaches in the study of a particular phenomenon, and is relevant to some aspects of this research. However, being exclusively loyal to the positivist approach would mean that the quantitative aspects of the project, described previously, would have to be ignored.

In the same way that Positivism and Interpretivism are placed at polar opposites, the two theory building approaches in social research are presented in figure 4 as mutually exclusive. The two theory building extremes are inductive and deductive, with the first formulating theory using literature and then testing the data, and with the latter exploring the data first and then formulating a theory which is eventually related to the literature.

This research is primarily guided by an inductive perspective as theory building will be data-driven. Although a substantial body of literature focusing on sustainable development already exists, we have identified in previous chapters that there are significant terminological issues and much debate over the specific criteria that define sustainable development. For that reason, working inductively, using case studies as the source of data, is a strategy likely to lead to the emergence of theories deriving from the investigation of practical applications.

On the other hand, the deductive design seemed like an appropriate approach when I was trying to address the issue of selecting appropriate case studies for my research project.

How is best practice defined? At the end of Chapter 3, I have answered the question by summarising key points deriving from the literature review conducted, in a table of criteria. I have then used it as a checklist in an attempt to distinguish the four most appropriate projects among the numerous eligible ones. This strategy, however, is the complete opposite of the inductive theory building described in the previous

paragraph. When looking at figure 4, this hybrid approach might seem controversial, however, it has become increasingly popular over the past 20 years or so (Morgan, 2007).

The philosophical dilemmas described so far have generated a substantial body of literature and philosophical movements that have attempted to marry the polar extremes. As Saunders has successfully put it, research is rarely straightforward since *reality is considerably messier* (Saunders, Lewis, & Thornhill, 2009, p. 10). Therefore, seeing the different methods as mutually exclusive and the two approaches as polar extremes can limit the research possibilities. Accordingly, many researchers claim that varying methodologies should be adopted in a complementary way if the nature of the research questions demands it. As Saunders argues, *if the research question does not suggest unambiguously that either a positivist or interpretivist philosophy is adopted, this confirms that it is perfectly possible to work with variations in your epistemology, ontology and axiology* (Saunders, Lewis, & Thornhill, 2009) .

This multi-perspective stance towards a problem or a phenomenon is deeply rooted in the pragmatic philosophical tradition as this was defined by Prof J. Dewey. As many scholars have claimed, mixed methods research is an approach to knowledge that attempts to consider multiple viewpoints, perspectives, positions and standpoints, and therefore one of the philosophies informed by it is pragmatism (Johnson, Onwuegbuzie, & Turner, 2007). In Dawey's social ontology, practice is primary, or logic should be prior to ontology, and the meaning of theories derives squarely from their practical consequences (Ralston, 2013, p. 62).

Based on the previous discussion it is apparent that Pragmatism is not committed to any system of philosophy and reality. It focuses on solving practical problems by following a flexible approach, rather than aligning with the pursuit for either the objective truth, or subjective perceptions (Wheeldon, 2010). For that reason, this research has adopted the pragmatic approach as it applies perfectly to the flexible way in which axiologies (subjective/objective), methods (qualitative/quantitative) and

approaches (inductive/deductive) will be used to best enable the testing of the research hypothesis.

What is unique about Dewey's pragmatism, is that it perceives the environment as flux rather than fixed and therefore knowledge, facts and truth are temporal and generated through our experiential transactions (Hall, 2013). This standpoint promotes an experimental enquiry approach in which verification plays a significant role to determine future actions (Hall, 2013). This research has used an inductive approach to build a tool to aid the successful implementation of sustainable development strategies. The tool has been tested in Chapter 11 and a suggestion for further testing has been made in the recommendations for further research in Section 12.4. This line of action fully embraces the constant movement of reasoning between inductive and deductive the pragmatic approach advocates.

Furthermore, what critically concerns the pragmatist is not the compatibility of the different philosophical perspectives being mixed, but other dimensions of a mixed methods enquiry such as methodological traditions, data gathering, analysis techniques, personalised understandings and, value commitments (Greene, 2007). This philosophical position applies to a mixed methods type of research in which inquiries draw liberally from both qualitative and quantitative assumptions when they engage in their research (Creswell, 2003). The researcher is, hence, given the freedom of choice in terms of methods, techniques, and procedures of research so that his needs and purposes are met.

An example of how the aforementioned views have shaped the course of this research is the analysis conducted for each of the four case studies, aiming to highlight areas of divergence between what the stakeholders considered as the cornerstones of sustainable development and what was in reality important for the sustainability of the locality. This method of assessment, allowed mixing to ensue in various scopes. Firstly, an amalgam of different questions allowed for different aspects of sustainable development to be evaluated: historical, societal, economic characteristics (qualitative) and the extent to which this type of development changed people's lives

(quantitative). Secondly, a mix of perspectives from different practitioners (the developers, the residents, the architects) within the stakeholder groups, with different experiences and knowledge background, was sought to investigate in depth the characteristics of sustainable development. Finally, an Analytic Hierarchy Process was used to unite the quantitative and qualitative aspects of the study into a complete checklist of criteria for sustainable development.

Within the discussion of Dewey's pragmatism, *intelligent action* has a pivotal role in informing the mixed-methods evaluation (Hall, 2013). Intelligent action is about intelligently utilising different methods to provide information that will help us make evaluative judgements. This opens possibilities for "*different types of data, methods, and even assertions to be mixed based on the premise that both means and their consequences are developed and perfected in the processes of continuous inquiry*" (Dewey, 1938)

With regards to research findings, Dewey argues that each issue has to be argued through on the metrics of the case against the background of a particular history and context. This is a belief that underpins this research as it emphasises on the larger societal, financial, and historical context that has moulded the implementation of each project studied. With these contextual considerations in mind, a description of the planning system of the two countries of interest is conducted in Chapter 5, and a description of the political and societal context that influenced the generation of each scheme is undertaken in the first paragraphs of Chapters 6, 7, 8 and 9. Furthermore, the success of each project has not only been evaluated by key stakeholders, but has also been partially assessed by the population of each neighbourhood.

Dewey asserted that no knowledge claim, no moral rule, principle, or ideal is ever certain, immune from all possible criticism and revision (Ormerod, 2006). He believed that progress can be made by the maintenance of social structures that encourage continuous enquiry. In this type of practice, constantly reflecting upon the various lines of action, inquiry practices, or hypothetical consequences provides credibility of

evidence (Dawey's Principle of Credibility⁸) in a study of a particular phenomenon. This credibility is what makes the utilization of evidence democratic in the way that not only does it serve those with the power to force a resolution, but also the ones least empowered (Seigfried, 1996).

This belief has shaped this research project in the sense that the final theory proposed in the form of a matrix for sustainable neighbourhood development will have to be subject to continuous inquiry. The aim of the research is to utilise experiences and evidence from case studies to generate a tool that can be used by the people of a community for the development of their community, within the sphere of an extended and highly inclusive public participation process.

The pragmatic philosophical position wants our habits to be flexible and intelligent, but then, we must do our best to structure an environment that will allow and provoke the operations of intelligent inquiry (Ormerod, 2006). Considering this theory on the practical application of the pragmatic views, this research project does not end at the point where the matrix is presented. On the contrary, we suggest that the tool should be tested on a real setting where the actors involved in the process of continuous inquiry will be the communities and the stakeholders participating in the development process, who will collectively engage in a democratic decision-making course.

4.2 The case study research

4.2.1 Rationale

Built environment is a rather complex field that consists of several different components, both material and nonmaterial in nature and, as a result, the use of a single methodology is usually inadequate in exploring them all (Amaratunga, Baldry, Sarshar, & Newton, 2002). The mixed methods approach counteracts this weakness and enhances research in the built environment. There are certain benefits in

8 According to Dawey, reflection is what makes evidence credible. "From analysing multiple data sources, questioning assumptions, considering various lines of action, hypothesizing about consequences, to warranting assertions, reflective acts permeate Dawey's intelligent inquiry and form the basis of his "Principle of Credibility" (Murphy J. P., 1990, p. 68).

conducting a mixed methods research and these have to do with the utilisation of the best attributes that the qualitative and quantitative approaches can offer. In the recent literature, the benefits of conducting a mixed methods research are related to triangulation, completeness, offsetting weaknesses and providing stronger inferences, and answering different research questions (Doyle, Brady, & Byrne, 2009). The selection of the mixed methods approach in this research underpins the pursuit for a holistic appreciation of the sustainable development field which comprises of both qualitative and quantitative elements.

Key to the methodological approach employed is the selection of case studies to investigate how sustainable development is conceived and implemented in practice. Case study research is appropriate for a field as complex as the field environment (Proverbs and Gameson, 2008), combining empirical data with theory and concepts. Collecting data through case studies offers a close linkage with reality and the theory formulated is likely to be novel, testable and empirically valid (Eisenhardt, 1989).

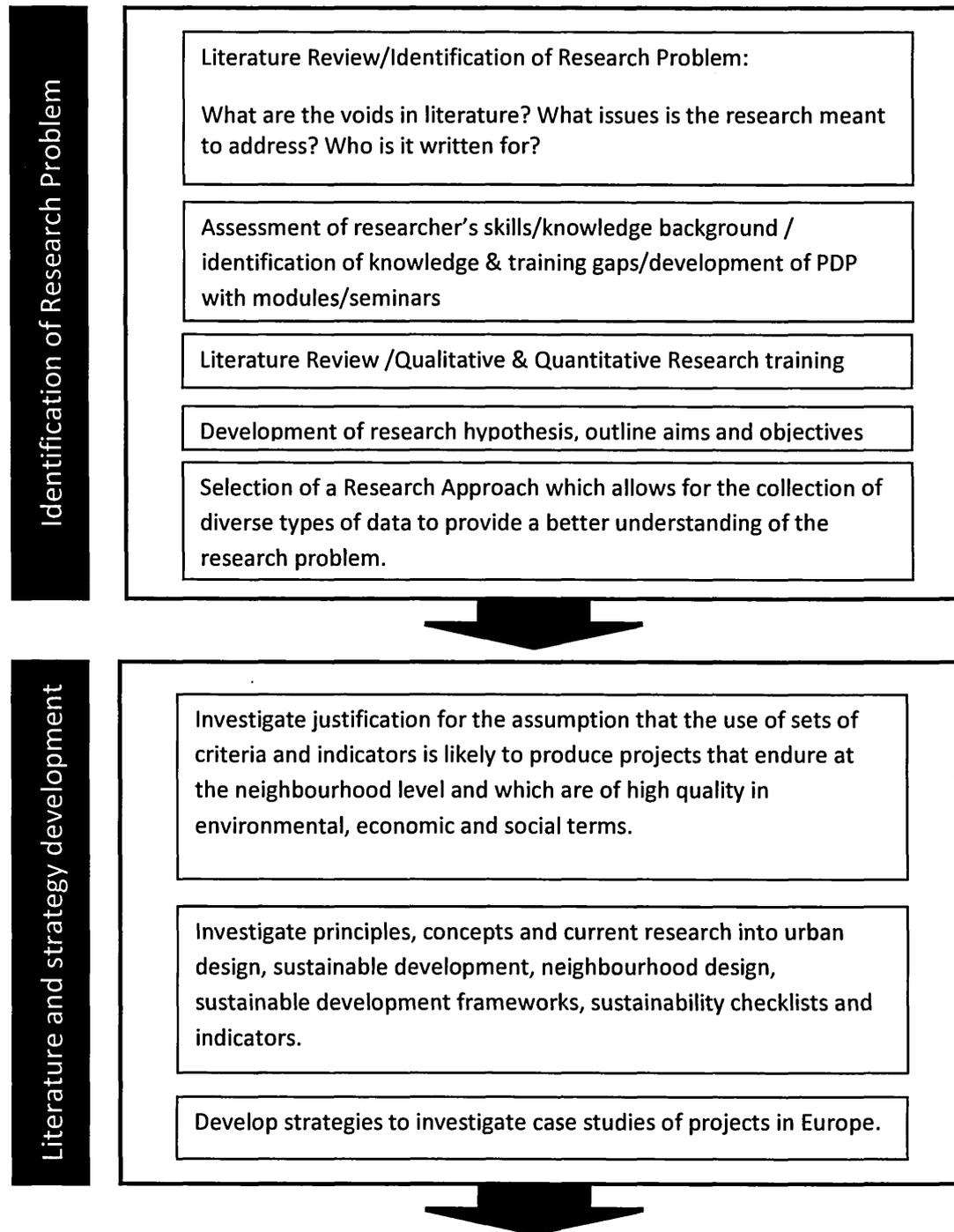
With regards to data collection, the use of triangulation was adopted. Triangulation is the combination of two or more data sources, investigators, methodological approaches, theoretical perspectives, or analytical methods (Thurmond, 2001). Four sources of evidence have been used (Yin, 2003) and incorporated in the research design to maximize the validity and to add breadth and depth to data collection. These were documents, questionnaires and interviews with key stakeholders concurrently gathered in the process of study visits, and were integrated in the interpretation of the overall result.

Qualitative data gathered from interviews and project documentation assisted with the material side of the study concerned with the identification of criteria that physically define a sustainable neighbourhood. In addition, quantitative data that have stemmed from a statistical survey on resident satisfaction will help the nonmaterial side of the study. The non-material side of the study depends on subjective judgements of satisfaction with regards to various life-domains that define sustainable development. The material and non-material sides of the study will eventually merge

in the analysis of the case studies selected so that a more comprehensive understanding of the successes and failures of the projects is gained.

4.2.2 Research Design

The proposed research design and stages for the study incorporated into five major steps as illustrated in Figure 5.



Case Studies

Review of sustainable neighbourhood development initiatives in Europe and select the ones most appropriate for the research.

Investigate international, national and local policies relating to the successful implementation of the features of sustainable development on each neighbourhood case.

Explore the decision-making process: background of stakeholders involved; each party's involvement in the process, different perspectives on what constitutes sustainable development etc.

Investigate the development strategy followed, the urban design qualities of the master plan produced and the criteria and indicators that were selected to promote sustainability.

Search for data relating to the monitoring of the projects and investigate the residents' overall satisfaction in order to see whether the quality of life has been improved.



Analysis

Collect the data stemming from the case studies investigation: thematic analysis of interview transcripts, questionnaire statistical survey, themes and outcomes found in project documentation, photographic material and personal notes from study visits.

Compare and contrast negative issues and problems concerning either the process of conceptualization or the process of implementation of the projects.

Compare and contrast the positive elements that constitute the success of the projects.

In accordance with the findings, introduce basic themes for sustainable neighbourhood development.



Matrix Development

Generate the checklist of criteria for success based on the themes deriving from the analysis.

Develop or use an existing method to weight the material and non-material criteria in order to create a matrix that will assess a neighbourhood development initiative in quantitative terms.

Testing/validation of the matrix.

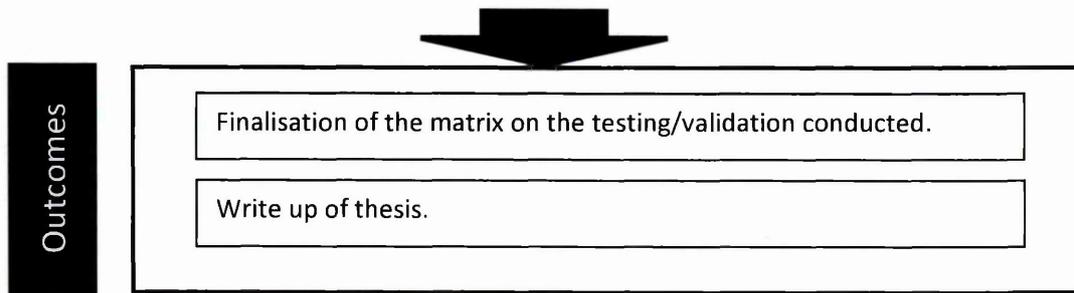


Figure 5 Conceptual Framework (Illustration created by the author)

The research design indicates that this research is grouped into six steps: Identification of the research problem, literature review and strategy development, case studies investigation, analysis of the data gathered, checklist and indicators development and outcomes documentation.

I started the research process by identifying the research problem. Through an extensive literature review on sustainable development I was able to identify how, despite extensive research undertaken by numerous academics, there was no consensus on which specific issues need to be addressed to facilitate sustainability in urban planning and design. Furthermore, I realised that although the planning system had shifted its focus from the regional to the local geography, little research pertaining to small scale urban development had been undertaken. It eventually became clear that while the transition from global to local was a matter of priority for many governments in Europe, sustainability at the neighbourhood scale was an understudied field. The literature review also brought to the surface how frameworks and indicators for sustainability were either focusing on larger scales (global/national/regional), or small scales (building) but were neglecting the intermediary ones. These considerations and the identification of literature gaps guided the formulation of the research hypothesis for the research, presented in Section 1.3.

The multidisciplinary nature of the field under investigation called for advanced skills in qualitative and quantitative research. My technical background and studies in Architecture had made me more comfortable working with quantitative techniques. However, the investigation of the social aspects of sustainable development required qualitative treatments which I was not very familiar with. A Personal Development

Plan that involved modules and seminars was then formulated, in collaboration with my supervisors, to ensure that knowledge gaps would be appropriately addressed.

The training received along with an extensive study of research methodologies enabled me to make an informed decision on an appropriate research paradigm which would form the philosophical background of my research. I decided to adhere to the pragmatic research paradigm as it attempted to fit together the insights provided by qualitative and quantitative research into workable solutions.

Because of the complexity of the process of developing the built environment, the literature review undertaken needed to be particularly broad in essence and thus it covered several different interrelating disciplines. The main areas of interest were the concepts, missions and components of sustainability, urban planning and design, and the incorporation of sustainability principles in the development process, and the history of the development of neighbourhood settlements. More technical issues such as assessment methods, indicators and frameworks were studied in detail, and the progress achieved internationally so far was reviewed.

During those initial stages of my research, the literature review alone seemed inadequate in enabling me to acquire a holistic perspective of all aspects of sustainable development. Thus, exploring practice in relation to theory became central to my research design.

This practice is academically known by the term *reflective writing* and many journals accept its significance as it is a way to establish rigour within the study (Jasper, 2005). This reflective strategy is also perfectly aligned with the pragmatic paradigm moulding this research, in the sense that the interpretation of each theoretical notion should be conducted by tracing its respective practical consequences (Peirce, 1878).

Therefore, concurrently, with the initial literature review and in order to achieve a better understanding of how sustainable development is implemented at the neighbourhood level, study visits were conducted and numerous conferences and workshops were attended. For instance, Hockerton, a rural settlement in UK was visited in spring 2009, where I had the opportunity to observe and evaluate the

admissibly enhanced quality of life that sustainable settlements provide to the inhabitants. In these early stages of investigating the concept of sustainable development through literature review and direct observations, crucial decisions were made with regards to the selection of data collection methods for the research project. I recognised the benefits of conducting study visits and felt that these had to be repeated for the projects to be included in the research. In addition, the importance of meeting with key stakeholders in different jurisdictional levels was acknowledged. Conducting interviews was seen as an appropriate method that would bring in surface inconsistencies in policy and problems in the decision making process that are usually encountered by practitioners and stakeholders.

Finally, the importance of the residents' views with regards to sustainable development was seen as a key element for the validation of any research outcomes relating to the success of the projects. As sustainable development is expected to meet the needs of the present and future generations, it was important for this research to investigate whether this criterion had been met. This was attempted through measuring resident satisfaction with regards to a number of criteria, closely related to quality of life aspects as explained in Section 4.9.1. Questionnaires were, therefore, seen as a reliable source of information that could further assist in proving or confuting the success of the projects under investigation.

The analysis stage of the research utilised the investigation of qualitative and quantitative data to provide the basis for the development of a set of criteria that will explicitly define a sustainable neighbourhood. At this stage, the outcomes of the qualitative and quantitative surveys were associated and compared and the advantages and disadvantages observed in each case were gathered and will be presented in Chapters 6, 7, 8 and 9. Based on the outcomes of the analysis, a checklist of criteria for success was developed (Chapter 10). This checklist was aiming at introducing best practice integration of sustainability in the development process to meet the needs of a broad range of users. There are already different sets of checklists and indicators currently in use for the development of new neighbourhoods. However, this case study research of best practice projects has provided an opportunity for the

comparison of processes, checklists and indicators that have been used in reality and have proven to be successful.

As outlined in Figure 5, the last stage of this project has been devoted to the documentation of all aforementioned stages of the research.

4.2.3 Strengths and weaknesses of methodological approach

A common challenge of the mixed methods approach is the ability of the researcher to efficiently use qualitative and quantitative methods with equal mastery (Doyle, Brady, & Byrne, 2009). This is a reasonable critique since most graduate programmes tend to specialise in one set of methods to the detriment of others (Pearce, 2012), a fact that implies that depending on the training the researcher has received, they tend to specialise in either qualitative or quantitative approaches. It has been argued that the aforementioned has been the cause of sloppiness in research (Feilzer, 2010), a problem that can be resolved when a research team rather than an individual researcher is employed, so that both qualitative and quantitative phases of the research project can be undertaken concurrently (Doyle, Brady, & Byrne, 2009).

On the other hand the methodological pluralism mixed methods research entails contributes to a better understanding of the development industry's organisations and projects (Dainty, 2008). The multiplicity of processes and actors involved in the development of the urban environment can only be fully comprehended and investigated when both qualitative and quantitative aspects are considered.

Another crucial aspect of blending the two different methods is associated with the combination of their strengths to produce a final result that highlights the significant contributions of both (Nau, 1995). If the two paradigms are successfully mixed the research findings and outcomes are more likely to be superior to mono-method studies (Johnson, Onwuegbuzie, & Turner, 2007).

4.3 Cross-comparative study of successful initiatives in Germany and the UK

4.3.1 Rationale

According to Zartman (2005), multiple case studies allow for a better understanding of the details and peculiarities of an issue so that the fit between generalisations and the data can be fully explored, explained and understood. Since this research seeks to test how the concept of sustainable development is materialised in the urban context, the use of multiple case studies as opposed to a single, will give a rich insight on what criteria have influenced the development of sustainable settlements in different settings. A cross-comparative study of that sort will focus on variations in different locations, giving in that way a rich harvest of factors that have contributed to failures and successes. This exploratory process will be particularly useful in introducing a generic checklist of criteria for success in developing sustainable neighbourhoods.

The schemes chosen for this researched are located within the European territory and were selected on the basis of their success in achieving the sustainability goals perceived as significant in contemporary literature. The analysis of the case studies in the chapters to follow will relate to a wide range of parameters such as urban and architectural design attributes, legal, institutional and operational issues related to sustainability, the role of the political forces involved, the main stages of the development process, how and in which of the stages was sustainability considered, the cost, and models of financing, etc. The multiplicity of attributes analysed is not only aiming at an in depth exploratory research practice but it is inevitable for the holistic and accurate investigation of the complex field of sustainable development.

4.3.2 Strengths and weaknesses of case study approach

One of the most important virtues of case study research is its internal validity (Woodside, 2010). It enables the researcher to gain a holistic view of a phenomenon using multiple sources of evidence (Noor & Baharein, 2008). The multiplicity of variables and the wide range of causal links to be examined offer the possibility of in-depth analysis, making the prospect of the emergence of a clear picture of a certain phenomenon more likely.

Furthermore, theory building from cases increases the likelihood of generating a novel theory. As contradictory or paradoxical evidence is closely investigated creative insight arises and a new theoretical vision is produced (Eisenhardt, 1989). As the new theoretical vision is intimately tied with evidence, it closely mirrors reality and, thus, it is empirically valid.

Another major advantage of multiple case study research is that it makes the research findings more consistent, when replication of the findings occurs in all case studies selected (Noor & Baharein, 2008).

The multiple case study approach is also the groundwork for an investigation of distinctive circumstances that have played a role in each scheme's success in terms of sustainability. This type of study heavily relies on the theory of *eco-localism*, the economics of a local (placed) community, which illuminates how local contextual differences affect the overall progress towards sustainability. According to Curtis (2003), the establishment of a healthy community economy requires both the preservation of the eco-system on which it depends as well as the subordination of the economy to society, the local community. The theory has, therefore, compatible concepts of sustainability and, focuses at the local scale, as the environment and natural capital varies by locality and region. Consequently, the selection of multiple cases studies for this project, aims at exploring how these local capital variations affect differentiations in strategies for sustainable development.

Along with focusing on local uniqueness, this research also seeks to identify cross-national similarities that are related to the success of sustainable neighbourhoods. The selection of multiple case studies permits the examination of whether a particular phenomenon observed in one setting also occurs in a similar fashion in a different setting. For that reason, I will be looking at two different countries, Germany and the UK, to explore potential similarities or differences in the way sustainable neighbourhood development is perceived in theory and implemented in practice. Essentially, by defining parameters of similarity, the potential for theorisation of successful concepts and techniques becomes more feasible.

Despite the aforementioned strengths, there are significant weaknesses associated with case studies as a method of research. One of the major criticisms is the 'subjective' essence of judgements that often the investigator uses to collect data (Yin, 1994). Unless the research design incorporates a fully comprehensive set of attributes to be studied, which are genuinely relevant to the research questions, the research is biased and therefore lacks validity.

Another weakness of the case study approach is the complexity of the theory formulated. The staggering volume of rich data poses the temptation to build a theory that captures everything (Eisenhardt, 1989). The result is then likely to lack sense of proportion and can be overly detailed and complex.

Also, the issue of external validity can be rather problematic when conducting case study research since they have been criticised of providing little basis for scientific generalisation (Yin, 1994). If the selective cases are not representative or typical, generalisation can be misleading. The generalisation of the results of the case study forms a theory that might apply to a larger number of similar cases, even though further replications have not been performed. This can be appropriate, but it can be problematic at the same time since case studies are generally situation-specific (Dubois & Gadde, 2002). It is, therefore, essential to test the potential of the framework to become universal in the scientific field.

In comparison to single-case study research, multiple case studies can require extensive resources and time beyond the means of a single student or independent research investigator (Yin, 1994). *That is because each individual case study is a 'whole' study, in which convergent evidence is sought regarding the facts and conclusions for the case; each case's conclusions are then considered to be the information needing replication by other individual cases* (Yin, 1994).

In summary, case studies are an appropriate strategy to be used in the field of the built environment and they are very successful in providing answers to questions of how and why within a real life context (Yin, 1994). Conducting case study research, however, can be a daunting and particularly demanding task for the investigator since,

in order to overcome the weaknesses of the method, they need to exercise great attention in conceptualising the research design and undertaking the study.

4.3.3 Ensuring the quality of the research design

According to Yin, the quality of the research design can be assured using a number of measures (Yin, 1994). The measures that apply to this research are the following: Construct validity, external validity and reliability.

To ensure construct validity and to, therefore, avoid subjective judgements this study has incorporated several sources of evidence from which the findings will be extracted. First of all, interviews have been conducted with representatives of the investor, developer and designer organizations, with the key planning officers and with members of the community. Secondly, questionnaires have been given to the residents to measure the success of each project from the public's point of view. Lastly, further information has been drawn from archival records and other documents.

An additional measure that has been employed is a chain of evidence in the final, narrative form. In that respect, each key element of the research presented in the text is always related to evidence of different kinds. In that way, the logical flow of evidence is maintained.

External validity is related to the problem of generalisation of the research findings. The risk of misleading generalisation can be avoided if replication of a theory constructed from one of the case studies in the others occurs. Such an attempt has been made in this research and a further attempt to enhance external validity has been made through the pilot study for the selection of the cases the details of which will be presented in the following section. The careful selection of the sample, as well as the replication technique, has justified a tentative analytical generalisation. To further increase the validity of the findings, the author pursued the feedback of the experts that were interviewed for this research. The final checklist of criteria was therefore sent to all interviewees who were involved in the development process of the four projects. Their extensive experience from the projects and their expertise in

matters relating to the sustainable development discipline highlighted their appropriateness to evaluate the checklist developed (see Sections 6.3, 7.3, 8.3 and 9.3). Based on the responses of the individuals who agreed to provide their comments and remarks, the checklist was amended accordingly.

Reliability according to Yin represents the effort to minimise errors and biases in the study. There are two strategies proposed by Yin. Firstly, there is a need for a case study protocol to be established. This has to provide an overview of the case study project, field procedures, case study questions and a guide for the case study report (Yin, 1994). The research protocol is presented in Section 4.11.

The second technique, as presented by Yin, involves the development of a case study database, where the data from the different sources of evidence is used jointly and analysed in comparison to each other. In this research, for each one of the case studies under investigation, a database was developed, where the evidence deriving from interviews can be seen in relation to evidence extracted from published documentation for each case study.

By employing Yin's suggestions and procedures, an effort was made to minimise errors and biases and increase the validity of the findings of this research. A further measure to add validity would be the testing of the checklist on a real project but that surpasses the scope of the present study, which is significantly limited by time and financial constraints.

4.4 The pilot study: searching for exemplary projects at the neighbourhood scale

4.4.1 The selection process

As was outlined in the previous section, in order to increase the external validity of the research project much attention was paid to the sampling procedure. In order to arrive to an appropriate match between reality and theoretical constructs an appropriate sample had to be selected on which data collection could be based (Dubois & Gadde, 2002).

The primary aim of the pilot study was to identify the most appropriate sustainable neighbourhood projects to be involved in the research. It involved three stages and it concluded in four neighbourhoods that represented best practice and that could be included in the research for further investigation.

The first step involved an in-depth literature review to identify key criteria for sustainable urban development. This process was explicitly discussed in Chapter 2 where key attributes of sustainable development were pursued, analysed and presented in Section 2.5.

The second step of the pilot study involved the investigation of projects that represented best practice. Through an elaborate literature and internet based research a vast amount of different kinds and forms of sustainable neighbourhoods were identified. These were located in different countries in Europe, were varying in scales (from 5,000 to 100,000 inhabitants), were in either rural or urban locations, regeneration or Greenfield developments, and in different levels of completion.

The different projects were evaluated in terms of their progress towards sustainability using the table formulated in the first stage. The pilot study then identified 8 projects that fulfilled most of the sustainability criteria. These were **Hammarby Sjöstad** in Stockholm, **New Islington** in England, **Freiburg** in Germany, **Ecolonia** in Holland, **BedZed ecovillage** in England and **Hafencity and Kronsberg districts** in Germany. All of them were the result of careful design, positive planning at a larger spatial scale and innovative decision-making practices, which in all cases involved extended public participation.

In the final stage, and after the projects had been assessed, the final selection was based on issues of scale, site location, and other concerns of practical nature that would enable the research to be completed in time and within the financial limits set by the university. Therefore the research is focusing on urban settings rather than rural ones. In addition, projects that were completed or were near completion were preferred, to allow for a resident satisfaction survey to take place. Finally, the scale of the projects that were favoured had to be typical of a neighbourhood or small

community, as this is defined in the relevant literature (see Chapter 3). Hence settlements with population of 5,000 – 20,000 inhabitants were preferred.

Further criteria for inclusion were related to practical issues that were considered forbidding by the researcher. For instance, language limitations would hinder effective communication with key stakeholders. Moreover, of crucial importance was also the accessibility of the sites, since study visits had to be conducted. Hence, projects with on line web sites and on-site offices that organise study tours were preferred.

PROJECTS	Evaluation																			
	Socially Sustainable						Environmentally Sustainable						Economically Sustainable							
	Meeting basic human needs	Community Resilience	Local Identity	Safety and Security	Collective groups and networks	Accessibility and stability	Social diversity and integration	Social participation	Ecologically responsible energy strategy	Ecologically responsible water strategy	Ecologically responsible waste strategy	Ecologically responsible selection of building materials	Preservation/Revitalisation of natural landscape	Land use diversity, high density development, sustainable mobility, local food	Owner and resident training and education	Pollution Control and environmental auditing for businesses	Training and skills development for residents and entrepreneurs	Support for community businesses and local co-operatives	Sustainable, environmentally friendly transport for maximum accessibility.	Partnerships between local councils, agencies, and the private sector/creativity
New Islington	★	?	★	?	★	★	★	★	★	?	★	★	★	★	★	?	X	X	?	★
Upton	★	?	★	?	?	?	★	★	★	★	★	★	★	X	?	?	★	★	?	★
Kronsberg	★	★	★	?	★	★	★	★	★	★	?	★	★	★	★	?	★	★	★	★
Vauban	★	★	★	★	★	★	?	★	★	★	★	★	★	★	★	?	★	★	★	★

Key	★	Successful according to literature	X	Not successful according to literature	?	Further investigation required
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Figure 6: Sustainability evaluation matrix (illustration created by the author)

Consequently, New Islington, Upton, Kronsberg and Vauban, sustainable neighbourhoods located in Germany and in the UK, were included in the research. The case studies adopted have been within the geographical limits of Europe, not only because of financial and time constraints, but also because of the common strategy for matters concerning sustainable development by the European Union’s member states.

Although the pilot study undertaken was of superficial essence, in the way that it was subject to the constraints of a literature review, many lessons were learned from the projects studied, which assisted the researcher in acquiring a holistic picture of the diversity of criteria for sustainability that have defined eco-neighbourhoods in different countries. However, further investigation of the cases selected, which will

take into account quantitative aspects as well, will be conducted in the following chapters, to allow for meaningful conclusions to be drawn in the final outcome.

4.4.2 The case studies

In this section, the four case studies are briefly presented. Background information relating to type of development, population, the initiator of the development process and the stage of the development have been summarised and tabled. The basic aims of the projects are highlighted and a brief abstract outlines some key issues. The four case studies are presented in more detail in Chapters 6, 7, 8 and 9.

New Islington, Manchester, U.K.



Figure 7: New Islington (Google Maps, 2009)



Figure 8: New Islington square (Author, 2009)

Categorisation	
Type	Urban greenfield
Population	Approximately 5000
Initiator	Public/private partnership
Stage of development	Progressing. Expected to be completed in 2012

Aim:

The development of a new high-density, mixed-use area that will revitalise the currently isolated and declined Cardroom Estate.

Upton, Northampton, UK



Figure 9: Upton master plan. (The Prince's Foundation, 2010)



Figure 9: Upton, Phase 1 (Author, 2009)

Categorisation	
Type	Urban extension
Population	5.000
Initiator	Public
Stage of development	Under development

Aim:

The development of an urban extension to the South West of the city of Northampton.

Kronsberg, Hannover, Germany



Figure 10: Residential buildings in Kronsberg (Author, 2010)



Figure 11: Panoramic view of Kronsberg (Hannover (Hannover Handbook, 2000)

Categorisation	
Type	Urban greenfield
Population	15.000 (5 smaller neighbourhood units of 3.000 each)
Initiator	Public/private partnership
Stage of development	Mainly built but still progressing

Aim:

Kronsberg is a showcase for a range of exemplary initiatives concerning sustainable urban development, and was planned as a completely new city district with the objective of giving physical expression to the EXPO 2000 themes (Humankind-Nature-Technology).



Figure 12: Vauban central square (Author, 2010)



Figure 13: Vauban Main Avenue, view from the square (Author, 2010)

Categorisation	
Type	Urban renewal
Population	5.000
Initiator	Public
Stage of development	Completed in 2006

Aim:

The project's aim was the development of a city district that meets ecological, social, economic and cultural requirements, in a co-operative, participatory way

4.5 Data collection methods

In relation to the overall research methodology, different sources of evidence were employed for consistency with the selected research method. According to Yin, converging findings from different sources increases construct validity in case study research (Yin, 1994). In line with Yin's suggestion, four data collection methods were used, a more detailed description of which follows below.

Projects' Documentation

A literature review of the projects' documents and reports was conducted to explore key goals and objectives and sustainability criteria employed for the development of each scheme. Key policy documents and planning regulations were also investigated to identify the policy and planning background in the different countries. All information gathered from the literature review was summarised and tabled by the author, and is presented in this thesis in Chapters 6, 7, 8 and 9.

Interviews

Empirical evidence stemmed from data deriving from interviews to key stakeholders who were members of the team of partners, planning officers, developers, residents or professionals within the built environment field who had developed a keen interest in the projects. The selection of interviewees from different groups was intentional and was aiming at exploring perspectives of actors who were either professionals in the field or common people who were involved in decision-making for the projects. The purpose of the interviews was to evaluate the success of the projects from the key actor's point of view.

The Interview Protocol

The interview protocol utilises the semi-structured approach. Therefore, the same set of questions was asked to all participants to allow for meaningful conclusions to be drawn in relation to each theme. The interview protocol was sent to the interviewees in advance, to give them sufficient time to prepare their responses. The questions were flexible, enabling the interviewees to focus on their experiences from participating in the development process. According to their responses, further questions were asked for clarification and probing purposes. The themes that underpinned the questionnaire derived from the literature review and were intending to highlight the participant's perceptions on successes and failures. These covered the following generic areas:

- Participant's involvement in the scheme
- Participant's perception on the successes and drawbacks of the project
- Participant's perception of urban design qualities for sustainability
- Participant's perceptions on the effects of environmental legislation
- Project's success with regards to economic sustainability
- Perceptions of civic pride and community spirit
- Participant's perceptions on public-private partnerships for success
- Participant's perceptions on community involvement and action in decision making
- Participant's perceptions on indicators and frameworks for sustainability

- Participant's perceptions on the transferability of successful aspects of the project

4.6 Ethical Considerations

Confidentiality was maintained by protecting the anonymity of the participants (Ryen, 2004). Therefore participants in this study are referred to as "Interviewee" followed by a letter of the alphabet and no reference was made to their specific responsibilities in the project such as 'director of...' or 'chief executive...', for example. This decision was made by the researcher in light of potential disclosure of confidential information by members of the developer companies relating to the projects' assessment conducted by the organisation they represent. Such disclosure of sensitive information could have been in potential conflict with the firm's code of ethics. Further concerns were related to the likely exposure of names of third parties that could potentially jeopardise the interviewee's social relations in the community or in their work environment. Interviewees' consent with regards to anonymity and to participating in the research was formally requested via a written invitation prior to initiation for the interviews.

The participant consent forms were securely stored, separately from both tapes and transcripts. In that way, all information relevant to the identity of the participants on the consent forms was separated from the audio material and the transcripts. The recordings were not available to any other individuals apart from the researcher and the supervisors and they will be retained until the final degree results are announced. Once the results are announced, data will be discarded so that they do not fall into the hands of other researchers who might appropriate it for other purposes. All aforementioned issues were made clear to all participants in the consent form. This project received ethics approval from Sheffield Hallam University in January 2010.

4.7 Analysis

Strategies for qualitative analysis fall into three main groups: categorising strategies (coding/thematic analysis), connecting strategies (narrative analysis and individual

case studies), and memos and displays for a more detailed discussion (Bickman & Rog, 2009, p. 236).

Firstly, a coding system has been used in this research to categorise the data. The goal of coding is to rearrange the data into categories which may derive from existing theory, or inductively generated during the research. Coding in this research has occurred concurrently with the development of the questionnaire as the questions represent the categories of interest. The codebook or in other words the template of codes, is usually based on a preliminary scanning of the text (Fereday & Muir-Cochrane, 2006), but for this study, the template was developed a priori, based on the research questions. The topics selected have derived directly from the literature review and are stemming from the basic sustainability themes consolidated in Figure 1, Section 2.5. Bearing in mind the participants' level of involvement in the projects, the questions (see Appendix 4) are aiming at gauging the key stakeholders' perceptions on whether the projects remained true to their initial aims and whether true progress towards sustainability has been achieved.

The analysis of the interviews has followed a thematic approach. Thematic analysis is a search for themes that emerge as being important to the description of the phenomenon (Dally, Kellehar, & Gliksman, 1997). It is a form of pattern recognition within the data, where emerging themes become the categories for analysis (Fereday & Muir-Cochrane, 2006). Thematic analysis has been preferred to Content analysis as the latter is more relevant in cases where there are no previous studies dealing with a phenomenon, and therefore the coded categories are derived directly from the text data (Hsieh & Shannon, 2005).

Interviews were tape-recorded and transcribed. As Hart suggests, *"The use of a tape recorder has proven to be vital to the success of an interview, relieving the interviewer from multitasking, so that a genuine exchange can take place, and the accuracy of complete transcriptions for analysis can be obtained"* (Hart, 1989). The process of transcribing the data was a vital first step in providing an overview of the information in hand. According to Boyatzis, this initial stage is highly important as the researcher is able to appreciate the richness of the data collected (Boyatzis, 1998). Following the

transcribing process, the complete transcript was read several times and *marginal remarks* were coded (Miles & Huberman, 1994). These were remarks that assigned units of meaning to the descriptive or inferential information within the verbatim text (Miles & Huberman, 1994). This process was manually conducted, by using 'comment boxes' related to the different statements of particular interest, in Microsoft Word. An example of a typical transcript with marginal remarks is shown below.

If I'm being critical, the bit that we were least satisfied with is the quality of the architecture in the later phases. The code was actually changed and simplified after phases one and two. And I think with that change in the code, actually the quality of the architectural design begun deteriorating...It became easier to get away with poorer quality architecture...Phases one and two are in my opinion far higher in architectural quality and public realm quality than the later phases where the architecture and the detailing is much worse.

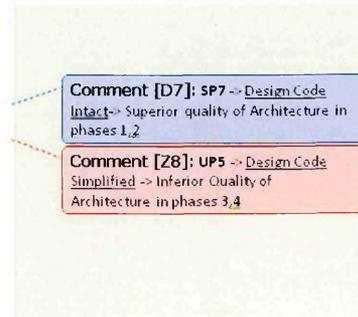


Figure 10: Example of typical transcript with marginal remarks

SP here is an abbreviation for successful point whereas UP is an abbreviation for unsuccessful point. The use of coding and colours assisted me in the final consolidation of the successes and failures of the projects (as these were raised by the interviewees) in a single table. This type of coding remained consistent throughout the process of analysis in all 9 interview transcripts and it assisted in data reduction and conclusion drawing (Miles & Huberman, 1994, pp. 10-11).

The second stage of analysis involved the development of a matrix-form interview data display for each case study. These displays were thematically orientated and aimed at highlighting the prevailing opinions, conflicting statements or interesting remarks for each theme. An example of a typical interview data display is shown below.

		Summary of Verbatim Data		Theoretical Notes
		Interviewee A	Interviewee B	
Q3	Which would be the aspects of the development that could be applied in similar initiatives to lead to their success?	<ol style="list-style-type: none"> 1 Some of the most successful aspects of New Islington like the canals are very site-specific and might not be the right solution in another location. 2 District heating schemes are more likely to be included in a universal set of criteria for success, but it needs to be made sure that a critical mass is existent so that they are truly effective. 3 The division of the land into small plots ensured a diverse aesthetic result and could easily be applied in other schemes as well. 4 In projects where just one or two designers are involved, the result is aesthetically monotonous and boring. A plethora of different architectural styles can make an area more exciting. 5 The connection of a new development with the surrounding areas is of crucial importance for its viability. 6 Urban Splash recruited experts from different disciplines to ensure success in every aspect. 7 Instead of recruiting a team of consultants from another company (like BEQUEST), the developers decided to form their own team. That practice integrates trustworthiness and has been successful for the specific developers so far. 	<ol style="list-style-type: none"> 1 There is not a right recipe that can guarantee the success of every project because success is dependent upon location. 2 The regeneration of areas creates a snowball effect by giving motivation to the owners to refurbish their old properties. As a result, more people are attracted to the area and the area becomes a hotspot for developers. 3 The owners' confidence to invest originated from the logical assumption that the combination of the regeneration works and the refurbishment of the old building stock would attract more people in the area. 4 There is a proportional relevance between quality and the cost of a development. If quality is the desired result then a significant amount of money should be invested on both the public realm works and on the building stock of an area. 5 The quality of the area in terms of public realm should be reflected in the quality of the buildings as well. 6 The water features of the area of New Islington and the reopening of the canals had a major contribution to the success of the project. It was difficult to implement and costly but it made the project exemplary and unique. 7 When the team of the different partners consists of people who are open-minded and creative then the success of a project is highly likely. 	<ol style="list-style-type: none"> 1 Both of the interviewees claimed that success is site-specific and dependent upon the market conditions in a certain location, at a certain moment in time. 2 Amongst the aspects of the scheme that could be applied to other initiatives regardless to location are: <ul style="list-style-type: none"> • <u>District heating schemes</u> (when a critical mass is existent) • <u>The division of the land into small plots</u> and the <u>involvement of various developers</u> both of which ensure a diverse aesthetic result. • <u>Accessibility in every sense</u> (to the adjacent areas and for the people with disabilities) • <u>The recruitment of experts from the different disciplines</u> in a development project and the <u>formulation of a trustworthy and coherent team</u> (opinion shared by both interviewees) • <u>Public realm works</u> that apart from being crucially important for the viability of the community, give confidence to the private sector to invest. • <u>Building upon the prevailing conditions of each area</u> like it happened in New Islington with the canals. • <u>Investing in quality</u> both for the neighbourhood and for the buildings. It might be risky moneywise, but it leads to a successful result. <p>Theme: Success is location-specific</p>

Figure 11: Example of a Typical Matrix-Form Interview Data Display

The first column in the table displayed above includes the question while the second and third columns contain the summary of the verbatim data. Finally, the *Theoretical Notes* (Tuckett, 2005) in the third column have brought together the research participants' commonalities and differences. The corresponding themes that began emerging were recorded in red font.

The utilisation of this form of display was aiming at facilitating the theme comparison between the four case studies, and later on, the contrasting of the data extracted from the interviews with the data extracted from the resident satisfaction survey.

Consequently, a story was developed as eventually the data were organised in a cohesive way. The final stage of analysis then involved the comparison of the data gathered in a sequence that moved between description and abstraction concurrently with a review of the relevant literature. The themes extracted from the interview analysis represent the specific factors that have influenced the projects' performance and they have been discussed in depth in Section 11.5.

The transcripts were finally returned to the interviewees via email to ensure they were comfortable with the result. Participants were asked to reflect on the content of the

interview and to indicate whether there were certain statements they wished to withdraw. *Respondent Validation* is considered to be appropriate in qualitative research literature as it increases research validity (Bryman & Burgess, 1994).

4.8 Limitations

Certain limitations emerged due to the initial decision of the researcher to conduct single interviews with the participants. According to Mishler (Mishler, 1986) vital contextual information is more likely to emerge across multiple meetings with the participant. Although an effort was made to seek clarification on certain statements and to examine additional content via email, in the author's experience multiple interviews would likely have established a stronger relationship between the interviewee and the researcher and thus result in a better understanding of issue under investigation. However, in this research, the feasibility of conducting multiple interviews was hindered by time and financial constraints.

4.9 Questionnaire Survey

The survey of resident satisfaction was the third data collection method employed in this project. As Romice argues, *'for their size and impact on daily life, neighbourhoods are ideal units to study and assess quality of life because they combine physical and social scale: Social networks tend to overlap to spatial arrangements and issues of territoriality, identity and well-being become attached to location'* (Romice, 2005). Literature also suggests that it is important to explore neighbourhood satisfaction since it influences the community's residential mobility, and it is also a quality of life indicator (Permentier, Bolt, & Van Ham, 2011).

The quality of life issue has been extensively identified by multiple researchers as a principal element of sustainable development. As Petersen & De Vries suggest, *'the best development process is one that allows the greatest improvement in people's quality of life; and quality of life depends on the possibilities people have to adequately satisfy their fundamental human needs'* (de Vries & Petersen, 2009) Since improving

quality of life is one of the primary goals of sustainability, it can be suggested that resident satisfaction is indirectly an indicator of sustainability.

The survey was therefore aimed at evaluating the effectiveness of sustainable development strategies, as these were applied on the four case studies, from the residents' point of view. Its principal objective was to investigate the residents' satisfaction with attributes of their homes and their surrounding local urban and natural environments.

Although the questionnaire analysis was conducted in an appropriate scientific manner, the statistical tests (bivariate, frequency based) should not be seen as statistically relevant but the method should essentially be seen as qualitative, as the sample is not statistically representative. As Pertti Alasuutari claims in her discussion on qualitative analysis of quantitative data, in choosing the method, one does not have to buy the whole concept of science (Alasuutari, 1995, p. 3). As she further explains, having open questions would mean that one could not be able to collect the same information from all individuals. If the same questions are asked to a number of individuals then the answers amount to an overview of the behaviour of the population. This latter statement might conflict traditional views on quantitative research, however, the questionnaire survey has been particularly useful in conceiving the residents' perceptions about their neighbourhood as well as the success aspect of the initiatives investigated.

4.9.1 Questionnaire Design

In the questionnaire design much attention was paid to the selection of the variables to be included. According to Sirgy *et al.*, community well-being is based on perceptions of impact on various life domains (Sirgy, Widgery, Lee, & Yu, 2010). Life domains and sub domains affect overall life satisfaction, and accordingly, satisfaction with a particular life domain is influenced by lower levels of life concerns within that domain. Older studies in Britain have clearly indicated that the housing quality is included within the three of the most important areas of people's life satisfaction (Mulvihill, 1977). Even more recent research suggests that community satisfaction and attachment influence individual well-being (Theodori, 2001). However, as Weidemann

et al. argue, it should not be assumed that because housing for instance, is adequate, based on the traditional planning authorities' evaluation, resident satisfaction in that particular domain is high (Weidemann, Anderson, Butterfield, & O'Donnell, 1982). That is because, essentially, a planner's evaluation of success usually includes more tangible criteria such as structural integrity, relationship between rent and income or, the degree of crowding of housing occupants. But what the traditional evaluation omits is the quality criteria of residents themselves (Davis & Fine-Davis, 1981). An indicative case is the housing scheme of Malmo in Sweden which is globally renowned for its bioclimatic qualities but, research suggests, it has been rejected by its residents (Weidemann, Anderson, Butterfield, & O'Donnell, 1982).

Investigating the concept of quality of life is rather complex because it includes a multitude of contributory facets such as housing, education, work and environment (Blanco & Chacon, 1985). Romice O. (2005), states that the problems affecting the perception of life quality in a neighbourhood fall into the following generic categories:

- Social: (high concentration of fragile groups; low level of residents' resources/unemployment; lack of social interaction; feelings of insecurity; negative neighbourhood image
- Physical: poor physical quality of the housing stock; lack of maintenance of outdoor spaces; vacant housing and building plots; physical isolation of the neighbourhood from the rest of the city
- Managerial: inefficient housing management; low level of residents' participation; lack of private investment

In line with Romice's categorization, in this research, the selection of the life domains to be studied was based on social, physical and managerial sub-domains of sustainable development, which reflect the residents' living situation. The sub-domains included in the questionnaire are focusing on housing and location characteristics, residential attachment, perceived neighbourhood safety, and background characteristics of the residents themselves as, research evidence suggests that these domains influence resident satisfaction (Galster & Hesser, 1981). Not only do these features exert

influence on the feelings of residents towards their neighbourhood, but they are also directly linked to the neighbourhood sustainability criteria presented in Section 2.5.

Residents' satisfaction was therefore assessed for a number of variables that were grouped into the following sub-domains of sustainability:

1. Background information
2. Dwelling
3. Neighbourhood
 - 3a. Planning/Design
 - 3b. Transport
 - 3c. Environment
 - 3d. Community
4. Overall satisfaction

Specific criteria addressing the aforementioned domains that have been found to relate to community satisfaction and attachment include family size (Miller & Crader, 1979); home ownership (Austin & Baba, 1990); duration of residence (Brown R. , 1993); number of children living in household (Riger & Lavrakas, 1981), residential satisfaction, residential mobility and social participation (Jesser, 1967); access to material resources for meeting daily needs (Theodori, 2001); social ties with people of the community (Goudy, 1977); satisfaction with employment (Filkins, Allen, & Cordes, 2000).

The questions included under each sub-domain were, therefore, addressing all of the aforementioned criteria. Putting the demographic information aside, all criteria included under each sub-domain are directly linked to neighbourhood sustainability as Figure 1 suggests. Consequently, determining resident satisfaction with each of them, also determines the success of the scheme.

With respect to question encoding, a great effort was made to select wording that was easily understandable by the respondents. Therefore, the use of jargon and lengthy questions was avoided to prevent confusion and misunderstanding (Brace, 2004). Ambiguity was further avoided by avoiding double-barrelled questions as research

suggests that they can potentially be detrimental to the obtaining of accurate responses (Brislin, 1986). More specifically, I tried to make the questions as clear as possible by avoiding the incorporation of two verbs or two aspects within the same question. For instance: 'Do you feel safe living in this neighbourhood?' or 'Are you satisfied with the public transport?' are two such questions included in the questionnaire that contain only one verb and only one aspect. Finally, to avoid potential language barriers, questionnaires that were distributed in Vauban and Kronsberg were translated into German by a native German speaker⁹.

For each statement in the questionnaire, the respondent was invited to clarify their attitude, in a response scale of Likert type ranging from 'yes' to 'no'. Although most popular are scales with 5 or 7 grades, in this research, a four point scale was used. The question form directed the respondent to choose between different rating scales such as "yes, to some extent, no" or between evaluative scales such as "often, rarely, never", with the 'don't know' option, also being available.

As Jacoby & Matell have demonstrated, the number of scale points does not affect reliability or validity of an instrument (Jacoby & Matell, 1971). In fact, there are academics arguing that the length of response scales should be related to the content of the question, meaning that shorter scales are more appropriate for absolute judgements, whereas longer scales (7-9) are more appropriate for situations where more abstract judgements are sought (Foddy, 1993), (Lietz, 2010). Most of the questions in the questionnaire call for absolute judgements such as: 'Are you satisfied with the public transport?', or 'Do you recycle?' Therefore, one middle alternative was deemed sufficient.

Research on the effects of the use of middle alternatives has also shown that it can potentially jeopardise the response rate as the more the rating alternatives the more exhausting it is for the participants to select an appropriate response (Krosnick, 1991),

⁹ The questionnaires were translated in German by a native speaker of the German Language who has also provided a signed statement describing their qualifications and certifying the accuracy of the translation for the purposes of this study (see Appendices 6, 7). A "back" translation (from German to English) was not necessary due to the multiple choice layout of the questionnaires.

(ISA (International Sociological Association), 1998). The number of scales was hence limited to four, including only one middle alternative and the 'Not Sure' option.

In light of issues of reliability that might arise, it should be repeated at this point, that the questionnaire survey should be considered as a qualitative research method. That is because the aim was to gauge an underlying disposition rather than generalise findings.

Another issue that was taken into consideration when designing the questionnaire was the question order. This followed a logical pattern, starting from the socio-demographic ones that provided me with background information on each respondent or household. The rest of the questions were thematically orientated, and followed a gradual arrangement, starting from questions relating to more tangible themes and potentially desirable qualities such as the physical attributes of the respondent's home or neighbourhood, and ending with questions investigating more complicated and broad concepts such as the resident's involvement in decision-making or their overall satisfaction with their neighbourhood.

Much attention was also paid to the visual design attributes of the questionnaires as they play a significant role in guiding the respondents (Jenkins, 1995). Different colours were used to indicate different themes, and boxes enclosing certain statements or words in bold reflected a high level of importance. A set of directions at the top of the first page clarified the way responses to questions should be given, while the researcher's contact details were also included for cases where respondents wished to return the questionnaires by post. In the brief introductory section, respondents were also informed about the anonymity of the questionnaires. In the case of Vauban, where the questionnaire was uploaded on the web-site, a covering letter was used to inform the respondents about the researcher, the purpose of the study and the dissemination of the results.

4.9.2 Questionnaire Distribution

Questionnaire distribution was conducted concurrently with field visits to the neighbourhoods. In total, 120 questionnaires were distributed to a random sample of neighbourhood residents and, 71 were returned at a response rate of 59.2%.

Questionnaire distribution started with Vauban. The initial concept involved the electronic distribution of the questionnaires, which then would then be received in the form of digital documents via emails. The existence of an on-line forum for the community provided an excellent opportunity for the residents to get informed about this research, and for the questionnaire to be posted on an easily accessible online source. However, the low response rate (5 responses out of 799 “clicks” on the questionnaire) enforced a deviation from the initial plan. A study visit was then conducted and the questionnaires were distributed individually to a randomly selected sample of residents. Twenty-one out of thirty residents agreed to participate and completed their questionnaires. The highly satisfying response rate (70%) was an indication that this method was a more efficient way to secure a satisfying response rate.

The lessons learned from the distribution process followed in Vauban were applied to the rest of the case studies. Questionnaires were distributed in a door-to-door manner, or residents were approached in the neighbourhood streets. Contrary to the questionnaire distribution by post which is usually associated with very low response rates (Gorard, 2003) the selected method yielded much better results. Furthermore, it allowed for a greater level of personal interaction and participants were given the opportunity to ask questions and get better informed about the particulars of the survey. As Gorard suggests, being present at the administration of a survey can be a rewarding experience - fruitful for new ideas or contacts – that gives the potential for observations or field notes that other methods of delivery deny (Gorard, 2003). Indeed, there were cases where respondents were asking for clarifications about the questions, were discussing the reasons for giving a specific response, or were making additional remarks with regards to certain statements. On the other hand, the method

was particularly time consuming and, in the case of the two neighbourhoods visited in Germany, it required the assistance of a translator.

4.9.3 Analysis

The analysis of the raw data collected was conducted on SPSS. The data were categorised according to their level into nominal, ordinal, interval, or ratio (Hinton, 2004). Each variable was then labelled, and entered into SPSS.

The analysis of the data was based on the following categorization of the variables into independent and dependent.

Dependent variables

- A. Type of property
- B. Satisfaction with home
- C. Satisfaction with planning and design of the neighbourhood
- D. Satisfaction with transport
- E. Satisfaction with the environment
- F. Satisfaction with community
- G. Success of the sustainable development initiative

Independent variables

A. Home

- 1. Adequacy of private space for the members of the family,
- 2. Existence of garden
- 3. Adequacy of space for visitors
- 4. Flexibility of layout
- 5. Maintenance costs

B. Planning and design of Neighbourhood

- 1. Retail in close proximity
- 2. Adequacy of public and green space
- 3. Easy pedestrian, cycle and vehicle orientation
- 4. Provision for pedestrian, cycle and vehicle friendly streets

5. Provision for community and leisure facilities
6. Distinctive character

C. Transport

1. Cost of public transport
2. Speed of public transport
3. Frequency of car usage

D. Environment

1. Quality of air

E. Community

1. Safety
2. Social bonds with neighbours
3. Trust in the public authority's ability to cope with problems
4. Satisfaction with opportunities given to participate in decision-making

A number of tests were then performed to enable meaningful conclusions to be drawn. Firstly, frequency tests were performed on all variables to measure resident satisfaction with each sub-domain.

In continuation, a bivariate analysis was conducted. Bivariate analysis was selected as the preferred method of statistical analysis as it directly determines the relationship among two variables (Lomax & Hahs-Vaughn, 2013). Instead of examining each variable individually using a *univariate* method of analysis, this research has focused on how the different variables interrelate. The reason for that particular approach is the fact that some pairs of variables have been described in literature as having a cause and effect relationship. For instance, many scholars have pointed out that the lack of shopping facilities directly affects the frequency of car usage. If this relationship is confirmed in the tests conducted for each of the projects studied in Chapters 6, 7, 8 and 9, then we can proceed to suggesting that in a neighbourhood where the necessary shopping facilities are existent, people tend to use their cars less.

To examine the presence or absence of a relationship between different variables, correlation tests were conducted. Measures of correlation indicate both the strength and the direction of the relationship between a pair of variables. Since the variables

under consideration are at the ordinal level, measures of rank correlation were used. Spearman's rho (ρ) was used as a method for examining the relationship between ordinal variables. Spearman's rho (ρ) is more commonly used by researchers, so it is preferable to report this statistic (Bryman & Cramer, 2009) instead of Kendall's tau (τ).

The results of the statistical survey are presented and discussed in detail in Sections 6, 7, 8, and 9, which focus on the investigation and assessment of the four case studies of this research.

4.9.4 Limitations

The rationale behind the questionnaire survey was to assess the success of four sustainable neighbourhood development initiatives. As we have seen, literature recognises the importance of residents' insights with regards to the success of the planned environment. Diener & Suh, for instance, have suggested that alongside objective indicators, subjective well-being measures are necessary to understand people's emotional and cognitive reactions to their environment (Diener & Suh, 1997). The survey was a way to validate the success of the projects by exploring the level of residents' satisfaction with living in their neighbourhoods. Therefore, it positively contributes to knowledge by reporting on the experiences of people who live in sustainable urban neighbourhoods. However, there are certain limitations that need to be considered as well.

Firstly, the sample size was relatively small, a fact that hinders the generalisation of the findings. However, generalizability was not the ultimate goal. The statistical survey was actually one of the methods used to confirm the success of the projects and to identify particular domains in which the particular projects selected have failed. The generalisation of the hypothesis that all sustainable neighbourhoods are associated with higher resident satisfaction would be a separate theme entailing a separate, rather extensive research to be exhaustively analysed.

Secondly, the survey is focused on people's opinions in a certain moment in time, because of the time and funding constraints. However, a longitudinal study would provide critical information on the residents' longer term aspirations. Especially in New

Islington and Upton, where the development process is still on-going, a longitudinal study would possibly yield more accurate results.

Thirdly, the study considered the influence on satisfaction with a number of sub-domains of living conditions. The selection of the sub-domains was based on a literature review and was proven to be relevant for the assessment of the success of the projects. However, the use of a number of open-ended questions would offer the possibility for the respondents to include any other parameters they considered important or absent from the questionnaire.

4.10 Study Visits

A third method of data collection employed in this research was study visits to the neighbourhoods under investigation. During the study visits, photographic material was collected and direct observations were possible. Photographic material and direct observations were tools for a generalised insight of the context, characteristics, and features of the projects.

Although potential risks were low, the author took measures to ensure personal safety when travelling to and from the data collection venue and, whilst at research venue. In study visits conducted in Germany, the researcher was accompanied by an acquaintance and translator who also provided assistance in cases of non-English speaking individuals¹⁰. Supervisors were also made aware of the researcher's whereabouts through frequent emails.

4.11 Case Study Protocol

The Case Study Protocol for the research is explained in this section, giving specific details of field procedures, case study questions and guidelines.

10 The translator who had college-level preparation in German, was familiar with the study and its scientific basis, and her role was to brief the participants on the aims and objectives of the research as well as on the importance of the questionnaire survey.

The collection of empirical evidence for this research was conducted through study visits, interviews, and questionnaires. These processes took place in different stages which have been outlined below:

Stage 1. A thorough literature and on-line resource search was conducted in that initial stage to facilitate the selection of potential interviewees for each case. A list of potential contacts was developed and their contact details were acquired. The individuals selected were members of the team of partners (developers, consultants, and architects), planners and professionals in the field who had developed a keen interest in the projects or residents who were involved in decision-making. A minimum of two interviewees per projects was considered necessary to be involved.

Stage 2. A schedule for the intended field trips was developed in October 2009. The potential interviewees were then contacted to ensure willingness to participate and availability. The emails sent included a brief summary of the research project, a covering letter explaining the reasons for inclusion of each individual and, suggested dates and venues for the potential meetings. In total, 9 individuals agreed to participate in the research, with which specific dates and venues for the interviews to take place were arranged.

Stage 3. The study visits were conducted from February 2009 to May 2010. During the visits the scheduled interviews were conducted with the individuals that agreed to participate. In the beginning of the meetings, participants were asked to sign a letter of consent, outlining the details about anonymity and about their right to withdraw from the research. Interviews lasted between 1 and 1.5 hours and were tape-recorded to enable an accurate interpretation to take place at a later point.

At that stage, the questionnaires for the resident satisfaction survey were also distributed to the residents in a door-to-door manner. In the study visits in Germany a translator provided assistance in cases where respondents did not speak English.

This personal interaction with the respondents entailed significant benefits. Clarifications over specific questions were given on the spot, making it easier for the respondents to accurately complete the questionnaire. Furthermore, the weakness of

the lack of open-ended questions was overcome since respondents had the opportunity to verbally express additional remarks which were recorded by the researcher. This was particularly the case in Upton, where participants dissatisfied with the public transport provided information about problems with transport specific routes.

Stage 4. Interviews were transcribed and transcripts were sent to the participants. At this stage clarification over specific statements was pursued and respondents were urged to provide any additional comments or feedback.

In order to increase reliability of the project, a table of questions relevant to the case study research was developed. The questions were aiming at providing answers to matters relating to the background of the projects (aims and objectives, key stakeholders, outcomes) or were aiming at exploring specific criteria that contributed to their successes or drawbacks. The research protocol has been presented in Appendix 1.

4.12 Summary

In this chapter, the methodological framework underpinning this research has been analysed in detail. The research philosophy, rationale, and methodology have been analysed and charted in the research design table and research protocol.

Although some limitations were identified in Section 4.9.4, overall, the methodology and research procedures discussed, were considered suitable to serve the purpose of this study, within the wider context of a pragmatic philosophical stance. In the chapters that follow, the various stages of the investigation briefly discussed here will be described in more detail and, the methodology selected will be applied to collect and analyse the data, and obtain the results.

The following chapter provides an introduction to the differences between the two countries under investigation, beginning with a historical review of the evolution of planning and design in the two countries, followed by how sustainable development has influenced the planning systems, and concluding with current challenges.

Chapter 5. Urban planning and design in Germany and the UK

5.1 Introduction

As previously discussed, this research will be comparing case studies drawn from two European countries that currently play significant roles in the global transition towards sustainable development: Germany and the UK. This direct comparison is necessary to help distinguish culturally specific factors that span different levels of success towards sustainability. The study is of particular interest since the UK, on the one hand, has a long formidable history in urban planning. Germany, on the other hand, has become a leader innovator in sustainable technologies, especially in the field of energy. To my knowledge, this is the first study that directly looks at directly comparing determinants of success towards sustainable development in Germany and the UK. It can, therefore, highlight successes and failures in current practice and can, hopefully, serve as a foundation of similar cross-country comparisons of sustainable development strategies in the future. This chapter will give a historical overview of how urban planning has evolved in the two countries, focusing on the most recent years after the end of World War II. The historical overview will finally provide an insight into how sustainability has become embedded in both countries' planning agenda to allow for a better understanding of the case study analysis that will follow in the next four chapters.

5.2 Post-war Urbanisation

The devastating implications of World War II posed a major challenge for Town Planning in Germany. On the one hand, there was an urgent need to provide accommodation and amenities to the population, and on the other hand, Town Planning was also confronted with the enormous task of preserving the historical heritage of the German cities (Albers, 2006). Controversy arose over the city image town planners were to create. The different visions expressed at the time ranged from a drastic abandoning of the old vernacular to a widespread recreation of the traditional urban and architectural forms. In most cases, however, the solution was found somewhere in between the two extremes, with the majority of efforts targeted towards restoring the historically significant elements of the city core while at the same time introducing a more modern design dynamic.

In the UK, by 1942, there were important towns and districts for which not even the preliminary stages of planning had been carried out. The administrative system was highly fragmented and planning was the sole responsibility of the Local Authorities that, immediately after the War, did not have the resources to implement ambitious plans of any nature in a speedy manner. However, urgent problems were emerging due to projections for increasing population, and due to the uncontrolled expansion of the cities towards rural areas and landscapes of unique historical significance. It was apparent that the satellite garden city model had created a problematic situation that had to be addressed with the implementation of expansion controlling measures. A core concern was the problem of accommodating increasing populations in new towns. The failure of the Garden Cities had to be exorcised with the development of new settlements that would have some degree of independence over metropolitan areas, and which would be more successful in providing better living and working conditions. For the realization of this ambitious plan, both the regional authorities and the government would have to acquire a more regulatory role. In fact, there was considerable progress in this field, with the Town and Country Planning Act in 1947 that enabled the Regional Offices to prepare Development Plan for the whole of the country.

Gradually, in the 1950s and 1960s, town planning began acquiring an increasingly important role in the shaping of the cities. In Germany, it became multifaceted in principle, having to serve social, cultural and economic needs, while incorporating specific time scales. At the same time, the preservation of Germany's historical heritage in urban centres started gaining crucial importance, especially within the urban cores. The strong state mechanism empowered and broadened the functions of Town Planning, and tough regulations solutions were sought to problematic issues.

From an urban design perspective, the modernist tradition influenced the shape of the cities to a large extent. Large apartment blocks took over the former tranquil traditional urban environments while, with the increasing personal wealth, new urban development patterns of lower density and uniform aesthetics, were formulated in

suburban locations. The urban pattern of undefined boundaries between the city centre and its surroundings eventually succeeded the very well defined city cores of the past (Wiegandt, 2000). Cities grew into polycentric agglomerations and, with the zoning regulations, land uses were dispersed at the urban fringe, tremendously increasing the population's dependency on cars. From a societal perspective, the gradual decline in the construction of social housing after the 70'-s had been threatening the previously established homogeneous social mixture. Meanwhile, the recession and the consequential rise in unemployment rates had created an unorthodox urban patchwork of rich neighbourhoods where the German Middle Class resided, and poor neighbourhoods, where immigrants and beneficiaries could afford the rents. This new urban pattern eventually increased social segregation and triggered the international critique over the pressing social issues in the 1960s.

The effort for the coordination of planning system in the UK was abruptly terminated with the rise of the conservative government in the early 1950s. The regional offices of the Ministry of Planning were abolished, and high priority was given to the construction of housing. Over the next few years, the high building targets that had been set by the government intensified the construction of new developments by both the private and the public sectors. At the same time, development plans for new towns were on-going but very slow paced due to the lack of resources. However, the absence of a strong planning system that would regulate the exploding construction process was the cause for further expansion of large urban areas at the expense of the countryside. The reaction to the problem came with the introduction of the Green Belt Circular in 1955, which sort to control urban sprawl, but the weak local councils were incapable of undertaking such a major task.

The rapid increase of the population in the 1960s, further intensified the need for new towns. Meanwhile, urban centres suffered decay through a lack of amenities and green spaces, slum clearance, construction of high-density building blocks and numerous social problems particularly related to poverty, crime and racism. The need to regenerate the suffering urban areas and to refurbish the old building stock that would prevent further sprawling of the cities was reflected in a range of government

programmes in the late 1960s and the 1970s. However, despite the government's effort to impose regulations and eliminate the crisis, social problems multiplied further due to the deindustrialization process that caused a momentous change in the economic climate of the country.

In the 1980s town planning was deeply influenced by the financial and political neoliberal conditions of the time. The rise of conservative political regimes in Europe disdained the role of public services and town planning alike (Krogh, 1989). In Germany, the numerous problems of social, environmental and economic nature caused an unprecedented downward demographical trend. The inner city microclimate had become severely downgraded due to pollution; properties were becoming less and less affordable; and listed buildings were demolished and replaced by concrete council flats. As a result of the destruction of the inner city neighbourhood identity, and the degradation of the urban environment, city cores in metropolitan areas were depopulated. This situation was specifically relevant to the middle and upper classes that were financially capable of moving to more attractive areas on the periphery. As a reaction to the aforementioned result, and after a decade's worth of passionate critique of the modernism movement, the maintenance of the remaining old structures and reconstruction of old buildings for nostalgic and didactic reasons reached its peak point (Albers, 2006).

In contrast to the descending trajectory of the population statistics in the urban centres, rural and suburban regions, where new development was taking place, became more favourable. Amongst the key factors that played a role in that urban transformation was the improved infrastructure in rural areas, and the decreasing cost of mobility, combined with the shortage of available lots and high land prices in the city cores. Also, a change in mentality of the higher-income groups had taken place, where the more advantageous locations, in terms of their proximity to nature, become more desirable (Gans, 2000).

Immigrant populations, on the other hand, followed an ascending progress from 1985 to 1996, in line with the political changes in Eastern Europe. Strong immigrant

communities were formulated in the large city centres and in regions where access to employment was easy, or cheap accommodation was available (Albers, 2006).

In the UK, the rise of the conservative government in the 1980s was followed by the release of enterprise, which was hoped would boost local economies. Public areas were privatized and taken over by Urban Development Corporations (UDC) that stimulated public realm works and improved the urban environment to a large extent. At the same time, however, local planning control was diminished, and more powers were allocated to the government. The market orientated policy was contradicting the concurrent need to continue the realization of development plans for the country.

The solution to the problem of synchronizing Town Planning with the constantly changing market conditions came in the 1990s when the New Labour Government strengthened the role of the regional policy. Regional planning guidance started being informed by the priorities set by the local councils, local stakeholders were more involved and Regional Development Agencies were developed. From 1994, a wide range of issues including regeneration and transportation had to be incorporated to regional spatial strategies (Cullingworth & Nadin, 2006).

In the discourse of Germany's planning history, the beginning of the 1990s marked a population rise in the German Metropolitan areas. The prevailing factor that influenced that change was the reunification of East and West Germany, which caused a significant migration movement to the large economic metropolitan centres of the West. This accelerating tendency was only temporary since it was soon followed by another wave of massive depopulation of the urban centres in the mid 90'-s. High land and property prices, and lack of space, caused the relocation of major enterprises to peripheral locations or smaller adjacent towns. Just like a chain reaction, part of the inner city population moved closer to marginal locations that were offering better employment opportunities, affordable living and quality of life away from the polluted and environmentally downgraded urban centres.

Within the same cities, a paradox occurred, where some settlements faced unexpected growth and some others began to shrink significantly, leaving neighbourhoods and old building stock abandoned, and derelict (Wiechmann & Pallagst, 2012). In East Germany, this phenomenon was particularly intense, where the political and economic changes after the reunification triggered industrial decline and out-migration (Wiechmann & Pallagst, 2012).

This problematic situation rapidly informed the country's planning agenda and resulted in the introduction of a range of federal programmes aimed at regenerating the declined areas throughout the country. For instance, the scheme 'Urban Districts with a Particular Need of Development – the Social City', which was subsidised to a large extent from the government, targeted the urban renewal of neighbourhoods in decline by tackling economic and social issues.

In summary, the two countries' planning history demonstrates several similarities, especially in the way the Planning system has reacted to European economic and political challenges. The major transition that gradually took place in the 1990s marked a more humanistic approach to planning, and transcended the debate about sustainability, influencing in that way a drastic change in the Town Planning of the twenty-first century.

5.3 Changes in policy after the Rio Declaration

After the Rio Declaration and the Brundtland Report, sustainability moulded town planning regulations in Germany and the UK. Economic, social and environmental aspects had to be embedded in policy and the emphasis was now posed on exploiting abandoned city areas and refurbishing derelict building stock. However, according to Cullingworth and Nadin, the theory behind the practice for sustainability differs substantially between the two countries. In the UK, it takes the form of a reaction to environmental problems, whereas in Germany, the precautionary principle (Vorsorgeprinzip) is the norm. According to that theory, reaction comes after

projections for environmental damage, so that the problem is prevented before it even occurs (Cullingworth & Nadin, 2006).

In Germany, the population loss due to emigration, change of employment patterns, industry decline or excessive urban sprawl in the 1990s had left a considerable number of city areas deserted. As Albers suggests, an 'urban shrinkage policy', previously unknown, had to be implemented, so that part of the unused building stock was demolished if not needed anymore, and part of it was refurbished and reused (Albers, 2006).

Although, initially, most measures were targeted to merely removing the dilapidated building stock, Germany did develop elaborate strategies to tackle the problem of urban decay and city shrinkage. Planners started looking for development opportunities within the neglected inner-city areas, or as they have been introduced in the British terminology, brownfield sites (Wiechmann & Pallagst, 2012). The emphasis was eventually posed on the neighbourhood scale, at which the success of regeneration interventions is more easily achievable. As Wiegandt has successfully remarked, however, this preoccupation with small-scale projects, in the light of the Agenda 21 directions, has prevented important action from being taken at the larger scale (Wiegandt, 2000). At the core of the debate was now the inability of the Planning system to function efficiently at the regional level. In other words, although social, environmental and economic issues could be easily addressed at the local level, there were crucial decisions that had to be taken at the regional scale.

In the UK, the Brundtland Report released in 1987, the Agenda 21 programme that was discussed at the Earth Summit in Rio in 1992, and the British Government's decision to embark upon issues that had for a long time been neglected, brought about an organized effort to protect the environment and to preserve Britain's historical heritage. This effort became more coordinated in the 1990s and a comprehensive national strategy for sustainable development was first published in 1994 and revised in 1999. Specific aims were set, and a checklist of 147 sustainable development

indicators was developed. The four central aims of the 1999 strategy were (HMG, 1999):

- Social progress which recognises the needs of everyone;
- Effective protection of the environment;
- Prudent use of natural resources; and
- Maintenance of high and stable levels of economic growth and employment.

At the local level, development plans were to be created by communities throughout Britain. Indicators were chosen to reflect the local needs, however comparisons between different towns with regards to progress were difficult to make, since the criteria chosen by each municipality differed to a great extent.

Societal consensus has been another thematic area receiving much attention since the Rio Declaration and takes shape in the form of public participation in the planning practice. A bottom up approach is now seen as the most effective way to develop successful long-term strategies and solutions. Planners and private investors are no longer the omniscient stakeholders that provide the panacea for all kinds of urban problems, but instead seek advice, consultation and original ideas in the people of the community.

In Germany, land use plans are discussed with the public at the very initial stages of draft preparation and a second round of consultation is initiated by the Local Councils as soon as the more comprehensive versions of development plans are finalized. The final version of those plans takes into account community's aspirations and suggestions and it can be further discussed and altered if individuals affected request re-examination.

With regards to community empowerment in the UK, the Agenda 21 ethos provided the background for gradually increasing community involvement in policy making and implementation. Even more specific targets for the latter were set in 2004, with the government's statement, entitled Community Involvement in Planning: The

Government's Objective. The statement was explaining the existing statutory obligations for making information available for plans, and planning applications, but was also enforcing the preparation of Statements of Community Involvement (SCI). The SCIs would have to incorporate a comprehensive policy for involving all interested parties and local stakeholders in Local Development Documents, and would be independently assessed (ODPM, 2004) .

Environmental issues were also addressed in the Town Planning legislation of the two countries after the Rio declaration, but only became fully incorporated in comprehensive strategies after 2000. Furthermore, the specific targets set by the EU, as well as the rapid advancements in technology, caused a strong emphasis to be put on facilitating a sustainable energy supply by both countries. As a result, ambitious goals were set with regards to energy produced from renewable sources.

Germany has been implementing environmental policy since 1997, when the first steps towards a comprehensive strategy for Sustainable Development were initiated with the report 'Towards Sustainable Development in Germany'. However, specific nationwide institutional guidelines were set with the report 'Perspectives for Germany. Our Strategy for Sustainable Development' published in 2001 by the Federal Government (Tils, 2007).

The Federal Government however, has been very systematic with policy concerning Renewable Energy use from as early as 1991, when the Electricity Feed Law (StrEG) was introduced. Nationwide commitment to the laws, as well as the significant funding from the Federal state, has brought Germany amongst the world leaders in Renewable Energy use. The most recent revision of the Renewable Energy Sources Act of 2004, was directing a significant growth in the percentage of renewable energy sources in power supply, and was setting a long term target of 20% until the year 2020 (BMU, 2004). More specifically, the connection of the grid with renewable energy plants across the country was recognised as a primary priority. This was legally binding for the Grid system operators who had to prioritise the purchase and transmission of electricity produced by renewable energy sources.

Since as early as 1994, the UK Government has taken steps towards a national Sustainable Development Strategy. The 2005 revised strategy entitled 'Securing the Future' encompassed even stronger international and societal dimensions, as well as more explicit focus on environmental limits (ODPM, Department for Environment Food, and Rural Affairs, 2005). The strategy involves a clear list of the priorities for Britain, as well as priorities for international action, to better integrate global commitments, and to enable progress to be measured in more quantitative terms.

5.4 The economic and environmental crisis and the effect on the development industry

In the current obscure economic climate in Europe immigration to more stable European countries is expected to rise. Germany is likely to accept a significant number of European immigrants over the coming years, who will be mostly concentrated in inner-city areas, where rental accommodation is offered (Müller & Siedentop, 2004). According to the most recent federal population projection, the country will be accepting 100,000 to 200,000 immigrants from Eastern European EU countries, Northern Africa and Turkey in the long term, and until the year 2050 (Eisenmenger, Pötzsch, & Sommer, 2006). The rise in the energy costs might also have an effect in demographics since it is likely that part of the population might move to more central inner-city areas to avoid long distance commuting to work (Müller & Siedentop, 2004). The aforementioned projections about a possible migration surplus in the city centres, place an enormous task for the Town Planning system to regulate development and accommodate the incoming population.

Likewise, in the UK, a similar projection about the inward flow of immigrants and a significant increase of the population by 2018 will intensify the need for housing in the coming years (ONS, 2009). In the 2011 Housing Strategy for England, a report published by the federal department for Communities, and local Government, the need for a new approach is explicitly stated. The government's programme will financially support firms in need of development or finance, will invest £4.5 billion in

new affordable housing, and will promote locally planned large scale development (CLG, 2011).

From an operational perspective, both in Germany and the UK, the recession has brought up changes as to who the initiators of development are. The public sector has been unable to subsidise developments to a large extent. As a result, new forms of co-operation between public and private sectors have emerged in the form of partnerships (Wiegandt, 2000). Private sector's flexibility in adapting to the changing market conditions and the public sector's power of enforcing regulations has in many cases proven to be a brilliant combination that has provided excellent results. In the UK, this cooperation in the form of partnerships has nowadays almost become the norm. Through those partnerships, the regulatory role of the Planning system becomes more flexible to adapt to the needs of the market, and the risk of failure is minimized (Cullingworth & Nadin, 2006).

At a regulatory level, creating a regional strategy is becoming increasingly important. In an effort to adapt to the demographic, and disinvestment changes, Local Governments are faced with loss of their revenues, which leads to the down-scaling, or abandoning technical and social infrastructure such as utility networks, schools and other services (Bernt, 2009). However decisions like these have to be taken with regards to the longer term and the preservation of social and technical infrastructure might be more cost effective in a long-term perspective. Additionally, 'intermunicipal barriers are easier to overcome when a superordinate authority collaborates with the individual neighbourhoods' (Müller & Siedentop, 2004).

The responsibility for Town Planning in Germany is vertically allocated across three governmental levels; the federal (Bund), the state (Länder) and the local (Kommunen). Regional authorities prepare regional sustainable development plans, approve land use policies prepared by Local Authorities, and are engaged in managing decisions about infrastructure of spatial relevance. According to critics however, there has been weak cooperation at the federal and regional levels that has led to arbitrary decisions being taken by the local councils (Tils, 2007).

In the UK, on the other hand, Regional Development Agencies (RDAs) are more influential in enforcing sustainability, especially with regards to economic matters. In light of the current unstable climate in which many urban cores have lost their identities as economic and cultural centres, and others have started taking on important functions, the regional scale has attained a strategic role (Wiegandt, 2000). Policy formulation at the Regional level in the UK takes into account the National Sustainable Development strategy and allocates specific actions to the Local Councils. Especially since the Labour Government came to power, the scale of the interventions has increasingly become more concentrated on the neighbourhoods. It is at that small scale where the likelihood of having a real impact and bringing about significant change is greater (Shaw & Robinson, 2010).

Whereas the practical implementation of sustainability in the UK before 2000 had mainly focused on environmental issues, the rather unstable and unpredictable economic climate with its social consequences has enforced a rather holistic approach in policy formulation. In the Review of sub-national economic development and regeneration, the incentives available to local authorities have been increased, and action for the deprived or disadvantaged areas has become a priority. In the report, the need to identify each locality's competitive advantage is seen as a way to sustain local economies in the challenging globalized environment. Furthermore, from an administrative perspective, the paper recognizes the importance of decentralizing policy formulation, but, at the same time, stresses the necessity of selecting the optimum level of spatial interventions in accordance with the impact these will entail (Communities and Local Government, 2007).

5.5 Summary

In conclusion, both countries' planning reforms and commitment to EU targets in the beginning of the twenty-first century have managed to address the particularly pressing environmental, social and economic issues caused by the recession and political instability. Policy has been updated and has consolidated the international

guidelines, while sustainable development frameworks are firmly in place at all spatial levels. Finally, we have seen how the local level, has become increasingly important and how neighbourhoods have been made the key points of problems and potentials.

The following chapters will focus on particular interventions at the local level where the delivery of sustainable development has been achieved. Successes and failures of projects in the two countries will be discussed in more detail, and challenges dominant at the neighbourhood level will be discussed in more detail, to enable further comparisons to be made.

Chapter 6. Towards the development of a checklist of criteria for success: The New Islington regeneration project

6.1 Introduction

New Islington Millennium Community is the third Millennium Community project to be completed in Manchester, UK by English Partnerships and Communities and Local Government (CLG). The Cardroom housing Estate, located on the site before the New Islington project commenced, was suffering from urban decay, high crime rates and depopulation. The situation was not different from other similar estates close to the city centre of Manchester that are responsible for the city centre's notorious reputation.

Deeply affected by the consequences of industrial decline, the depopulated inner city estate was included in *New East Manchester's* ambitious plans for regeneration of the East part of the City of Manchester. As part of the Millennium Communities Programme, the scheme was aiming at delivering excellence in terms of sustainability by giving priority to good transport links, mixture of uses and tenures, protection of the local landscape, and energy efficiency (English Partnerships, 2007).

Subsidies for the £250m project came partially from the Government, and significant capital was invested by the partners involved. With a vision to regenerate the previous derelict estate, English Partnerships invested significant financial resources in site preparation and public realm works to ensure it would be attractive for public and private sector investors. More specifically, the Homes and Communities Agency's £22.7m investment included site preparation, masterplanning and public realm works whereas a further £3.3m stemmed from the National Affordable Housing Programme (NAHP) for the construction of new homes (Homes and Communities Agency, 2010).

In 2001, Urban Splash was selected as the lead developer for the site and in 2002 the strategic framework for the development of the site in New Islington was formally launched. Construction works started in 2004 and by 2006 the first residents had

moved in. Although the project was scheduled to be completed by 2002 financial complications caused serious delays and as a result the scheme is still on-going.

6.2 Description of the project

6.2.1 The project's context

The regeneration of the site was directly linked to the New East Manchester's effort to increase the population of the area and to exploit the various opportunities for development of the formerly neglected estate. In line with that vision, the project's strategic framework encompassed the construction of 1,734 new homes, commercial and leisure facilities, social infrastructure, and the reopening of the canals to create green open spaces that would serve the community.

Creating a socially sustainable community was the primary target and the most difficult one to achieve. In order to reverse a situation where crime and vandalism flourished, in an area that had become stigmatised, the partners focused on the people that formed the local community. Community engagement was essential for site-specific needs to be identified. Through numerous consultation meetings the partners recorded residents' experiences and wishes to explore why the area had failed and to create a strategy to effectively regenerate the area. In the consultation meetings, the way forward was discussed and radical solutions were sought. The former social housing dominated area had to become socially diverse with a variety of housing opportunities available for different income groups.

The unique identity of the place had to be preserved through the restoration of important listed buildings such as the Ancoats Hospital and through the revitalisation of the Ashton Canal Corridor. Additionally, the symbolic action of replacing the old name of the estate aimed at discarding all the negative associations with previous stigmatised place.

Ecological optimisation and the construction of a building stock of high quality were also important factors that influenced the development strategy. As part of the

Millennium Communities programme, the project was meant to be exemplary from an environmental perspective. Primary targets set by the Millennium Communities included 50% reduction of energy consumption in the processing of materials, construction and post-occupancy, water efficiency, and waste minimisation (English Partnerships, 2008). In order to achieve the aforementioned ambitious targets, innovative green technology had to be used both at the urban and the building levels. For instance, individual CHP units were installed on the first phase social housing at New Islington Square and future plans include the construction of a district CHP plant that will reduce the energy consumption across the whole site of New Islington.

6.2.2 Site location and context

New Islington lies just outside the city centre and is bounded by the Great Ancoats Street on the southwest. The site's close proximity to the city centre of Manchester is a competitive advantage amenity- and employment-wise. Within just a short walk to Piccadilly train station, the residents can find a wide variety of shops, leisure facilities, and services, as well as numerous employment opportunities.

The site has a long history associated with Manchester's glorious industrial past. The Ancoats Estate was developed in the 1890s to accommodate the labour force of the nearby cotton mills. It was one of the first single-class housing areas in England. The estate was redeveloped in the late 1970s by the local council to accommodate social housing beneficiaries in modern (for the era) terraced houses.

However, the layout of the area, prohibitive of through traffic, with numerous cul-de-sacs, isolated it from its surroundings. Moreover the declining industries caused the massive depopulation of the estate and created a rather problematic situation. Resident numbers were not enough to sustain any local leisure and commercial facilities and the geographic isolation of the area created a fertile environment for crime and various other unlawful activities to escalate.

On the North West, Royal Mills zone bound the area and was included in New East Manchester's regeneration project of the eastern quarter of Manchester city centre.

The old spinning mills of that historically important area are being renovated and have been allocated residential and commercial uses (NWDA & NEM, 2010).

New Islington provides good access to the commercial core of Manchester's city centre and is also ideal for commuters since it lies between two principal rail stations: Piccadilly and Victoria. Furthermore, an extension of the tram system running from Piccadilly station to Droylsden and passing through New Islington is nearly completed (AGMA & TfGMC, 2011).

6.2.3 Key stakeholders

As common practice in the UK dictates in cases of urban development and regeneration, the scheme had to involve a consortium of partners from both the private and the public sectors. Hence, the principal initiator of the scheme, English Partnerships, worked closely with the local authorities (Manchester City Council), lead developer Urban Splash, and other public agencies such as New East Manchester Ltd and Great Places, throughout the course of the scheme. In addition, various architecture practices participated in the project to encourage a range of diverse design approaches.

Following the selection of Manchester Housing Association as the preferred housing association partner in 2002, a series of architectural competitions took place to appoint the architecture firms to be involved in the construction of the different phases of the project. Amongst the winning architects were FAT who developed the first phase of social housing at Islington Square, Taylor Woodrow and Shedkm, the winning practice for the 12-hectare Tree Houses site, Alsop Architects who proposed the visionary masterplan and designed the multifunctional Chips building, dMFK who were the winning architects for the second phase of social housing at Guest Street, and many more.

The extensive community engagement throughout the different phases of the project created trusting relationships between the locality and the partners. Over a series of workshops and meetings at a local meeting point the community contributed to the

innovative ideas that moulded the vision for New Islington, and eventually became a partner itself (Grant L. , 2007).

6.2.4 Development process

After decades of debates and negotiations over the need of its regeneration, the Ancoats site was designated as the land for the development of the third Millennium Community in 2002 and the masterplanning meetings were initiated (Grant, 2007). In September 2002, the strategic framework for New Islington was launched by the Minister for housing, planning and regeneration. At that point, only half of the 204 houses in the estate were occupied.

Site preparation marked the launch of the scheme in 2003. The land was to a large extent contaminated as a consequence of the past industrial activity within the area (Manchester City Council, 2004), hence soil decontamination techniques had to be implemented as part of the preparation of the site. The process was time consuming and required a substantial amount of public funding to complete. Demolition of part of the old building stock begun with the former nurses' block at the Ancoats Hospital, while a year later works on the Ashton Canal commenced.

In 2005, the first phase of social housing and the Old Mill Street had been completed and the first residents-tenants of the Manchester Methodist Association occupied the first houses of Islington Square. The second phase of social housing developed by dMFK was initiated in 2006 at Piercy Street, while, in the same year, several festivals were organised by the team of partners to promote New Islington and to promote a coherent community.

In 2007, the competition for the row of terraced houses alongside the canal was launched. The Tutti Frutti development- as the partners named it - was inspired by a West 8's project in Amsterdam and was meant to promote a diverse architectural result and a unique streetscape alongside the canal (Urban Splash, 2008).

6.2.5 Planning and design: Aims, Criteria and guidelines

The Aims, Criteria and guidelines of the project stemmed from the Millennium Communities' programme ethos to provide a *"good range of high quality and innovative homes to facilitate an environmentally friendly lifestyle"* (English Partnerships, 2007).

In order to succeed in that initial target, profound attention was given to enhance the following areas: 1. Resource consumption, 2. Local environmental capital, 3. Design quality, 4. Construction quality and efficiency, social inclusion and participation, 5. Quality of life, 6. Long term economic viability, 7. IT enabling, 8. Car hubs and cycle facilities, 9. Lower defects and snagging items.

The following table gives a more detailed overview of the specific objectives for the New Islington project as these were identified in project documentation.

Initial Aims (Millennium Communities)	Objectives	Measures taken	Performance
Minimise resource consumption	Reduction of energy used for construction and embodied energy by 50%	<ul style="list-style-type: none"> Micro CHP units in social housing of the first phase Site wide Combined Heat and Power Plant(CHP) A rated white goods Reuse of old engineering materials Unification of separate heating networks 	New Islington has achieved a 13% improvement on 2006 building regulations (EP, 2008)
	Reduction in water consumed by 20%	<ul style="list-style-type: none"> Naturally filtered drinking water A rated white goods 	
	Reduction in domestic and construction waste disposed by 50%.	<ul style="list-style-type: none"> Recycling facilities in new homes (50% of the waste to be separated for recycling) 	
Protect and enhance the local character and environmental capital	Building upon the prevailing landscape conditions of the area	<ul style="list-style-type: none"> Canals transformation Water Park 	Canals reopened Water park created Listed buildings refurbished
	Some of the old building stock refurbished	<ul style="list-style-type: none"> Ancoats Hospital refurbished 	
	Remediation works on the contaminated land		
Maximise Design Quality	Investing in quality both for the buildings and for the neighbourhood	<ul style="list-style-type: none"> • Better space standards in line with the Scheme Design Standards • Lifetime Homes and Secure by Design • Will Alsop’s masterplan and Chips building • FAT architects’ design of the Social housing units with the distinctive Dutch inspired facades • Award-winning social housing on Guest street 	Architectural diversity and design quality have contributed to the attractiveness of the place Award-winning residential projects
	Aesthetical Diversity	<ul style="list-style-type: none"> Division of land into small plots for Tutti Frutti houses 	

Initial Aims (Millennium Communities)	Objectives	Measures taken	Performance
Improve construction quality and efficiency	<ul style="list-style-type: none"> Construction to take place in different phases for efficiency Preference for developers who favoured sustainable construction 	<ul style="list-style-type: none"> Use of innovative and energy efficient construction methods and materials, Reuse of building materials from demolished buildings on site, Improved indoor air quality 	BREEAM eco homes excellence certification
Increase social inclusion/participation	Focus on partnering and engaging with other stakeholders	<ul style="list-style-type: none"> <u>Key partners:</u> Urban Splash, Manchester Methodist Housing Group, Alsop Architects, Manchester City Council, English Partnerships, New East Manchester Ltd, Ancoats Urban Village Company In April 2003, 100 experts met in the city to hear the latest ideas for the site and offer their support to Urban Splash. Combining the efficiency of the public sector in setting the standards and in being more aware of the needs of the locality, with the private sector's skills in contributing to innovation 	The recruitment of experts from different disciplines for the formulation of a coherent and trustworthy team
	Facilitate community involvement	<ul style="list-style-type: none"> The locality was a consultant for the developers during the site appraisal phase. Partners tried to gather information from the residents on why the area had failed Whole community invited to comment on the development framework for New Islington. Community was then invited to choose the architects for each plot. Urban Splash held regular public meetings in the Cardroom Estate pub, as well as visiting non-attendees door to door. 	The end result reflects the community's aspirations and preferences
	Consider the community's aspirations and needs	<ul style="list-style-type: none"> Successful architects worked with the local community Existing members of the community were invited to choose their new properties before the development was advertised more widely. 	Consultation was a continuing process from planning to implementation
	Facilitate community cohesion	<p>Urban Splash hosted a number of street parties and other events so that old and new members could get to know each other</p> <hr/> <p>Urban Splash hosts websites designed to be used by local residents to advertise clubs, services and events</p>	Community cohesion

Increase social inclusion and participation	Raise awareness and make the project widely known	Partners organised festivals and minor celebrations	Ideas and practice that moulded the realisation of the project could be transferred to other communities
	Affordable Housing, part ownership schemes	Variety of tenures, affordability levels, and house types	Social diversity

Initial Aims (Millennium Communities)	Objectives	Measures taken	Initial Aims (Millennium Communities)
Improve quality of life	Regeneration of the old estate from a neglected neighbourhood where crime thrived to a place of international reputation.	<ul style="list-style-type: none"> Quality of public realm works Improved site health and safety Improved noise reduction Health centre and primary school planned 	Viability for the community and encouragement for the public sector to invest
Achieve long term economic viability	<p>An effort was made by the partners to create some job opportunities in the retail and construction sectors</p> <hr/> <p>Effective promotion of the project with the involvement of reputed firms and with advertising campaigns tailored to the aspirations of the groups of individuals the developers were aiming to attract</p>	<ul style="list-style-type: none"> Mixture of tenures 29 retail units planned Office space planned The development of the Marina was aiming at attracting visitors and enhancing tourism 	<ul style="list-style-type: none"> Space for commercial/leisure facilities has been created but due to recession the majority remain unoccupied New Islington marina developed Apartments and houses were quickly sold
IT enabling	In the Eco-Homes guidelines enhanced telecommunications systems were given priority		All new developments are capable of supporting broadband technologies
Car clubs and cycle facilities	Accessibility in every sense	<ul style="list-style-type: none"> One-way streets re-opened to two way traffic but speed limits are below 20mph. Revised street widths New pedestrian footpaths 	<ul style="list-style-type: none"> Site accessible to cyclists, pedestrians and cars Old Mill street has been an exceptional example of boulevard design
Lower defects and snagging items	Measure sustainability across the project's life cycle	According to the interviewees frequent monitoring reports were conducted by the team of partners	Author's survey report shows that residents are to a large extent satisfied with their homes (see section 6.4)

Table 2: New Islington: Aims Criteria and Guidelines

Source: Summarised and tabled by the author using development documentation and data from interviews

The objectives support the development of a sustainable community in a wide range of contexts that are directly associated with the sustainable development themes extracted from the literature review in Section 2.5. More specifically, the objectives developed by the stakeholders address social, environmental and economic aspects but above all, rather than being generic, they focus on the local context, encapsulating an intention to resolve the pressuring issues of social and economic decline Ancoats community was dealing with.

The situation where the area was suffering from 'social stigma' had to be reversed and an attractive and safe area both for the old and for the incoming residents had to be created. The partners therefore emphasised on two fundamental approaches: 1. Creating a strong image for the area and 2. Empowering community engagement.

Firstly, contemporary iconic buildings designed by 'superstar' architects such as FAT and Alsop acted as a catalyst to create a strong branding for the scheme from the very initial stages of development. Furthermore, the major restoration works on several listed buildings emphasised on the local vernacular and utilised the historical significance of the region. In addition, the major transformation of the Rochdale and Ashton canals, and the development of a new marina, aimed at attracting visitors from the surrounding region. Utterly significant has also been the scheme's website that advertises the scheme and provides detailed documentation, videos and pictures of what has been planned and of what has been realised so far.

Secondly, in order to empower community engagement, partners embraced active dialogue from the beginning, as well as some rather uncommon techniques. From as early as in 2002, partners started organising regular meetings with the residents at the local pub (Cob o' Coal) in Ancoats, *'in an effort to investigate why the area had failed'* as one of the interviewees for this research project pointed out.

The partners' efforts were also focused on educating the residents. In line with this idea was a study visit to Amsterdam, where the residents of the former Cardroom estate had the chance to view successful social housing initiatives (Grant L. , 2007). Finally, in order to build on a cohesive community spirit, the partners regularly

organised street festivals and minor celebrations that were also aiming at making the project widely known.

The partners of the scheme regarded environmental sustainability with equal attention, as it was one of the Millennium Communities. The BREEAM criteria had to be followed to ensure exceptional outcomes with regards to resource consumption and protection of the local environmental capital. However, as the interviewees pointed out, the BREAAM guide and tools for assessment had not been fully developed in many important areas when the project was initiated.

Despite the insufficiency of the method, according to a preliminary monitoring report published by the English Partnerships in 2008, the scheme until that point had managed to achieve a 13% improvement on 2006 building regulations (English Partnerships, 2008). Amongst the measures taken in respect to environmental sustainability were: the unification of separate heating networks, the reuse of old engineering materials, the instalment of recycling facilities in new homes, Micro CHP units in social housing of the first phase and the plan to develop a site wide Combined Heat and Power Plant (CHP). The employment of the aforementioned measures led to awarding of the Eco Homes Excellence Certification to all buildings of the scheme.

With regards to economic aspects of the Sustainability agenda, the group of partners decided to take some measures to deal with the intractable problem of unemployment in the area.

Although Manchester city centre is in the vicinity of Cardroom, unemployment levels in the area were troublingly high according to the 2001 census. With regards to the aforementioned the partners aimed at creating a mixed-use scheme that would provide a fertile ground for more job opportunities in the area. For instance, the ground floor of the Chips building was allocated retail and leisure uses, in line with the residents' wishes to have *'a pub, a butcher, a baker, a greengrocer, and an Indian takeaway'* (Grant, 2007) in their neighbourhood. In addition, some job opportunities were created in the construction sector, according to the interviewees.

6.3 Analysis of the key stakeholders' perceptions on the strengths and weaknesses of the project: Lessons learned

In New Islington, two interviews were conducted with professionals that hold very responsible positions in the team of partners. Interviewee A is the overall project manager of the lead developer firm, and interviewee B is the area manager of the Homes and Communities Agency.

Initial considerations

From the two interviews it was clear that sustainability aspects were encompassed in the core of the scheme from a very initial stage and contributed greatly to its success. However, although Millennium Communities had set a generic overarching framework for development, the lack of specific indicators forced the developers to produce their own.

According to Interviewee A, *"Back when we started working on that project sustainability was quite a new term. So figuring out the sustainability features to be implemented on New Islington was not a very easy thing to do. I remember spending quite a few weeks doing web searches and writing up the first plan..."*

For the lead developer, and for the rest of the partners from the private sector, sustainability was a world of new opportunities. Back in 2001, it provided a competitive advantage in a business landscape where sustainability principles were gaining growing importance.

As Interviewee A recalls, *"New Islington project came at a time for us as a private developer when we started to look at different sustainability options which were obviously going to become a big part of our work. We were looking for an opportunity to start and push our expertise, move on to the next step and start something bigger."*

Satisfaction with outcomes

In the question about their satisfaction with the way the initial commitments of the project bore fruit, both interviewees stated that the most successful aspect was the flexibility of the initial framework for development. *"It was designed to respond at any*

given time to what Manchester needed and to what new technologies allowed”, as Interviewee A said. For instance the densities were lower than initially planned, but the basic aspirations of the masterplan (public realm works, high environmental standards, affordability and diversity) were not compromised.

Satisfactory was also the realisation of the project’s ultimate goal, which was the regeneration of the old, derelict Cardroom Estate according to both interviewees. They reported that the transformation of the neglected neighbourhood where antisocial behaviours and crime thrived into a place of international focus was recognised by the residents who are now proud and happy living there.

Sustainable urban design: quality issues

The importance of having a variety of tenures and affordability levels emerged consistently in the analysis of the interviews. According to Interviewee A, *“It facilitated the acquiring of property by people of different incomes”*. This was considered by both interviewees as one of the main drivers of success since it contributed to a socially and aesthetically diverse outcome.

Furthermore, it was also pointed out by the participants that the reuse of old engineering material acquired from the demolished buildings on construction works within the site, the unification of the separate heating networks, and the remediation works on the contaminated land were all exemplary sustainability initiatives relating to technical aspects of urban design, which led to a successful result.

Affordability

It was commonly mentioned in the interviews that although rent levels in New Islington are higher than the ones in the adjacent area, they are equivalent to the property values in other regenerated areas of Manchester. None of the interviewees thought of the area as an exclusive one where rents are affordable only to a small minority, but instead identified the close proximity to the city centre and the involvement of popular developers as probable factors that influenced the slightly

increased property values. The financial schemes that were employed were thought by both respondents as crucial to the economic and social viability of the scheme.

Transferability of successful aspects of the scheme

The interviewees shared a common line of thinking regarding success. They highlighted the importance of identifying success as site specific and dependent upon market conditions in a certain location at a certain moment in time.

According to what Interviewee B stated, *“There is not a right recipe that can guarantee the success of every project because success is dependent upon location”*.

However the participants enumerated several features of technical nature that can be applicable to other similar initiatives and these were:

- District heating schemes (when a critical mass is existent)
- The division of land into small plots that encourages the involvement of various developers
- Accessibility in every sense
- The recruitment of experts from different disciplines for the formulation of a coherent and trustworthy team
- Investing in the quality of public realm works that not only are crucially important for the viability of the community, they also give confidence to the private sector to invest
- Building upon the prevailing conditions of the area, as occurred in the case of New Islington with the canals
- Investing in quality both for the buildings and for the neighbourhood; *“It might be risky moneywise, but it leads to a successful result”*, as interviewee B explained

Accessibility

Participants highlighted the importance of accessibility in every sense. The bus and tram connections, as well as the close proximity to the town centre, make New Islington fully accessible by all means.

Environmental legislation

In the case of environmental legislation at the time, the project was initiated the participants identified some gaps. Although the BREEAM and Millennium Communities standards contributed to the efficiency of the scheme and encouraged quicker delivery, they hadn't been fully developed in many areas back when the project was initiated. The buildings of the scheme were all awarded the eco homes excellence certification, but at the neighbourhood scale, there were no tools available for the assessment of the scheme.

Impact on employment

Although local economic activity creates wealth and diverse work opportunities it is sometimes considered to be the panacea for unemployment problems. It would therefore be naive to assume that the high unemployment rates in the Manchester area (5.2%) could be combated solely by the initiators of a small scale urban project.

Both interviewees regarded close proximity to the city centre of Manchester as a competitive advantage for New Islington in terms of employment.

However, project partners showed increased responsibility with regards to the unemployment issue by making an effort to create some job opportunities in the retail and construction sectors. Interviewee A explained that *"there have been examples of residents of the old estate that got jobs in the construction works on the site. There was also this old lady who used to run a cafe business for the builders in the estate"*.

It is, however, very difficult to assess the outcomes of their effort. As interviewee A mentioned, *"Bordering the area in which employment conditions have changed due to the development of the scheme is difficult"*. It would probably take a separate study to investigate the number of local people who found employment in new positions associated with the scheme.

Sustainable development and civic pride

Interviewees confirmed a connection between the regeneration of New Islington and the enhancement of the community's civic pride. Participants identified the regeneration of the old rundown estate, the reopening of the canals and, the

international reputation the project has received due to its sustainable profile, as contributing factors.

Public/Private sector partnerships

The significance of the partnership in the success of the project was highlighted by the interviewees. According to their experiences, success and quick delivery were guaranteed by combining the efficiency of the public sector in setting the standards and in being more aware of the needs of the locality, with the private sector's skills in contributing to innovation, and in being more aware of the market.

However, as Interviewee B pointed out: *"The differences in the levels of mobility that each sector has can create problems"*. More specifically, Interviewee B referred to public sector's bureaucratic character and the delays it causes in cases where a project deviates from standard construction guidelines and techniques.

Public participation

Although there is a general belief that public participation is always effective, both interviewees pointed out that usually the locality only has a marginal effect on decisions. In contrast to what common practice suggests partners in New Islington followed a more democratic strategy, trying to achieve high levels of participation in consultation meetings.

Interviewee A characterised the initial workshops as analytical in the sense that partners were *"trying to gather information about the area that could not be automatically understood, and investigating the reasons why the area had failed"*. The 2002 consultation meetings revealed that the remaining people in Ancoats had long association with the area and constituted a rather coherent community.

In the first round of consultations, numbers were limited and people who attended expressed radical ideas concerning the demolition of old industrial buildings. According to Interviewee A, this was an indication that *"people were anticipating a big change in their neighbourhood...The old industrial buildings were the reminders of the old difficult times that the older residents who had worked there wanted to forget"*. The historical

significance of those buildings, however, made impossible any plans and ideas that involved their demolition and it was important for the local people to understand this argument. With respect to reaching to a consensus over the most feasible solutions, interviewee B stressed the significance of the involvement of professionals from the team of partners in the consultation forums. As he suggested, *“Expert opinions are essential to justify which of the residents’ ideas can be implemented and which not”*.

In an effort to have a more inclusive participation process, the partners organised festivals and minor celebrations to raise awareness and to make the project more widely known. These initiatives resulted in a more inclusive second round of consultations during which the initial framework for the scheme was shaped.

Interviewee A highlighted the importance of seeking out the views of non-joiners by conducting social surveys. The developer firm in New Islington for instance visited households individually to make sure the views of the people who did not attend were taken into account.

Sustainability indicators: their contribution to success

In New Islington, it was a primary requirement for the scheme to comply with the generic checklist of criteria introduced by the Millennium Communities as interviewees explained. Furthermore, all building structures had to be eco homes excellence in accordance with the BREEAM standards.

Both participants referred to a series of reports that were meant to assess each phase and ensure that the delivered outcome met the initial objectives and expectations. The first set of reports was made for each plot separately. Its aim was to examine how each building hit the targets of the sustainability plan. This set of reports was followed by the submission for planning approval, during which time the targets that were introduced in the first phase were explained in quantitative terms. Finally, the last set of reports was assessing the development in terms of compliance with the initial targets.

Participants were asked for more information but they both refused to provide any relevant documentation, as such disclosure would jeopardise sensitive information about the private companies involved.

Unsatisfactory points

Recession was identified by both interviewees as the main factor associated with unsatisfactory outcomes. Severe delays were caused in the delivery of the project, and the demand for housing in the area was significantly shrunk. However innovative schemes such as the *"First Time Buyer"*, and the *"Rent to Homebuy"* facilitated the acquiring of property by people of different incomes.

When the interviewees were asked to comment on the urban design aspects of the project that have made it exceptional in terms of sustainability, they distinguished between technical aspects, which in most cases are given a priority, and social considerations which are usually difficult to account for. In other words, they recognised the lack of specific indicators that would contribute to the social viability of the neighbourhood. As Interviewee B said, *"Urban design issues are more associated with technical specifications which were developed by the Millennium Communities, and therefore they were easier to realise. The social aspects on the other hand were more difficult to achieve"*.

Issues raised by the interviewees also included barriers to community involvement. The first one related to the difficulty of achieving the maximum level of inclusion. They explained that it is a common phenomenon in focus groups and workshops that small minorities who are not necessarily representative dominate the discussion. As mentioned by interviewee A, *"in consultations there are always people who are more open and can more easily state their opinions in front of a public, and there are others who are more reluctant to do so"*.

As far as checklists and indicators are concerned, interviewee A raised the problem of the absence of indicators and formal checklists that go further than the scale of the individual household. As he said, *"the existence of a joint set of criteria that would incorporate both building and neighbourhood standards would be invaluable since the*

single result it would produce would make comparisons between projects possible in quantitative terms". He added that "this would give a motive to builders to put more effort to achieve higher standards and buyers would be more aware of what they buy. Furthermore, it would facilitate general public's holistic understanding of what sustainable development stands for".

Lastly, interviewees criticised the inflexibility and therefore the cynical use of checklists of sustainability indicators as "checkbox exercises". According to what they said, unless the partners have the necessary knowledge of the local circumstances the success of the project is jeopardised regardless of indicators having been used or not. "Common sense needs to be used alongside any kind of quantifiable sets of criteria", as Interviewee B pointed out.

6.4 Analysis of the questionnaire survey: Investigating residents' satisfaction

General points about the demographics of the sample

In New Islington, 23 of the 37 questionnaires distributed were returned at a response rate of 62.1%. Rented properties and social housing units seem to prevail in the area - a fact that differentiates New Islington from the rest of the neighbourhoods this study focuses on.

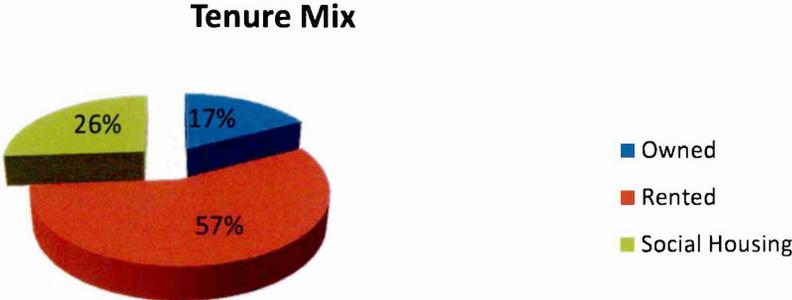


Chart 1: Tenure mix in New Islington

With regards to the household mix, as seen in the chart below, the neighbourhood mainly comprises of adults - a fact that leads to the conclusion that not many families reside in the area. Considering the bad reputation the region has had in the past we could suggest that the lack of families with small children is related to the high crime rates and the wide range of problems the area had suffered in the past.

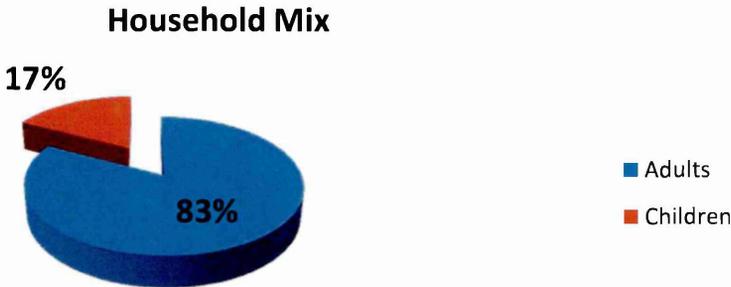


Chart 2: Household mix in New Islington

6.4.1 Correlations

Your home/Type of property: General points about the property and its occupants' satisfaction levels.

As shown in Table 2¹¹, very high rates of satisfaction were expressed by all subgroups with regards to most questions referring to their properties. However, the lack of space for children is a notable observation, particularly in rented properties and social housing units.

Another prominent fact reflected in the table below is the inflexibility of the layout of properties in the area which could potentially be a factor of inconvenience with regards to future alterations due to changes in the household mix.

¹¹ Different colours have been used to improve the visualisation of the data with green representing "very satisfied", yellow indicating "to some extent satisfied", red suggesting "not satisfied" or a negative response and finally, blue representing "not aware/sure".

Finally, as we have also seen in the other case studies, the construction measures for optimum energy performance seem to have had a modest effect on energy saving since residents appear to be either unsure about or not satisfied with their monthly spending on bills.

		Type of property						
		Rented		Owned		Social Housing		
Criteria	Enough Privacy(% within type of property)	57.1% very satisfied		100%very satisfied		66.6% very satisfied		
	Garden (% within type of property)	100% have a garden		100% have a garden		100% have a garden		
	Enough space to socialise(% within type of property)	57.1% very satisfied		100% very satisfied		66% very satisfied		
	Enough space for children (% within type of property)	100% to some extent satisfied		No children		50% to some extent satisfied	50% very satisfied	
	Flexibility of layout (% within type of property)	42.8% to some extent satisfied		50% very satisfied	50% to some extent satisfied	66% to some extent satisfied		
	Eco home less bills (% within type of property)	42.9% not satisfied	42.9% not sure	50% to some extent satisfied	50% not satisfied	33.3% to some extent satisfied	33.3% not sure	33.3% not satisfied

Table 3: New Islington: Your home/type of property correlations

Your community/Length of residency

General points about neighbourhood qualities correlated with individuals' length of residency.

In accordance with the findings of the recent census about high unemployment rates in the area of Greater Manchester, the residents that were asked from both sub-groups are either not satisfied or to some extent satisfied with the opportunities for employment in the adjacent area.

We can also see in Table 3 below that the local population is not completely satisfied with the opportunities they are given to participate in decisions. The greater dissatisfaction lies within the >5 years sub-group, where we can see that nearly 70% of individuals asked would like to be given more opportunities to be involved in decision-making for matters that concern their community.

Finally, the findings from the questionnaire survey seem to be contrasting to the interviewees' perceptions with regards to neighbourliness. As the table below indicates, the majority of the residents who have lived in the area for 5 years or less are to some extent satisfied with how close they are to their neighbours. However, this might be the result of their short length of residency, which means that they have not yet been fully integrated in the local community.

		Length Of Residency	
		1-5 Years	>5 Years
Criteria	Employment opportunities (% within length of residency)	66.6% to some extent satisfied	66.6% not satisfied
	Feeling safe (% within length of residency)	66.6% very satisfied	66.6% very satisfied
	Satisfied with opportunities to participate in decisions (% within length of residency)	66.6% to some extent satisfied	44.4% not satisfied
	Affordability of properties (% within length of residency)	66.6% very satisfied	66.6% very satisfied
	Feeling close to neighbours (% within length of residency)	66.6% to some extent satisfied	77.8% very satisfied

Table 4: New Islington: Your community/length of residency correlations

6.4.2 Frequencies

From the table below¹², it is apparent that, although residents are pleased with the attributes of privacy, space to socialise, and flexibility in their properties, they are not fully contented with the space available for children and with the savings they have had on bills since they moved in to an energy efficient home. It is, however, notable, that significant differences exist between the UK and other European countries, with respect to average dwelling space. In the 2010 Housing Statistics in the European Union, the average dwelling size in England is 82.7 sqm, considerably less than other European countries such as Germany (113.6) or France (99) (The Hague: Ministry of the Interior and Kingdom Relations, 2010).

¹² A smiley face scale has been used to improve the visualisation of data. The first column contains the prevailing frequencies for each aspect of satisfaction. The third column indicates whether each prevailing frequency corresponds to a positive, neutral or negative result. Green smiley face reflects the "very satisfied" responses, yellow reflects the "to some extent satisfied responses and, red indicates the "not satisfied" responses.

SATISFACTION WITH RESIDENCE		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
66.6%	House allows for enough privacy	
73.9%	Enough space to socialise in communal areas	
62.5%	Enough space for children	
43.5%	Flexibility of dwelling's layout	
30.4%	Eco home less bills	

Table 5: New Islington: Satisfaction with residence

The level of satisfaction with the qualities of the neighbourhood in New Islington is high according to the table below. This provides a quantitative reflection of the significant improvement in public realm and regeneration works that have taken place over the last five years in the area.

SATISFACTION WITH NEIGHBOURHOOD		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
65,2%	Public spaces	
56,5%	Everyday shopping needs being met within walking distance	
47,8%	Easy pedestrian orientation	
47,8%	High quality infrastructure amenities (community centres, residents' associations)	
82,6%	Distinctive neighbourhood character	

Table 6: New Islington: Satisfaction with neighbourhood

Resident perception of air quality is a very important factor since it affects people's health to a large extent (WHO, 2005). This is especially true in city centres where traffic pollution increases with the amount of cars usage and, bad quality of air can potentially cause respiratory problems when it comes to hyper-sensitive groups of people, either very young or very old in age. The table below reveals that residents' degree of satisfaction with the quality of air in New Islington is mediocre. Apparently, the close proximity with the city centre has a very important role to play, however, the

park that was completed, after the statistical survey took place, will have a positive effect on the microclimate of the neighbourhood.

SATISFACTION WITH ENVIRONMENT		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
56,5%	Quality of air	

Table 7: New Islington: Satisfaction with environment

The vast majority of the residents are not regular car drivers but although they use public transport as an alternative, they are only to some extent satisfied with the frequency of the services as well as with the ticket prices. In addition, according to public perception, streets in the neighbourhood are not particularly encouraging for both pedestrians and cyclists alike.

SATISFACTION WITH MOBILITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
55%	Public transport(in general)	
40%	Ticket prices	
75%	Frequency of public transport services	
43,5%	Frequency of vehicle usage	
47,8%	Pedestrian and cycle friendly streets	

Table 8: New Islington: Satisfaction with mobility

Satisfaction with opportunities for employment was and still is, after the decline of the adjacent industrial quarter, a significant problem for the neighbourhood. Although measures were taken from the local council and the lead developer to incorporate leisure and commercial facilities in the scheme, the local population remains to a large extent benefit dependent. This fact is indeed reflected in the table below, where it can be seen that people are only to a certain degree satisfied with employment opportunities. It is however a matter that needs to further be researched since what needs to be specified is whether the local jobs available are suitable for local residents.

Furthermore, the recession in the UK, at the time the survey was undertaken, needs to be borne in mind.

The locality's perception over safety, another problematic issue the area had greatly suffered from in the past, seems to contrast the literature review findings. 66.5% of the people appear to believe that their neighbourhood is a safe place to live in and not the hostile environment the literature review illustrates. In fact, this perception is further confirmed by the recent Crime Police Reports for the area, according to which only 26 minor crime incidents were reported in New Islington in June 2012; whereas the nearby areas appear to suffer a lot more (Greater Manchester Police, 2012).

Finally, while residents are satisfied with the opportunities they have to be involved in decision-making, they believe that their aspirations and opinions are not taken into that much consideration. This leads to a matter of great concern; despite the fact that public participation has been fully embedded in the planning process as a mandatory procedure, the way it is actually implemented seems to be superficial since developers and city council alike are unable to incorporate people's aspirations in their plans for the development scheme.

SATISFACTION WITH COMMUNITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
47.8%	Opportunities for employment	
69.6%	Affordability of properties	
66.5%	Sense of safety	
52.2%	Good relationship with neighbours	
47.8%	Opportunities to participate in decision making	
52.2%	Is your voice being heard by public authorities?	

Table 9: New Islington: Satisfaction with community

The neighbourhood change in relation to the improvement in quality of people's lives in general is positive according to the pie chart below. The vast majority of the residents are either very much, or to some extent satisfied with how their quality of life has been enhanced since the scheme was initiated.

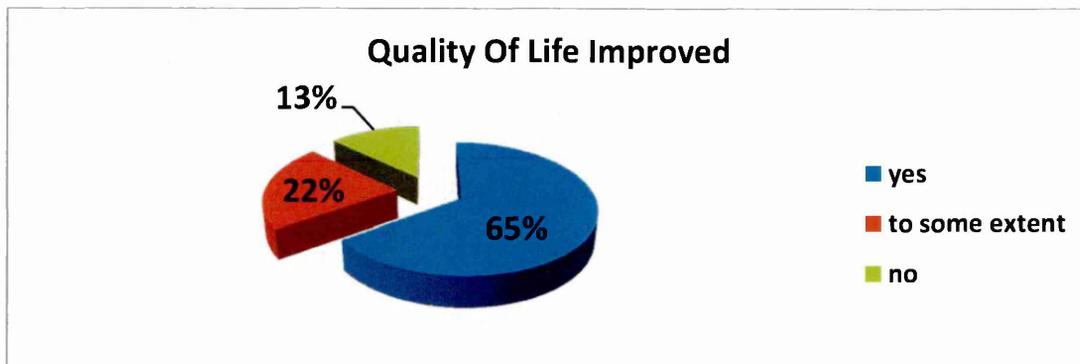


Chart 3: New Islington: Quality of life improved?

As discussed earlier, crime was one of the key issues that had to be addressed in this particular scheme since it was one of the reasons behind the neighbourhood's notorious reputation.

Crime still is a matter of concern on a frequent basis, according to the chart below, but residents' feeling of safety is not significantly affected, as it was outlined previously. This perception of safety might be related to the establishment of new residents in the new-built developments in the neighbourhood.

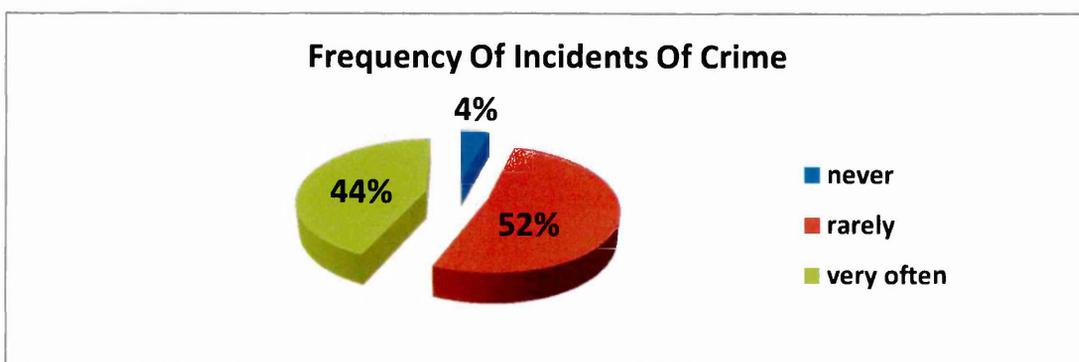


Chart 4: New Islington: Frequency of incidents of crime

Also, crimes occurred in the area are mainly relevant to anti-social behaviour and vehicle crime, and are not to a large extent related to arson, violent crimes and public disorder

(Greater Manchester Police, 2012). Worth noting, as well, is that the strong sense of community in New Islington maximises the potential for natural surveillance. Thus, it could be suggested that the community has in some cases the power to handle a number of incidents of crime, or even to prevent them, before they occur. This could be particularly the case in situations where the initiators of crime are members of the locality.

The following chart indicates the frequency of private vehicle usage in New Islington. It is a good indicator of people's commuting habits, of how well public transport suits the residents' needs, and of how congested the area is with traffic. The numbers are impressive since only 13% of the residents use their cars on a daily basis. However, the close proximity to the city centre, as well as the fact that a large proportion of the residents are unemployed (saving them the daily trip to work), are factors that should be borne in mind.

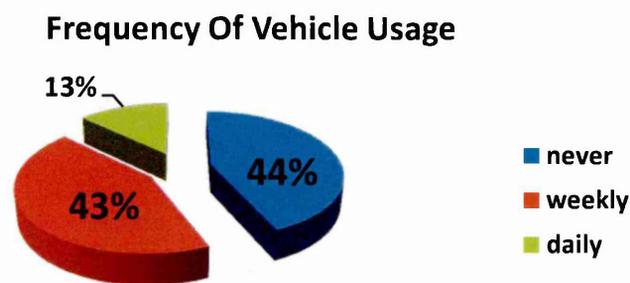


Chart 5: New Islington: Frequency of vehicle usage

Finally, the last chart shows a positive trend in people's behaviour that stems from the fact that the neighbourhood has been planned and developed in a sustainable manner. A significant 87% of the local population agreed that their lifestyles have to some extent or largely been affected and have taken a more sustainable course.

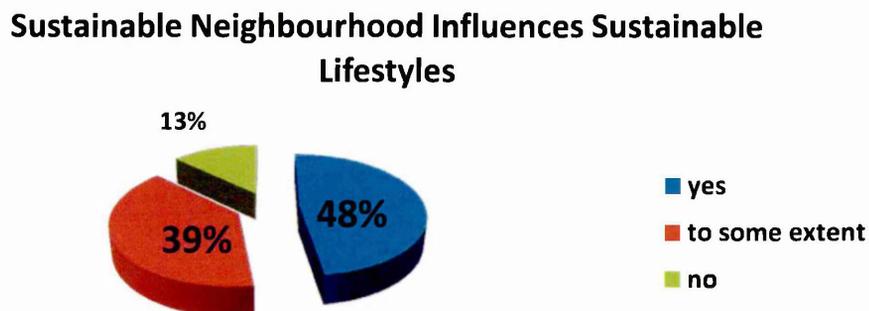


Chart 6: New Islington: Sustainable neighbourhood influences sustainable lifestyles?

6.4.3 Bivariate Analysis

The Spearman Rank Order Correlation coefficient (ρ) was run to measure the strength and direction of the relationship that exists between different sets of variables.

Where $df = 23 - 2 = 21$

At 0.05 level of significance with $df = 21$ a rho correlation coefficient of 0.438 is required for statistical significance.

The table below shows that there is a weak positive correlation (0.362) between the variables “provision for shopping needs” and “frequency of vehicle usage”.

Correlations

			Provision for shopping needs	Frequency of vehicle usage
Spearman's rho	Provision for shopping needs	Correlation Coefficient	1,000	,362
		Sig. (2-tailed)	.	,090
		N	23	23
	Frequency of vehicle usage	Correlation Coefficient	,362	1,000
		Sig. (2-tailed)	,090	.
		N	23	23

Table 10: New Islington: “provision for shopping needs” and “frequency of vehicle usage”

The table below shows us that there is a strong positive relationship (0.527) of statistical significance between the variables “Satisfaction with public transport” and “Frequency and speed of Public transport”.

Correlations

			Satisfaction with public transport	Frequency and speed of Public transport
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	,527**
		Sig. (2-tailed)	.	,010
		N	23	23
	Frequency and speed of Public transport	Correlation Coefficient	,527**	1,000
		Sig. (2-tailed)	,010	.
		N	23	23

** . Correlation is significant at the 0.01 level (2-tailed).

Table 11: New Islington: “Satisfaction with public transport” and “Frequency and speed of Public transport”

The table below shows that there is a strong positive relationship (0.647), with no statistical significance, between the variables “satisfaction with public transport” and “affordability of public transport”.

Correlations

				Satisfaction with public transport	Affordability of public transport
Spearman's rho	Satisfaction with public transport	with public	Correlation Coefficient	1,000	,647**
			Sig. (2-tailed)	.	,001
			N	23	23
	Affordability of public transport	of public	Correlation Coefficient	,647**	1,000
			Sig. (2-tailed)	,001	.
			N	23	23

** . Correlation is significant at the 0.01 level (2-tailed).

Table 12: New Islington: “satisfaction with public transport” and “affordability of public transport”

The table below shows that there is a positive relationship (0.344), but statistically insignificant, between the variables “satisfaction with public transport” and “frequency of vehicle usage”. This is an indication that people who are not satisfied with public transport tend to use their cars more often.

Correlations

				Satisfaction with public transport	Frequency of vehicle usage
Spearman's rho	Satisfaction with public transport	with public	Correlation Coefficient	1,000	,344
			Sig. (2-tailed)	.	,108
			N	23	23
	Frequency of vehicle usage	Frequency of vehicle usage	Correlation Coefficient	,344	1,000
			Sig. (2-tailed)	,108	.
			N	23	23

Table 13: New Islington: “satisfaction with public transport” and “frequency of vehicle usage”

The negative coefficient in the table below (-0.167) that the variables “provision for community facilities” and “frequency of vehicle usage” are not associated.

Correlations

				Provision for community facilities	Frequency of vehicle usage
Spearman's rho	Provision for community facilities	for community	Correlation Coefficient	1,000	-,167
			Sig. (2-tailed)	.	,447
			N	23	23
	Frequency of vehicle usage	Frequency of vehicle usage	Correlation Coefficient	-,167	1,000

	Sig. (2-tailed)	,447	.
	N	23	23

Table 14: New Islington: “provision for community facilities” and “frequency of vehicle usage”

The positive coefficient in the table below (0.261) shows that there is a direct relationship between the variables “pedestrian and cycle friendly streets” and “frequency of vehicle usage”.

Correlations

			Pedestrian and cycle friendly streets	Frequency of vehicle usage
Spearman's rho	Pedestrian and cycle friendly streets	Correlation Coefficient	1,000	,261
		Sig. (2-tailed)	.	,229
		N	23	23
	Frequency of vehicle usage	Correlation Coefficient	,261	1,000
		Sig. (2-tailed)	,229	.
		N	23	23

Table 15: New Islington: “pedestrian and cycle friendly streets” and “frequency of vehicle usage”

There is quite a strong positive correlation (0.366) between the variables “frequency of incidents of crime” and “feeling safe” according to the table below.

Correlations

			Frequency of incidents of crime	Feeling safe
Spearman's rho	Frequency of incidents of crime	Correlation Coefficient	1,000	,366
		Sig. (2-tailed)	.	,086
		N	23	23
	Feeling safe	Correlation Coefficient	,366	1,000
		Sig. (2-tailed)	,086	.
		N	23	23

Table 16: New Islington: “frequency of incidents of crime” and “feeling safe”

There is a strong positive association between the variables “feeling close to neighbours” and “feeling safe” (0.510) This enables us to assume that the good relationship that a resident in New Islington might have with his neighbours enhances the feeling of safety he has living in this neighbourhood.

Correlations

			Feeling close to neighbours	Feeling safe
Spearman's rho	Feeling close to neighbours	Correlation Coefficient	1,000	,510*
		Sig. (2-tailed)	.	,013
		N	23	23
	Feeling safe	Correlation Coefficient	,510*	1,000
		Sig. (2-tailed)	,013	.
		N	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

Table 17: New Islington: "feeling close to neighbours" and "feeling safe"

The table below shows that there is a strong negative relationship(-0.508) between the variables "opportunities for participating in decision making" and "frequency of attending community events".

Correlations

			Opportunities for participating in decision making	Frequency of attending community events
Spearman's rho	Opportunities for participating in decision making	Correlation Coefficient	1,000	-,508*
		Sig. (2-tailed)	.	,013
		N	23	23
	Frequency of attending community events	Correlation Coefficient	-,508*	1,000
		Sig. (2-tailed)	,013	.
		N	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

Table 18: New Islington: "opportunities for participating in decision making" and "frequency of attending community events"

The negative coefficient in the table below (-0.241) shows that the variables "frequency of attending community events" and "Is your voice being heard" are not associated.

Correlations

			Frequency of attending community events	Voice heard by council
Spearman's rho	Frequency of attending community events	Correlation Coefficient	1,000	-,241
		Sig. (2-tailed)	.	,268
		N	23	23
	Voice heard by council	Correlation Coefficient	-,241	1,000
		Sig. (2-tailed)	,268	.

Correlations

			Frequency of attending community events	Voice heard by council
Spearman's rho	Frequency of attending community events	Correlation Coefficient	1,000	-,241
		Sig. (2-tailed)	.	,268
		N	23	23
	Voice heard by council	Correlation Coefficient	-,241	1,000
		Sig. (2-tailed)	,268	.
		N	23	23

Table 19: New Islington: “frequency of attending community events” and “Is your voice being heard”

6.4.4 Discussion

The bivariate analysis conducted, highlighted that the strongest positive correlations were between the following pairs of variables:

- “Provision for shopping needs” and “frequency of vehicle usage”.
- “Satisfaction with public transport” and “Frequency and speed of Public transport”.
- “Satisfaction with public transport” and “affordability of public transport”.
- “Satisfaction with public transport” and “frequency of vehicle usage”.
- “Frequency of incidents of crime” and “feeling safe”
- “Feeling close to neighbours” and “feeling safe”

Firstly, with regards to the independent variable *satisfaction with public transport*, the results displayed above indicate that the frequencies of public transport services along with the price of tickets are highly significant factors.

Secondly, having a close relationship with the neighbours emerged as an element that positively affects the *feeling of safety* within the locality. In addition, and not surprisingly, the rare occurrence of incidents of crime reinforces the feeling of safety.

Thirdly, the variable *frequency of private vehicle usage* is, according to the study, positively associated with the presence of adequate local amenities, and with the community’s satisfaction with the public transport services in the area. The latter

finding is in agreement with what the literature review has suggested so far; that encouraging a mixture of uses, and implementing coherent, long term strategies for an efficient public transport networks, are keys to every urban scheme's success.

6.5 Summary

Although this study attempted to provide a systematic examination and assessment of the New Islington project, as it is still on-going, it looks at initial outcomes up to the time of writing. The scheme was originally planned to be completed in 2012, however, the recession had a severe impact on the pace of development. According to a report published by the Communities and Local Government Committee the partners are now considering deviating from the initial plan, and incorporating different types of housing in the scheme such as high-density and low rise flats (Communities and Local Government, 2011).

Overall, the outcomes so far have been positive, as it was seen in the analysis of the interviews and questionnaires. There has been a significant progress towards sustainability and the old neglected estate has been transformed to a large extent. The fact that all new housing has been allocated for sale or part-ownership was the result of the partners' desire to create a mixed tenure that would change the old monolithic structure of the neighbourhood population that merely comprised of benefit dependent households. However, time will show whether the population mixture has reached the desired diverse result and whether the social problems of the area have been eliminated. Nevertheless the efforts of the group of partners to engage with the community through every step of the planning and design process has been noteworthy and it could prove an important milestone towards sustainability since the realised outcome has been based on people's aspirations and wishes¹³.

In addition to what the scheme has achieved from a social perspective, it is also apparent that substantial effort has been put into improving the environmental

¹³ After all, the statistical survey clearly showed that 65% of the residents asked believe that their quality of life has been improved since the scheme was initiated.

performance of the buildings and preserving the local green infrastructure. Part of that effort definitely stemmed from what the environmental legislation was suggesting, but figures show (Homes and Communities Agency, 2010) that there has been some improvement to the minimum environmental regulations in force at the time the project started. Furthermore, the beautification of the local landscape through the reopening of the canals, the land remediation works, and the creation of the local park have generated potential for the development of a natural habitat of unique biodiversity interest within just a short distance from Manchester's urban core. The project is, therefore, an excellent example of how an environmentally declining former industrial area can be transformed when sustainable development principles are employed.

The New Islington project is also a prime example of successful economic regeneration of a former industrial estate. In the beginning, because uncertainty surrounded the area's future, it was difficult to attract inward investment. The involvement of the local authorities and public bodies such as English Partnerships however created a more secure and solid background of principles as to what could be achieved in the area. It also posed the emphasis on public realm interventions to create functional and attractive spaces for the local community. Equally important was the fact that the public bodies involved were also sources of funding for the scheme. Manchester City Council provided the land, whereas English Partnerships contributed 18 million pounds of funding (Communities and Local Government, 2011).

Finally the scheme has also had an impact on local employment. The partners had the intention to create a mixed-use scheme so there have been a few retail and office spaces incorporated. However, the magnitude of the effect on employment the scheme will have is difficult to border according to the interviewees.

Chapter 7. Towards the development of a checklist of criteria for success: The Upton urban extension project

7.1 Introduction

Housing pressures in Northampton back in the 1990s urged the City Council to investigate the possibility of an urban extension to the south west of the town centre. In 1997 the City Council gave outline planning permission for a residentially focused masterplan plan, which was challenged by an Enquiry by Design Workshop in 2001 (TCPA, 2007). The workshop was organised by a consultant team that involved the Borough Council, the Prince's Foundation and English Partnerships, and was a systematic participatory approach to planning that involved close collaboration with local stakeholders and professionals. The team formed a Working Group that was assigned to ensure that quality would be maintained throughout the development process, and established a new framework and masterplan for the development of a mixed-use sustainable neighbourhood in 2002.

The design solution presented through the masterplan was accompanied by a set of design codes, which provided detailed guidance on the implementation of the generic set of principles for sustainability established by the stakeholder group. Construction commenced in 2004, following a variation to the outline planning permission in 2003, that encompassed the decision to transform the Weedon Road Frontage into mixed-use development that would have a focal character for the local community.

7.2 Description of the project

7.2.1 The project's context

Through the establishment of design codes, the Upton project was aiming to accomplish two main targets. On the one hand, the design code was a framework that was meant to address the issue of sustainability in a holistic manner and a monitoring tool used to ensure quality standards were maintained during all phases of the development. On the other hand the design code was used as a starting point for inclusive dialogue between all partners and representatives of the local community. Through the design code and through close supervision by the Project Working Group, volume house builders managed to combine advanced sustainability standards with standard house-building techniques.

Upton is the first phase of the wider spatial plan for the extension of Northampton within a new South West District and it comprises of eight sites. The 44ha area under development will eventually accommodate 1,382 homes, a local centre with 700 square metres of retail facilities and a primary school (The Prince's Foundation, Rudi.net, 2008).

The parameters of the design code were related to a number of factors that had to do with the hierarchy of streets, the design and appearance of the blocks and buildings, the different character areas, open space standards, and environmental considerations. The division of the site into different character areas facilitated the specification of design codes for land use and density, as well as building types and heights. In addition, by giving clear guidelines for a specific hierarchy of the street network, the code also defined the land uses, building frontages, types and heights, open space and boundary treatment applicable to each street type.

There are four character areas in Upton, and these are the following: urban boulevard, Neighbourhood Spine, Neighbourhood general and Neighbourhood edge.

Although the code provides very specific guidelines for the urban scale by defining the character of each part of the neighbourhood, it allows for flexibility when it comes to the scale of the building. There has been significant debate on whether design codes restrict creative freedom (Street, 2007), but the aesthetic result in Upton is an indication of the opposite (see figure 12). The code has indeed influenced the architectural styles by influencing developers to consider the local vernacular, but some very interesting and diverse architectural solutions have stemmed from that requirement.



Figure 12: Upton, Phase 1

7.2.2 Site location and context

Upton is a 37-hectare flat former agricultural site, located in the South West of the town of Northampton and immediately on the North of River Nene. It is a Greenfield development within a 10-minute bus ride of the town centre. River Nene, the tenth longest in the United Kingdom, flows towards the east coast and along its path it forms flood plains, lakes and pools that comprise a scenery of unique natural beauty. In 1998, serious floods occurred in the East Midlands and River Nene was badly affected. Since

that incident the City Council has taken measures to minimise the risk of floods and to better protect the immediately affected areas.

Due to the aforementioned events the partners aspired to a Sustainable Urban Drainage System that would deal with surface water run-off and operate in combination with a conventional below ground piped system. The water would flow through the SUDS and swales, and would eventually reach the river.

The neighbourhood is compact with apartment blocks, and most houses being 5 or 6 bedrooomed. The 1.5 spaces parking allowance per dwelling was meant to discourage the use of cars, but it contrasts the aforementioned numbers of bedrooms per house and it eventually caused difficulties since the commercial site is still vacant (see 8.4). The first development phase commenced in 2003 at a 3.7 - hectare site (Site A) and included the development of a mixture of higher density townhouses and apartments, as well as semi-detached and detached homes. Site B consists of a further 204 properties with a range of integrated sustainable systems for ecological optimisation such as rainwater recycling facilities, solar water heating, green roofs and PV panels or micro CHP systems. Site C consists of 30 large semi-detached and detached units. Finally, site D1, still under development, will eventually include 345 dwellings (townhouses and apartments), which will again integrate advanced green technologies, while some of the units will be demonstration projects that will showcase the applicability of ZED standards (Energy Saving Trust, 2006).

7.2.3 Key stakeholders

Upton project is a partnership between the English Partnerships, the Prince's Foundation, Northampton Borough Council and a consultant team led by EDAW. Having English Partnerships as the owner of the land and Northampton Borough Council as a partner in the Working Group ensured a socially responsible strategy from the initial decision-making stages to implementation and delivery. Also, advanced site infrastructure, such as SUDS, would have been difficult to implement unless the local authority's interest were represented within the team of partners.

7.2.4 Development process

The former farming land in Upton was acquired by Northampton Development Corporation and transferred to English Partnerships as soon as the area was designated as an urban extension of the town of Northampton. The initial development plan was challenged by a weeklong Enquiry by Design workshop in which all stakeholders participated. The former car-orientated masterplan was transformed into a mixed-use, high density one, with adaptable and energy efficient buildings and innovative water management strategies integrated both at the building and the urban level.

Before commencing the urban extension project, the landowner developed a design code in collaboration with the Prince's Foundation or, in other words, a set of specific rules to clarify what constituted acceptable design quality for the team of partners¹⁴. It was because of the strong leadership role that the English Partnerships took, as the landowner and funding agency that the design code was possible to be realised.

The Upton Design Code became the instrument that maintained the initial objectives throughout the development process and was also the main tool to assess each house builder's proposal for the plots. It was primarily in line with the PPG1 and PPG3 planning policy guidance documents that encouraged the delivery of higher quality outcomes in the built environment discipline.

The Upton site was divided into 8 different land parcels and for each development phase, a different development brief with different levels of restriction was prepared by the Working Group. The selection of the preferred developers of each site was the outcome of a two stage process, the first of which was solely based on design criteria that stemmed from the design code. For the successful submissions a second stage

¹⁴ A 2006 Government Publication entitled "Design Coding in Practice, An Evaluation" defines the design codes as "an illustrated compendium of the necessary and optional design components of a particular development with instructions and advice about how these relate together in order to deliver a masterplan or other site-based vision" (DCLG, 2006).

would follow during which the developers were assessed on the basis of seventy present design criteria and thirty present financial criteria.

Construction works are still on-going but Sites A, B, D1 and D2 have been completed.

7.2.5 Planning and design: Aims, Criteria and guidelines

The development of Upton *“marks a radical departure from typical cul-de-sac based suburban development”* (Prince's Foundation, 2011) and *“demonstrates best practice in sustainable urban growth”* (Energy Saving Trust, 2006).

The Aims, Criteria and Guidelines for the scheme have been specifically set out in the Design Code, the purpose of which has been to *“control the quality of urbanism and ensure strict environmental and building design standards”* (Prince's Foundation, 2011). The specifics of the design code were the product of a thorough deliberation between English Partnerships and the Prince's Foundation over consecutive workshops that took place in 2001.

The approach aimed at raising the standards in the following areas: 1. Design quality, 2. Reduced carbon emissions and increase energy efficiency, 3. Reduced mains water use, 4. Construction efficiency and less defects, 5. Recycling provision, 6. Increased social inclusion and participation, 7. Variety of tenures, housing types and affordability levels, 8. Accessibility, 9. Long term economic viability, 10. Health and safety.

Deliverability of social sustainability has been addressed with the incorporation of the following aims: Increase social inclusion/ participation; variety of tenures/ housing types/ affordability levels; accessibility; health and safety. Furthermore, a strong commitment to environmental sustainability has been declared through the following aims: Reduce CO2 Emissions /increase energy efficiency; reduce mains water use; construction efficiency; and sustainable urban and architectural design. Finally aims for economic sustainability have been established with measures for mixed uses and energy considerations.

In the following table, the author has summarised objectives, specific measures employed and the scheme's performance with regards to each aim, based on a detailed review of project documentation.

Initial Aims	Objectives	Measures taken	Performance
Design Quality	Design Codes/phase	<ul style="list-style-type: none"> Street Types(Main Street, street, street with SUDS, Lane, Mews, Central Courtyards) Block Principles (central courtyard block, Mews Block) Building Height (driven by the destination of character areas) Building Types (Apartment block, detached, town house, Semi-detached, Mixed use building, Mews, Weedon Road, School) Building Materials and details Character Areas (urban boulevard, Neighbourhood Spine, Neighbourhood general, Neighbourhood edge) 	<ul style="list-style-type: none"> Cohesive architectural result; celebrating the style, tectonics, materials and craftsmanship of the local vernacular The design code did not allow for much deviation from the traditional style. Timber materials FSC certified OR re-used
		SUDS, parks and open spaces (SUDs, existing landscape features, school grounds, Upton Square, Playing fields, Pavilion, interpretation centre, Relationship with country park)	<ul style="list-style-type: none"> Promotion of local biodiversity Protection from floods Development of an aesthetically pleasing natural landscape Opportunities for recreational activities
		Environmental standards(BREAM Excellent, HER Rating-10, ode for Sustainable Homes, Mandatory Elements, Test Technologies, Demonstration Projects)	<ul style="list-style-type: none"> Reduced CO2 emissions to less than 20kg/m2 per year and improved performance of the building envelope by 15% over building regulations Environmental technologies are successfully integrated within the building fabric
		Flexible buildings on Main Street that will allow conversion at the ground floor level from residential to retail, office, or community services	Meeting future needs and responding to market opportunities

Initial Aims	Objectives	Measures taken	Performance
Reduce CO2 Emissions /increase energy efficiency	Passive Design	Solar gain to be mitigated through design <hr/> Increased Insulation: All developers had to achieve full marks within the eco homes "Building Envelope Performance" <hr/> Heat recovery ventilation encouraged	Buildings were awarded ECO homes excellence certification
	Energy Efficiency	Solar water Heating <hr/> Micro CHP units or high efficiency communal boilers	
	Integration of Renewable Energy Production	PV materials on south facing roofs	
Reduce Mains Water Use	SUDS (Deals with surface water run-off. Water flows through the country park areas and to the river Nane in a controlled way)	Rainwater Harvesting* (conventional rainwater systems were used to collect rainwater which was then passed on to a system of pipes that discharge it to the swales) <hr/> *Had to be provided by individual developers <hr/> Water butts (Rainwater to be stored and used for non-potable purposes) <hr/> Had to be provided by individual developers <hr/> Permeable Paving Anglian water required the permeable paving to be linked to tanks, since linkage with the piped system was not allowed.	<ul style="list-style-type: none"> • Risk of flooding reduced • The use of suitable modelling software in this case considerably aided the design process • Enhancement of the natural landscape and biodiversity of the area • Difficulties over the adoption of the surface SUDS elements. To resolve this, it was agreed that the Upton Management Company, which has English Partnerships and Northampton Borough Council backing, would undertake the necessary maintenance.
	Rainwater run-off to be dealt at the building scale	Green roofs	<ul style="list-style-type: none"> • Reduction of surface run-off volume • Thermal and sound insulation • Biodiversity
Construction efficiency/ less defects	Raise environmental benefits, reduce construction waste, and improve energy efficiency	<ul style="list-style-type: none"> • MMC (Modern Methods of Construction) • Measure sustainability across the project's life cycle 	<ul style="list-style-type: none"> • Quick delivery • Less defects • Environmental benefits • Energy efficiency

Initial Aims	Objectives	Measures taken	Performance
Recycling provision	Waste and recycling facilities to be distributed to all households	<ul style="list-style-type: none"> wheelie bins for each household-one normal for domestic waste, and one for garden waste recycling boxes Dwellings with gardens should be provided with a composting unit such as the new Zealand box 	<ul style="list-style-type: none"> Waste reduction Easy recycling
Increase social inclusion/participation	Community and stakeholder involvement key to planning	<ul style="list-style-type: none"> English Partnerships, Northampton Borough Council, EDAW, and The Prince's Foundation formed Upton Steering Committee to facilitate operations Enquiry by Design Workshops to establish vision, aims and principles Residents' Association became a formal member in the team of partners 	<ul style="list-style-type: none"> The recruitment of experts from different disciplines formulated a coherent and trustworthy team Good relations were maintained with the community
Variety of tenures/housing types/affordability levels	<p>Variety of housing types</p> <hr/> <p>22% of units are affordable in line with the 1998 Housing needs assessment survey and planning guidance on affordable housing.</p> <p>For the final phases of the scheme specifications for affordable housing were raised to 35%.</p>	<p>Townhouses/Terraces and Semi-detached</p> <ul style="list-style-type: none"> Pepper potting of Social housing or clustering in small groups across the development with a maximum of 3 homes together. No outward design differentiation between the affordable and the market rate housing. 10% of homes on site D2 Upton should be provided for the First Time Buyers Initiative 	<ul style="list-style-type: none"> Diversity of population Initially the council were being selective on social housing lettings to beneficiaries but in the later phases of development this situation was changed by law Social housing indistinguishable from the rest of the building stock In parts of the site where development is more dense there have been issues with a few social housing occupants Beneficiaries who were applying to be transferred to Upton were sometimes dishonest about their criminal history so a few crime incidents occurred. These were dealt with behavioural agreements

Initial Aims	Objectives	Measures taken	Performance
Accessibility	Provision for mobility housing	According to Northampton Borough Council standards for mobility housing 10% of all housing should comply with that policy.	<ul style="list-style-type: none"> Standards for mobility housing met Efficient car and pedestrian circulation
	Promote cycling	Bike storage on every residential unit and development of a cyclist network within the city council's future plans.	<ul style="list-style-type: none"> Bus route established but services are not reliable or frequent enough (the bus service connecting Upton with the town centre runs every 30' during daytime and every hour in the evenings)
	Development of an efficient street network (Telford Way/street, High Street, West Street) in line with guidance in Manual for Streets	<ul style="list-style-type: none"> Upton Way was linked to Weedon Road Secondary street network developed 	
	Provision for public transport	Bus route links Upton with town centre	
Achieve long term economic viability	Retail and leisure infrastructure provision	Parcels F and G will provide a convenience store, retail units, office space, a restaurant and a day nursery	<ul style="list-style-type: none"> Development of final parcels severely delayed so the neighbourhood lacks basic retail and leisure infrastructure Job opportunities for the local population
Health and Safety	Community safety and security	<ul style="list-style-type: none"> Secured by Design Planning out Crime in Northamptonshire 	Health and Safety Standards were met

7.3 Analysis of the key stakeholders' perceptions on the strengths and weaknesses of the project: Lessons learned

In Upton, two professionals from the team of partners agreed to participate in the research. Interviewee C was initially a member of the design team that was working on the design code for Upton. When the project was initiated, he became the representative of the Prince's Foundation in the panel of partners that was selecting the developers to be involved. Interviewee D has been working on the Upton project since 2001, as a member of the English Partnerships team.

Initial considerations

The pilot study (Enquiry by Design) that the Prince's Foundation, along with the English Partnerships, undertook proved that the Upton project was feasible and the partners preceded to the public consultation workshops for the draft masterplan, which was finalised within a week.

According to the interviewees, sustainable aspects of the project included the following:

- The development of a walkable neighbourhood
- A mixture of uses
- Development of SUDS
- Community buildings
- Transportation strategy
- High environmental standards for building construction and high quality design that were both maintained all the way through with the design code

Satisfaction with outcomes

Both interviewees agreed that the delivered outcome so far has been in general faithful to the vision and that the environmental specifications have been met. Moreover, interviewee C considers the fact that the partners managed to deliver the basic elements of the initial masterplan intact very successfully, although this presupposed a difficult and complex conflict with the relevant public authorities.

As Interviewee C explained, *“we had to argue with highways engineers about not having roundabouts everywhere...There were lots of similar issues we had. De-trucking an A road for example...It used to be a dual carriage way with 60 miles speed limit.. Now it’s a boulevard...It’s easy to draw a simple permeable block structure, with walkable neighbourhoods, but actually getting it delivered in practice is complex, because you have to almost break the rules”*.

Sustainable urban design: quality issues

With regards to the quality of urban design interviewees expressed their satisfaction with the outcomes. Interviewee D viewed the SUDS and the design quality of the building stock as elements that have particularly enhanced the attractiveness of the neighbourhood. An indication of the latter statement is the low level of residential mobility or residential mobility that takes place within the boundaries of the neighbourhood. As she explained *“even though we don’t have the commercial elements yet, we’ve had people who bought property on the first site and have now moved to properties of other sites”*.

The interviewees also referred to the following aspects in the question about the features of sustainable urban design that contributed to the success of the Upton scheme:

- The diversity of architectural designs
- The uniqueness of features like crossroads and mixed-use boulevards
- The high degree of permeability
- The SUDS
- The small sizes of the blocks that allowed easy movement around the development on foot

Affordability

Participants were also asked whether they thought that the exemplary qualities and publicity the project has received were factors that have influenced the property values in Upton. They both agreed that property values are higher than the average

values within Northampton, however, they recognised a number of positive aspects that will balance the cost in the long term.

Interviewee D said *“the minor 4% uplift in the property values in Upton which is related to its exemplary aspects, will be balanced by the reduced running costs post occupancy”*.

Interviewee C on the other hand, focused on the varying affordability levels within the scheme as an element that promotes diversity of population, rather than the formation of an upper-class neighbourhood. He also perceived the exemplary qualities of the scheme as factors associated with a good investment opportunity. According to what he reported, *“not only has a good balance of affordability levels been achieved in Upton, but the area is also a fertile ground for investment, provided that the quality of architectural standards is kept high”*. As a proof to his statement, he referred to *Valuing Sustainable Urbanism*, a survey undertaken by the Prince’s Foundation, which provides evidence for the positive association between sustainable urban developments and profitability of long-term investment in the property market. Both land and property owners benefit financially in the longer term since the schemes perform better and the property values rise steadily from the point when construction is completed.

Transferability of successful aspects of the scheme

With regards to successful aspects of the scheme that could be replicated in similar initiatives, both interviewees attributed the importance of the public/private partnership formulated for the development of the scheme. It was recognised that the structure of the team of partners was a matter of crucial importance for the success of the whole initiative, and that was regarded as the most important transferable lesson. Interviewee C highlighted the value of cooperating with a landowner with a long-term vision. Quoting his words, *“English Partnerships long term vision, ensured dedication to the design code and the principles of the initial framework”*.

Diversity was also considered a successful characteristic of the project that can be transferred to other similar schemes. Interviewee D distinguished the aesthetical and demographical diversity of the project as valuable elements, easily achievable by other

similar initiatives within and outside the UK. He suggested that *“diversity in architecture and social composition gives a place its own unique character, so people should start moving away from standard type housing”*.

Furthermore, the interviewees spoke highly of the enormous possibilities the contemporary advances in sustainable technologies have offered. As they said, the availability of the necessary know-how nowadays should be fully exploited and systems like SUDS, photovoltaics, waste and water management infrastructure, should be incorporated in every project in which environmental sustainability and quality constitute priorities.

Accessibility

Both respondents said that Upton was meant to move away from the standard practice of mono-centric urbanism by having a mixture of uses in its centre so that it would not rely entirely on the city of Northampton. Interviewee C explained that *“Upton has the right kind of density, with the through movement that facilitates the development of all necessary amenities and enhances walkability”*.

Interviewees also expressed positive views with regards to the connections with the town centre of Northampton. The linking of the main traffic route (Weedon Road) with the main neighbourhood boulevard (Upton Way) has facilitated the access to the town centre and the through movement by car. According to Interviewee C, *“unlike most urban extensions which are located on the edge of towns, Upton is just a short trip to the city centre”*.

This short trip to the city centre was described by Interviewee C as *“a walkable 30’ distance”*, but Interviewee D had some reservations concerning the unattractiveness of the pedestrian route that leads to Northampton. He said that pedestrians are walking *“through a ‘big box land’, so it feels in that degree slightly removed from the town centre”*.

On the other hand, bus routes facilitate access to the city centre. As to the practitioners interviewed, the bus services operating, provide satisfactory connections

with the city centre. However, the author's direct observations and the outcomes of the statistical survey presented in Section 7.4, indicate that bus routes available are insufficient and not frequent enough to promote the car-free lifestyle that a sustainable neighbourhood should encourage.

Environmental legislation

The interviewees said that although environmental legislation was encouraging and not different from any other development (environmental impact assessment, BREEAM building standards), the partners in Upton decided to set even higher standards (design code, higher environmental specifications). As interviewee C said, *"in terms of environmental criteria, we set higher standards than the ones normal building regulations require...We had to be very careful about the SUDS, and the run off which were two of the major considerations"*.

The very high environmental specifications, however, made the vast majority of developers reluctant to get involved, as Interviewee C explains: *"Moving away from their own standards was risky and difficult, so the majority of them did not bother. But the developers who were more interested in providing good quality, higher standards were encouraging since they were seen as a challenge"*.

Impact on employment

Both interviewees said that although a few employment opportunities will be created as a result of the construction of the commercial spaces and the school, in that phase, the focus has been posed on offering good access to the existing jobs in Northampton. As interviewee D noted, 85%-90% of the people who had moved to Upton were former residents in the wider Northampton area, *"So the impact on local employment has not changed dramatically"*.

The participants also clarified that, as the settlement grows, promoting local employment will be fundamental and more local workers will most likely find occupation in the commercial, educational and leisure facilities within the site, so that the population does not entirely rely upon the city of Northampton.

Sustainable development and civic pride

Both interviewees emphasised the importance of civic pride in the context of identity. They described Upton as an attractive place, a good quality development and one that has received positive comments in the national and international press. *“Therefore, we have been given very positive comments and it looks like residents are proud living there,”* as interviewee C said.

Public/Private sector partnerships

Not only did the involvement of the local council facilitate and speed up the planning and the realisation process, but it also ensured a smooth delivery, without any major complaints from the public as the participants reported. Interviewee C said that *“English Partnerships long term vision as well as their non-financial motives, ensured dedication to the code”*.

Interviewee D additionally recognised the importance of the role of the Prince’s Foundation in the project by saying that it *“had a major contribution in setting the high quality design standards and getting all details correctly”*.

Public participation

Agreeing on the importance of public participation for the effectiveness of any sustainable development initiative, the interviewees explained the role of the residents’ association in the Upton project. Not only were residents involved in the process, but the Residents Association was, and still remains a formal body in the team of partners. Interviewee D explained that the role of the Association, apart from being actively involved in the enquiry by design workshops, and in the meetings for the selection of developers for the scheme, is also to *“manage the community buildings, along with consultants from the HCA”*. Interviewee D further highlighted the importance of keeping the Residents Association updated at all times on how the project is moving forward.

Sustainability indicators: their contribution to success

As interviewee C's experience suggested, *"Indicators and checklists were the whole of the project's ethos and assisted greatly in maintaining quality"*. Eco homes excellence, the environmental legislation, the design code, and key performance indicators developed by the English Partnerships, had to be used by all developers and they counted for 70% of the assessment criteria for their selection by the panel of partners.

Developers benefited greatly by having specific checklists and indicators available. Apart from the code, the BREEAM standards and the development brief for each phase, the developers were given information documents with the exact criteria on which they will be judged. As Interviewee D pointed out, *"this system helped the developers to easily set up their submission against the assessment criteria, but it also produced easy to read submissions"*.

However, capacity to pursue the highest environmental performance depends upon the imponderable factor of the occupants' way of life according to what Interviewee D added. *"If people are not willing to make the effort to reduce the waste of energy, then the standards and codes will never be met"*.

Unsatisfactory points

When interviewee C was asked to criticise the quality of the delivered outcome, he pointed out that *"alterations and simplifications of the design code that took place after phases one and two, caused deterioration in the quality of architecture, the detailing and the quality of the public realm works, in the later phases"*. On the other hand, Interviewee D said that alterations of the initial plans and deviations from the design code were not always for the worse but they were sometimes related to innovation issues. For instance, *"On sites D and E the photovoltaics on the roofs were constructed to interlock with the roof tiles, although the code required the roof tiles to be made of clay"*.

Wrong initial estimations about the maintenance cost for the permeable paving on the courtyards made the partners deviate from the initial plan. As Interviewee D stated,

“the partners decided to give the maintenance rights back to the residents who then decided to install ordinary block paving on the courtyards”. Although a system of filters was installed underneath the courtyards, the water that reaches the SUDS is not as clean as it would have been if it had gone through the whole remediation process.

Another area of concern identified by both interviewees related to the mixing of population in newly developed areas, which aims at encouraging socially diverse communities. Both participants admitted that the team of partners had to deal with several incidents caused by the *“pepper potting”*¹⁵ strategy followed. Interviewee C suggested that *“greater care and screening should be taking place in the early stages of any new development, so that the risk of incidents of crime taking place is eliminated”*. Interviewee D moved a step further by suggesting that *“a point system could developed by the city councils. This would reward families who have been keeping their properties in good condition, by moving them to new properties in newly developed areas”*.

Another issue raised by Interviewee C was the problematic situation caused by the impenetrability of the structure of planning regulations in the UK. The partners encountered persistent resistance by the authorities in charge when they tried to introduce crossroads instead of roundabouts in Upton’s masterplan. As interviewee C said, *“moving away from standard practice is what makes features like crossroads particularly difficult to apply in the UK”*.

Further criticising the outcome so far, interviewees reported that *“the recession has prevented the commercial partners from taking the risk of investing in the area, a fact that has resulted in the commercial site still being vacant”*.

Although the international reputation of the project has contributed in the highest degree to the civic pride attached to the area, there have been issues of negative publicity in one of the local newspapers about the crime levels in the area. Interviewee D said, *“this has given a pessimistic impression, while at the time figures show that crime levels in the area are practically nil”*.

¹⁵ *“Pepper potting” was consistently used by both interviewees as a term that summarises the strategies followed to achieve a socially diverse and balanced community by providing the opportunity for people, whatever their income, to find*

A discussion about efficient community involvement was also made during the interviews. The participants' experience has shown that there are no barriers to community involvement and action, *"as long as the partners truly try to incorporate people's wishes and aspirations in the core of the project's plan in the best way possible"*. Furthermore, both interviewees said that during the consultation workshops, the *"big talkers"*¹⁶ do not necessarily undermine public participation since *"sometimes they are indeed representatives of their neighbours"*. Even if issues of non-inclusive representation emerge, according to Interviewee C, *"there are still other ways like certain types of social surveys, which can contextualise the problem and help partners deal with it"*.

The correct selection and use of sustainability indicators was also discussed by the respondents. *"In case the local circumstances and the location of the scheme are prohibitive, indicators and codes should allow for some flexibility so that the transition to sustainability can take place gradually"*, as Interviewee C said. He specifically referred to the 1.5 spaces parking allowance per dwelling in Upton. He further explained that the planning permission for 5 and 6 bed dwellings contrasts the 1.5 parking spaces allowance, especially with the commercial site not having been developed yet on the site.

Finally, Interviewee D reported that, in reality, renewable provision was not without problems. Wind turbines were incorrectly fitted on some of the buildings and the ground source heat pump that had been planned to be installed on the school was very expensive, so the partners had to search for alternatives to meet the environmental specifications.

¹⁶ Referring to the more enthusiastic group of people who are more willing to express their opinions in front of the public.

7.4 Analysis of the questionnaire survey: Investigating residents' satisfaction

General points about the demographics of the sample

In Upton, 22 out of 40 (55%) questionnaires were returned. The tenure mix chart below shows that owner-occupied properties constitute the prevailing subgroup (54%). The remaining 46% is equally shared between rented and social housing units.

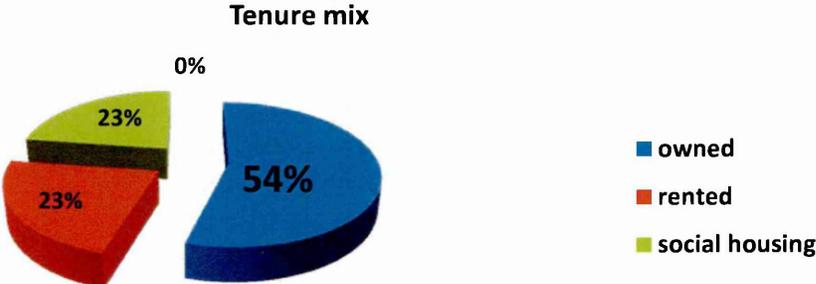


Chart 7: Upton: Tenure mix

The household mix of the sample can be seen in the chart below. 34% of the household population are children. This means that approximately every one in three individuals is a child, proving that the neighbourhood mainly attracts families.

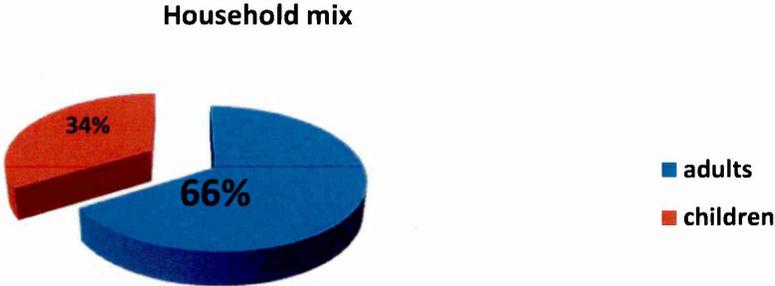


Chart 8: Upton: Household mix

7.4.1 Correlations

Your home/Type of property

General points about the property and its occupants' satisfaction with it

The general outcome deriving from table 21¹⁷ is that very high satisfaction was expressed by all subgroups with regards to privacy, space and flexibility of layout.

However, 80% of the occupants of rented properties are moderately satisfied with the flexibility of their house's/apartment's layout. In line with evidence presented in table 1, although some provision for future alterations has been made for the commercial units along the main boulevard, the residential units have small gardens, a fact that complicates further extensions or alterations.

Another notable outcome from the correlation test presented below is that the energy performance of properties in Upton is difficult to assess. The table provides evidence that there are a high percentage of individuals who are not aware whether they have saved money on bills living in an energy efficient construction. Furthermore, amongst the participants who had been monitoring their bills, the prevailing sub-group stated that there had been no significant changes in their energy consumption. The only sub-group that had noticed a difference in the cost for energy are the occupants of social housing units.

These results are similar to the results from the quantitative surveys conducted for the rest of the case studies, and indicate that despite the green infrastructure installed in the properties, a modest effect has been observed with regards to reduced energy consumption. This latter statement contradicts the prevailing argument expressed by both interviewees that the higher cost of construction associated with infrastructure for optimal energy performance is balanced by the occupant's long-term savings on bills.

		Type of property				
Criteria		Rented		Owned		Social Housing
	Enough Privacy (% within type of property)	100% very satisfied		58.3% very satisfied		100% very satisfied
	Garden (% within type of property)	80% don't have a garden		100% have a garden		100% have a garden
	Enough space to socialise (% within type of property)	80% very satisfied		75% very satisfied		60% very satisfied
	Enough space for children (% within type of property)	100% very satisfied		75% very satisfied		100% very satisfied
	Flexibility of layout (% within type of property)	80% to some extent satisfied		66.7% very satisfied		80% very satisfied
	Eco home less bills (% within type of property)	40% very satisfied	40% not aware	33.3% to some extent satisfied	33.3% not satisfied	60% very satisfied

Table 21: Upton: Your home/Type of property

Your community/Length of residency

General points about neighbourhood qualities correlated with individuals' length of residency.

The general picture we get from the table below is that residents in Upton are moderately satisfied with attributes of community they were asked about. Both subgroups reported analogous satisfaction rates with regards to opportunities for employment, opportunities to participate in decision-making, and affordability of properties in the area.

The sense of safety is enhanced across both sub groups. New and older residents reported they feel safe living in Upton, a fact that indicates the achievement of a satisfactory social balance, despite the crime issues reported by the interviewees.

Finally, prominent in the table below is the picture of a coherent community. Both old and new residents reported having a good relationship with their neighbours, a feeling that is likely to be associated with the existence of the Residents Association group.

		Length Of Residency	
		<6 Months	1-5 Years
CRITERIA	Employment opportunities (% within length of residency)	75% to some extent satisfied	50% to some extent satisfied
	Feeling safe (% within length of residency)	75% very satisfied	66.7% very satisfied
	Satisfied with opportunities to participate in decisions (% within length of residency)	50% to some extent satisfied	50% not satisfied 44.4% to some extent satisfied
	Affordability of properties (% within length of residency)	75% to some extent satisfied	50% to some extent satisfied
	Feeling close to neighbours (% within length of residency)	50% very satisfied	50% very satisfied

Table 22: Upton: Your community/Length of residency

7.4.2 Frequencies

The results from the frequency tests presented in the table below¹⁸ indicate that all residents expressed their satisfaction in all questions concerning their homes.

SATISFACTION WITH RESIDENCE		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
77.3%	House allows for enough privacy	
72.7%	Enough space to socialise in communal areas	
86.6%	Enough space for children	
59.1%	Flexibility of dwelling's layout	
36.4%	Eco home less bills	

Table 23: Upton: Satisfaction with residence

However, residents of Upton are the least satisfied ones with aspects of their neighbourhood in comparison to residents of the remaining three case studies. Respondents expressed their moderate satisfaction with the public spaces in their neighbourhood and reported that there is a lack of high quality infrastructure

amenities. Worth mentioning is the fact that, in a number of questionnaires, respondents expanded on further details by writing down phrases such as “need for pubs, cafes,” underneath the corresponding question.

Moreover, the majority of the respondents expressed their dissatisfaction with the fact that their everyday shopping needs are not being served within walking distance.

The questionnaire analysis shows how severely affected the local population is by the lack of the necessary leisure and retail infrastructure. However, in Section 7.4, the interviewees acknowledged how the vision for a mixed-use development had been planned from the initial stages of decision-making and explained that the cause for the severe delays was the unstable market conditions.

The case of Upton is a profound example of how unpredictable market conditions can lead the development process to an extensive stagnation. However, in the way the market currently works, dealing with such unpredicted matters is particularly difficult since commercial partners are usually concerned with quick profit, showing no interest in the overall scope of sustainable development.

SATISFACTION WITH NEIGHBOURHOOD		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
40.9%	Public spaces	
36.4%	Everyday shopping needs being met within walking distance	
77.3%	Easy pedestrian orientation	
54.5%	High quality infrastructure amenities (community centres, residents' associations, leisure)	
86.4%	Distinctive neighbourhood character	

Table 24: Upton: Satisfaction with neighbourhood

With regards to their satisfaction with the environmental conditions of the area, participants were asked to express their opinions about the quality of air. Unsurprisingly residents' degree of satisfaction appears very high according to the table below. Nevertheless, Upton is not surrounded by a heavily urbanised city

environment that would affect the quality of air, but on the contrary the topography is characterised by vast fields and natural habitats, connected with the river Nene, that form a healthy local atmospheric zone.

SATISFACTION WITH THE ENVIRONMENT		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
68.2%	Quality of air	

Table 25: Upton: Satisfaction with the environment

The questionnaire analysis shows that there is some unease around the topic of public transport services available to connect the neighbourhood with the adjacent areas. Overall, the majority of the residents seem to be disappointed with the public transport services. More specifically, the price of fares, as well as the frequency of the bus routes, leaves residents of Upton moderately satisfied.

The survey outcomes come in agreement with the author’s direct observations. The bus service that connects Upton with the city centre of Northampton runs every hour or more and it is highly unreliable. Delays are frequent, a fact that discourages widespread reliance on buses to a great extent. In fact, as the chart below indicates, residents in Upton are dependent on cars for their everyday needs. 64% of the sample reported using their cars on a daily basis, and just 18% depend entirely on the public transport services.

Frequency Of Vehicle Usage

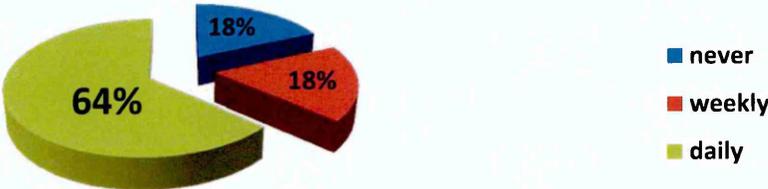


Chart 9: Upton: Frequency of vehicle usage

If the ultimate goal is the reduction of car usage, then it should be ensured that the performance of public transport services in terms of frequency and punctuality is improved.

Additionally, 50% of the sample reported that despite the specifications of the highly ambitious design code, streets are only to some extent pedestrian and cycle friendly. The need for further improvement, however, is not so urgent within the neighbourhood boundaries, since the traffic speeds of the secondary street network have been kept low. The problem is primarily associated with the pedestrian and cycle routes available to connect the neighbourhood with the town centre. At the time the study was undertaken, the only connection with the town centre was the highway, a highly unsafe and unattractive street environment for the pedestrian and the cyclist alike. For the situation to improve the provision for a bicycle lane and pedestrian connection to the town centre, separated from the highway, that meets health and safety standards and technical specifications, should be a high priority.

SATISFACTION WITH MOBILITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
27.3%	Public transport (in general)	
56.3%	Ticket prices	
47%	Frequency and speed of public transport services	
50% 50%	Pedestrian and cycle friendly streets	

Chart 10: Upton: Satisfaction with mobility

The sample expressed moderate satisfaction with certain community attributes about which they were asked.

Firstly, respondents appear to be moderately satisfied with the availability of job opportunities in the area. When evaluating constraints and potential improvements, though, it is clear that the aforementioned problem cannot be entirely resolved with measures that pertain to the local scale. However, if the commercial and leisure facilities planned for the area had been developed there would have been more job prospects for the local population.

Secondly, in accordance with the interviewees' statement about 4% uplift of property values in Upton, the questionnaire respondents are moderately satisfied with the affordability of properties in the area.

Thirdly, satisfaction was expressed with regards to sense of safety and good relationship with neighbours. This positive perception about neighbourliness is an essential constituent of community harmony and a factor contributing to sustaining people in a neighbourhood (Pilch, Tony, 2006). Furthermore, respondents appear to feel safe living in Upton, a fact associated with the rare occurrence of incidents of crime in the neighbourhood. According to the chart below, crimes and incidents of vandalism are a rare phenomenon in Upton as per the views of 82% of the sample.

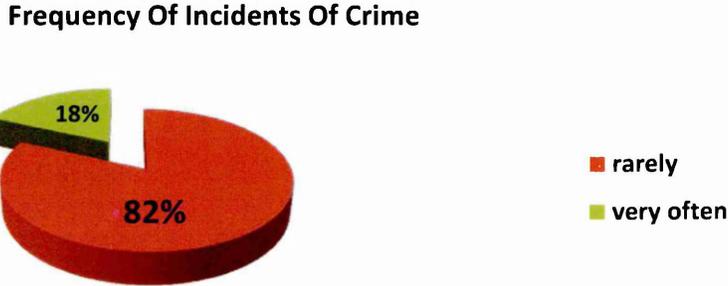


Chart 11: Upton: Frequency of incidents of crime

Finally, residents believe they have enough opportunities to participate in decision making, but don't think the public authorities take their opinions into account as much as they would have wished. With respect to planning regulations, community involvement strategies have become embedded in the planning process and specifically in Upton the community was involved in the Enquiry by Design workshops as the interviewees stated. However, despite the procedural adequacy, the sample expressed a desire for their views and aspirations to be realised into actions in a more meaningful way.

SATISFACTION WITH COMMUNITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
54.5%	Opportunities for employment	☹️
54.5%	Affordability of properties	☹️
68.2%	Sense of safety	😊
50%	Good relationship with neighbours	😊
45.5%	Opportunities to participate in decision making	😊
59.1%	Is your voice being heard by public authorities?	☹️

Table 26: Upton: Satisfaction with community

The question about the behavioural change driven from living in a sustainable neighbourhood yielded positive responses. As the chart below indicates, the majority of the respondents reported that their lifestyle has become more sustainable since they moved to Upton. Only 23% completely disputed the hypothesis that sustainable neighbourhoods influence sustainable lifestyles.

Sustainable Neighbourhood Influences Sustainable Lifestyles

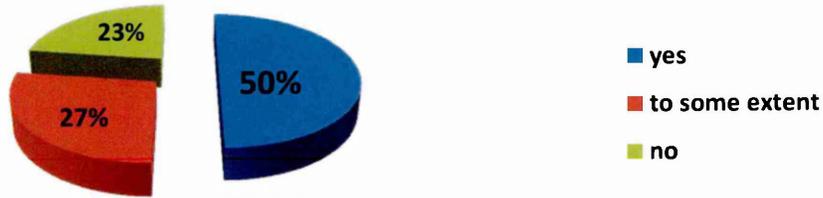


Chart 12: Upton: Sustainable neighbourhood influences sustainable lifestyles?

In the final question about quality of life, 68% of the respondents reported that their quality of life has been improved since they moved to Upton. If quality of life is the ultimate ambition of every sustainable project, then Upton has been successful in relation to the community's well-being.

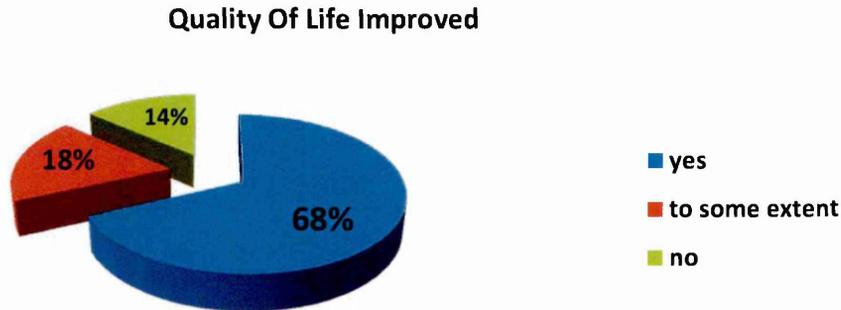


Chart 13: Upton: Quality of life improved?

7.4.3 Bivariate Analysis

The Spearman Rank Order Correlation coefficient (ρ) was run to measure the strength and direction of the relationship that exists between different sets of variables.

Where $df = 22 - 2 = 20$

At 0.05 level of significance with $df = 20$ a rho correlation coefficient of 0.447 is required for statistical significance.

In the table below, the negative coefficient of -0.167 indicates an indirect relationship between the variables “provision for shopping needs” and “frequency of car usage”.

Correlations				
			Provision for shopping needs	Frequency of vehicle usage
Spearman's rho	Provision for shopping needs	Correlation Coefficient	1,000	-,167
		Sig. (2-tailed)	.	,458
		N	22	22
	Frequency of vehicle usage	Correlation Coefficient	-,167	1,000
		Sig. (2-tailed)	,458	.
		N	22	22

Table 27: Upton: “provision for shopping needs” and “frequency of car usage”

The table below shows that there is a very strong positive relationship (0.863) between the variables “satisfied with public transport and “frequency and speed of public transport”. The relationship of the two variables is also of statistical significance.

Correlations				
			Satisfaction with public transport	Frequency and speed of Public transport
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	,863**
		Sig. (2-tailed)	.	,000
		N	22	22
	Frequency and speed of Public transport	Correlation Coefficient	,863**	1,000
		Sig. (2-tailed)	,000	.
		N	22	22

** . Correlation is significant at the 0.01 level (2-tailed).

Table 28: Upton: “satisfied with public transport and “frequency and speed of public transport”

The table below shows that there is a strong positive and statistically significant relationship (0.742) between the variables “satisfaction with public transport” and “affordability of public transport”.

Correlations				
			Satisfaction with public transport	Affordability of public transport
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	,742**
		Sig. (2-tailed)	.	,000
		N	22	22
	Affordability of public transport	Correlation Coefficient	,742**	1,000
		Sig. (2-tailed)	,000	.
		N	22	22

** . Correlation is significant at the 0.01 level (2-tailed).

Table 29: Upton: “satisfaction with public transport” and “affordability of public transport

The table below shows that there is a weak positive relationship (0.054) between the variables “satisfaction with public transport” and “frequency of vehicle usage”.

Correlations

			Satisfaction with public transport	Frequency of vehicle usage
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	,054
		Sig. (2-tailed)	.	,812
		N	22	22
	Frequency of vehicle usage	Correlation Coefficient	,054	1,000
		Sig. (2-tailed)	,812	.
		N	22	22

Table 30: Upton: "satisfaction with public transport" and "frequency of vehicle usage"

The positive coefficient in the table below (0.135) indicates a direct relationship between the variables "provision for community facilities" and "frequency of vehicle usage".

Correlations

			Provision for community facilities	Frequency of vehicle usage
Spearman's rho	Provision for community facilities	Correlation Coefficient	1,000	,135
		Sig. (2-tailed)	.	,550
		N	22	22
	Frequency of vehicle usage	Correlation Coefficient	,135	1,000
		Sig. (2-tailed)	,550	.
		N	22	22

Table 31: Upton: "provision for community facilities" and "frequency of vehicle usage"

The positive coefficient in the table below (0.067) shows that there is a very weak direct relationship between the variables "pedestrian and cycle friendly streets" and "frequency of vehicle usage".

Correlations

			Pedestrian and cycle friendly streets	Frequency of vehicle usage
Spearman's rho	Pedestrian and cycle friendly streets	Correlation Coefficient	1,000	,067
		Sig. (2-tailed)	.	,767
		N	22	22
	Frequency of vehicle usage	Correlation Coefficient	,067	1,000
		Sig. (2-tailed)	,767	.
		N	22	22

Table 32: Upton: "pedestrian and cycle friendly streets" and "frequency of vehicle usage"

There is a relatively strong positive correlation (0.748) between the variables “frequency of incidents of crime” and “feeling safe” according to the table below.

Correlations				
			Frequency of incidents of crime	Feeling safe
Spearman's rho	Frequency of incidents of crime	Correlation Coefficient	1,000	,748**
		Sig. (2-tailed)	.	,000
		N	22	22
	Feeling safe	Correlation Coefficient	,748**	1,000
		Sig. (2-tailed)	,000	.
		N	22	22

** . Correlation is significant at the 0.01 level (2-tailed).

Table 33: Upton: “frequency of incidents of crime” and “feeling safe”

Although there is a direct relationship between the variables “feeling close to neighbours” and “feeling safe” (0.146), this relationship is not strong enough to enable us to assume enhanced neighbourliness is positively associated with feelings of neighbourhood safety.

Correlations				
			Feeling close to neighbours	Feeling safe
Spearman's rho	Feeling close to neighbours	Correlation Coefficient	1,000	,146
		Sig. (2-tailed)	.	,516
		N	22	22
	Feeling safe	Correlation Coefficient	,146	1,000
		Sig. (2-tailed)	,516	.
		N	22	22

Table 34: Upton: “feeling close to neighbours” and “feeling safe”

The table below shows that there is an indirect relationship (-0.394) between the variables “opportunities for participating in decision making” and “frequency of attending community events”.

Correlations				
			Opportunities for participating in decision making	Frequency of attending community events
Spearman's rho	Opportunities for participating in decision making	Correlation Coefficient	1,000	-,394
		Sig. (2-tailed)	.	,069
		N	22	22
	Frequency of attending community events	Correlation Coefficient	-,394	1,000
		Sig. (2-tailed)	,069	.
		N	22	22

Table 35: Upton: “opportunities for participating in decision making” and “frequency of attending community events”

The negative coefficient in the table below (-0.369) shows that the variables “frequency of attending community events” and “Is your voice being heard” are not associated.

Correlations				
			Frequency of attending community events	Voice heard by council
Spearman's rho	Frequency of attending community events	Correlation Coefficient	1,000	-,369
		Sig. (2-tailed)	.	,091
		N	22	22
	Voice heard by council	Correlation Coefficient	-,369	1,000
		Sig. (2-tailed)	,091	.
		N	22	22

Table 36: Upton: “frequency of attending community events” and “Is your voice being heard”

7.4.4 Discussion

The bivariate analysis conducted highlighted that the strongest positive correlations were between the following pairs of variables:

- “Satisfied with public transport and “frequency and speed of public transport”
- “Satisfaction with public transport” and “affordability of public transport”
- “Frequency of incidents of crime” and “feeling safe”

According to the correlation test results, it is evident that the performance of the public transport services in terms of frequency, speed and ticket fares affects overall satisfaction with

public transport. These are, therefore, appropriate criteria that can be used to evaluate the effectiveness of public transport services.

Furthermore the statistical tests conducted indicate that the feeling of neighbourhood safety is highly affected by the frequency at which incidents of crime and vandalism occur. It can, therefore, be suggested that policies designed to reduce and minimise anti-social behaviour are vital to ensure that the community is confident in terms of safety and security.

7.5 Summary

This chapter has provided a description of the Upton project and has attempted an overall evaluation of its successes and failures based on evidence stemming from project documentation, interviews, a resident questionnaire survey, and direct observations. Similar to New Islington, the other case study presented so far in this thesis, the Upton project is still on-going, so the outcomes presented here are up to the time of writing.

The investigation has indicated that the Upton project has so far achieved successful results in terms of stakeholder engagement, urban design quality, construction efficiency, diversity of population and social cohesion, and water management.

However, there are a few areas in which the project has been less successful. In particular, the project has failed to yield positive results in terms of reducing dependence on private vehicles, creating the right mix of land use, and effectively engaging the public in decision-making.

Firstly, with regards to mobility, up to the time of writing, the private vehicle appears to be the only efficient means of transport appropriate to suit the needs of the residents. The research demonstrated that bus routes suffer from inadequate frequencies and punctuality issues and that appropriate pedestrian and cyclist connections with the city centre of Northampton are non-existent. Therefore Upton clearly lacks sustainable travel options, making car dependency particularly high. Furthermore, not only are private vehicles the only viable option, but parking provision is inadequate to the needs of the resident population. More specifically, a parking

permit of 1.5 spaces per dwelling meant to discourage the use of cars contradicts the lack of other transport alternatives.

Additionally, to the lack of alternative mobility options, the project has failed in its initial aims to reduce the need for travelling by integrating an appropriate blend of uses in the neighbourhood. Specifically, in terms of basic amenities and services, the neighbourhood depends exclusively on the town centre, making the resident's everyday commuting essential. On the other hand, we have seen that the failure to integrate the intended leisure, office and retail facilities was not related to a failure of the planning strategy, but was, to a large extent, associated with the unforeseeable 2008 recession that created difficult market conditions and prevented commercial partners from investing in the scheme. Because of the lack of mechanisms to offset unforeseeable factors such as the economic recession, there exists considerable doubt as to the project's overall sustainability and long-term success.

Secondly, with regards to effective public participation in decision-making, although procedures were followed, it seems that the project was focusing more on urban design quality issues. The resident satisfaction survey indicated that residents are unsatisfied with the incompetence of the partners involved to take into account their views and aspirations in a meaningful way. Enquiry by Design workshops did take place, but they were seemingly focusing more on expert opinions, rather than on effectively delivering an outcome that reflects the desires of the local community.

Another unsuccessful aspect that emerged was the dogmatism of the UK planning system that was powerless to accept alternatives to standard practice on the subject of urban planning and design. Interviewees expressed their concerns over the inflexibility of the planning regulations to allow for deviations from standard street patterns. The negotiations caused unnecessary delays to the overall timescale for the completion of the project that could have been avoided should the bureaucracy had been avoided.

Despite some failures, the Upton project experience provides several lessons for future sustainable neighbourhood design. The empirical evidence presented in this chapter suggests that design codes stemming from the New Urbanism paradigm are successful

in providing an underlying basis for the successful implementation of design concepts, and sustainability criteria. They can deliver a very efficient framework for urban development and their use can ensure compliance with the aims and aspirations of a project throughout the whole process of planning and implementation. Provided that the design code has some degree of flexibility, changing social, cultural, and economic conditions do not affect the implementation of the initial vision.

Secondly, Upton has managed to succeed in achieving a very distinct identity. The architectural style has drawn inspiration from the local tectonics and design, resulting in an excellent blending of the neighbourhood with the local vernacular. Not only the style of the buildings, but the choice of materials and the craftsmanship, institute a visible connection with the local character.

Finally, the experience illustrated that despite current limitations caused by the bureaucracy of the planning system in the UK, sustainable initiatives can still thrive. Provided that a strong partnership exists between the private and the public sector, the full potential of both sectors' assets can nonetheless be exploited. However, there is still an urgent need for the regulations to become more flexible if sustainability is to be effectively implemented.

Chapter 8. Towards the development of a checklist of criteria for success: The Vauban project

8.1 Introduction

The Vauban project is located in the southern margin of the city of Freiburg, where Germany meets the Swiss and French territories. The development of an eco-district in that area has deep roots in Freiburg's unique political culture and its people's astonishing sensitivity on environmental concerns. The city refers to itself as "*a birthplace of the green movement*" (Breyer, Halter, Horstkötter, Richter, & Zinthäfner, 2008) since it has a longstanding history of activism and dynamic ecological movements. In the 1970s, the residents initiated a campaign against the establishment of a nuclear power plant in nearby Whyll, the success of which was the catalyst that led to the development of a particularly active eco-movement that is widely supported by the majority of the residents.

In the early 1990s, a group of individual visionaries, supporters of the ecological movement and students cultivated the idea of the development of an eco-district in a former French Barrack site at the south part of Freiburg. The planning process was officially initiated in 1993 as a broadly participatory process between the City of Freiburg, Forum Vauban (the official residents' association), and various other credible institutions and organisations.

8.2 Description of the project

8.2.1 The project's context

Housing shortages in the early 1990s were primary concerns for the Municipality of Freiburg. To tackle these problems, new areas for housing construction had to be found. When the French army left the 38 hectare site in the southwest of Freiburg, the city council bought the land at a very low price and decided to develop a new residential district to meet the alarmingly increasing need for housing. The primary aim

for the project involved the development of a family-friendly neighbourhood of 5,000 people, where sustainable living and collaborative decision-making were primary concerns.

Although the Municipality had a long and successful history of involvement in environmental policies, the Vauban Quarter was, to a large extent an experimental initiative since the international debate on sustainability had only begun to dominate the global concern. The formulation of the official residents' association (FORUM VAUBAN) was a decisive step towards the agreement on the sustainability criteria that would inform the planning and design strategy. Although the city council were sceptical in the beginning, the continuing efforts of this small group of people eventually bore fruit.

The most impressive achievement of Vauban is the consensus that was finally achieved amongst the partners. By formalising the role of Forum Vauban as the coordinator of the public participation process, the city council took a key step towards an inclusive decision-making process. Planning and implementation were, therefore, strengthened and financial support was secured.

Discussions on the development plan started in 1995 between the partners. In the meetings and workshops organised by forum Vauban, the future residents were providing their input and creative ideas on several aspects that concerned their future neighbourhood. Between 1997 and 1999, after a series of meetings and workshops, the criteria that would direct the development in Vauban were eventually categorised in the following generic planning objectives: energy, traffic/mobility, building and participation / social interaction / public spaces.

By 2000, the first development phase that involved the refurbishment of old barrack buildings and the construction of student accommodation facilities had been completed, and the selling of the plots to future residents had commenced. Construction works of the second phase begun in 2000 and the development of the new district was finalised in 2006. Currently Vauban Quarter counts approximately 5,500 inhabitants and approximately 600 new jobs.

8.2.2 Site location and context

Vauban Quarter covers an area of 38 hectares and is located just 3 km southwest of the city of Freiburg. Site location is ideal, with the city centre being within close reach, and the Black Forest adjacent to its southern border. The Municipality of Merzhausen, alongside the northern border of the site, offers easy access to jobs, leisure and retail. Being at the periphery of the city, but at the same time within close reach via public transport, Vauban combines city life with suburban living.

Development took place in three different phases, the first of which involved the refurbishment of old barrack buildings and student accommodation, and was completed in 2000. The other two development phases took six years to complete and provided accommodation for approximately 5,500 residents.

8.2.3 Key stakeholders

In the case of Vauban, similarly to that of Kronsberg, the City Council was the landowner, a fact that offered the Municipality a competitive advantage since it had the power to select the system of regulations that would be applicable on the Vauban district.

Collaboration between the partners in Vauban was one of the most important elements for the success of the project. Public consultation was a mandatory requirement according to the planning regulations, but the City Council made a special effort to achieve the highest level of inclusion in the decision-making process by formalising the role of the residents' association (Forum Vauban). Forum Vauban was assigned a wide range of responsibilities from mobilising an extended participation process to organising Public Relations. In addition, "Projektgruppe Vauban" (Project Group Vauban) was formed as the administrative coordination of local authorities for the Vauban project, while "Gemeinderätliche AG" (City Council Vauban Committee) was the main platform for information exchange, discussion and decision-making.

In addition to the aforementioned key participants in the decision-making, other acting bodies, organisations and institutes had a major contribution as well. Amongst them

were Genova eG (Self Organised Building Co-operative Vauban), S.U.S.I. and Buergerbau AG, which, to some extent, managed to fill the gap of the lack of social housing subsidies (Sperling, 2002).

Genova cooperative was founded in 1997 and initially originated from Forum Vauban. Genova's activities are inspired by the ideals of democracy, collective action, and cooperation and it is financially supported by the contributions of its members. Genova was initially involved in the first construction phase in Vauban, which lasted from 1999 until 2001. During these years, Genova was involved in the construction of two four storey apartment buildings, community guest rooms, retail units and semi-public spaces. As a share-owned association, Genova's aim was to develop self-governed rental housing for individuals and families that could not afford to buy a property. With as little as €520, people could obtain a share that would give them a 3% annual interest (Genova eG, 2002). For each housing project raised in the consecutive meetings and workshops, the residents' representatives participated actively as members of the co-operative council and the management team.

In addition, the S.U.S.I. (Self-organized, Independent Settlement Initiative) was officially established as an association in 1990, as a response to the municipality's planning policy regarding the demolition of the old barrack buildings in Vauban. Initially, the group only included students, but, over time, it grew bigger and gained the respect of the community in Vauban. The S.U.S.I. association became involved in the construction of several buildings in Vauban, upon which members of the group and residents were working voluntarily. To meet the personnel requirements for the construction of the projects, the group even recruited employees through the municipal social security and employment offices.

For the duration of the scheme's construction phases, S.U.S.I. were organising weekly coordination meetings, where matters of concern were discussed, new creative ideas were introduced, and decisions were made in a democratic manner by all members who had equal voting rights. The association's various activities were financially supported through campaigns that were primarily targeted at private bodies and

individuals. The group's ethos involved the experimentation with alternative, inexpensive, and ecologically sustainable ways of construction and living¹⁹.

The S.U.S.I. initiative contributed greatly to the varied and unconventional architectural result that can be seen today in Vauban. Apart from residential units the co-operative was involved in various non-residential projects (restaurants, a janitor, shops and several multipurpose community rooms), but its most impressive achievement was its invaluable role, in organising a far-reaching participation in decision-making and co-building.

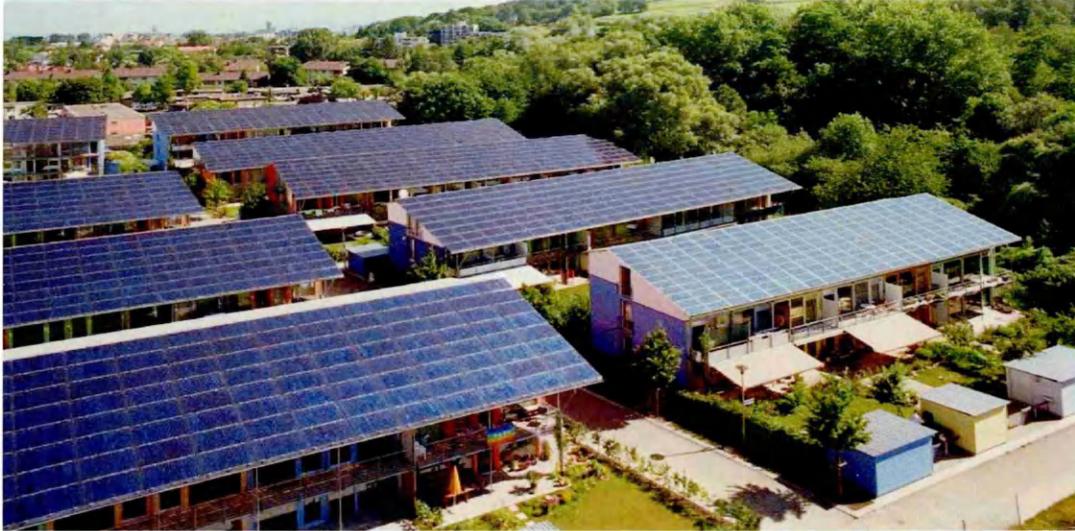
The co-ordinator of the community building projects in Vauban was Buergerbau AG (Citizens' Building Stock Corporation). The corporation was responsible for managing the whole process of planning and constructing the residential buildings in Vauban. It provided a wide range of services for the Baugruppens (building co-operatives), amongst which were the selection of an appropriate plot for the development of the residential unit, advertising until all members of the group of future building owners were found, organising the time schedules, controlling the cost and supervising implementation.

This joint building process that was extensively supported by the Municipality and Forum Vauban was a unique way for individuals to jointly build their property inexpensively, directly influence living conditions in the neighbourhood, and create a neighbourly atmosphere even before they had moved in. Vauban was one of the first places that introduced this type of development through Baugruppens, which greatly contributed to a variety of housing, a good balance of social groups, and substantial cost savings (approximately 25%) since private investors were excluded from the process (Forum Vauban, 2003).

¹⁹ More specifically, within the association's goals were the development of affordable housing, the creation of ample open space for the community, the protection of the natural landscape of the area, the dissolution of the traditional relationship tenant/landlord, the integration of different social groups and the creation of new employment opportunities for the people of the community (SUSI, 2000).

8.2.4 Development process

Immediately after the site was purchased from the Federal Republic of Germany for €20,000,000 in 1993, the planning process was initiated by the Municipality. The participatory decision-making process started in 1995 and most major planning



decisions had been taken by 1996.

The district was developed in three phases. The first phase involved the renovation of old military building stock by self-organised building cooperatives, such as SUSI and Genova, as well as the construction of the Solar Settlement, which included 210 low, zero and plus energy houses (see Figure 13). By 2000, the first development phase had been completed to a large extent and 2000 residents had moved in.

Figure 13: The Solar Settlement in Vauban

The City of Freiburg started selling the plots to Baugruppens in the summer of 1999 and the second development phase which involved the construction of another 645 housing units, was initiated in the summer of 2000. During the second building phase, the tram connection was also established, providing easy access to the city centre of Freiburg.

The last implementation phase started in 2003, but, due to financial difficulties stemming from the recession, it was not finalised until 2010. The recession and the difficult market conditions also forced the municipality to deviate from the Baugruppen concept and attract private investors, whose conservative ideas resulted

in a conventional (1:1) parking provision for the remainder of the site (Broaddus, 2010).

8.2.5 Planning and design: Aims, Criteria and guidelines

The motto that underpinned the Vauban project's ethos was '*Learning while planning*'. This principle was indicative of a very flexible approach to unconventional ways of development and extended citizen participation (Forum Vauban, 2003). This far reaching community participation and the effective co-operation between all partners involved was realised through meetings and workshops hosted by Forum Vauban. In those meetings, the aims and objectives for the project were established as a result of an extensive dialogue.

The vision for the new district can be divided in the following generic planning domains:

- Energy and waste and water considerations
- Balance between different social groups as well as between living and working areas
- Diversity of architecture
- Conservation of the natural landscape
- Car free living and transport strategy

In terms of environmental considerations, comprehensive energy, waste and water strategies were conceptualised to reduce the adverse environmental impacts from development. From an energy perspective, the district is entirely comprised of low energy or passive houses. The improved low energy standard (65 kWh/m²a) was a requirement of the planning regulations, so all developers had to comply. Furthermore, at the district scale by 2002 a combined heat and power plant that produced energy through wood chips and natural gas was in operation and connected to the district's heating grid. Also fundamental for the enhancement of neighbourhood sustainability was the deployment of a comprehensive district water management

concept that included the maximisation of permeable surfaces, so that water infiltration could take place in a natural way.

From a social standpoint, the strong support for joint building initiatives had a positive influence on the social balance in Vauban. Subsidies for social housing were unavailable when the project was initiated and, therefore, the efforts of SUSI and Genova were invaluable in the unique ways that they created affordable housing for low-income families, beneficiaries and students. The city council's commitment to the highest level of community involvement was another contributing factor to a balanced social composition. The formulation of different social groups was not just tolerated but overwhelmingly encouraged by the municipality of Freiburg.

The diverse aesthetical result mainly stems from the division of the land to small plots. Instead of following the conventional route of selling large sized plots to developer companies, the City Council gave preference to joint building initiatives. This innovative practice created favourable conditions for collective quality building, in higher densities, at a lower cost, resulting in an intriguing architectural result with colourful facades, and diverse use of materials and styles.

The natural landscape was widely preserved and enhanced. There was an effort to retain the old trees on site wherever possible, while the masterplan established green corridors that connected the neighbourhood with the surrounding countryside. Open spaces were carefully designed and were either public or semi-public in nature.

The car-free living target was probably the most difficult one to implement since it required a high level of commitment. However, because the idea originated from the community's own initiative, people were the driving force for the practical realisation of that vision. The strict parking restrictions, combined with the requirement for car-owning households to purchase a costly parking space in one of the parking garages located at the quarter margins, have minimised car-ownership throughout the neighbourhood.

Finally the public transit options have further reduced the need for a private vehicle. The revenue from the sale of the land to the building cooperatives enabled the

Municipality to subsidise the development of a new tram link that connected Vauban to the city centre of Freiburg. The unique transport concept became even more attractive with the establishment of a car-sharing scheme that is widely used by the residents in Vauban.

The key sustainability attributes of the project that underpinned the municipality's framework for development, and which were briefly discussed above, have been assembled by the author in the following table.

Initial Aims	Objectives	Measures taken	Performance
Energy/ waste/ water considerations	Co-generation plant and short-distance heating system	Co-generation plant was connected to the district heating grid in 2002.	<ul style="list-style-type: none"> • According to the interviewees the project still consumes a lot more energy than it produces • According to Oko Institut the project achieved 28 GJ energy savings per year (calculate as "CER", cumulative energy requirements) • 2100t reduction of CO2 emissions per year • R4t reduction of SO2 emissions • 1600 t savings on mineral resources • Vauban is the largest Passive house settlement in Germany • Solar settlement working as a residential power plant • Solar settlement was problematic. Houses were not selling (very expensive investment, inflexible design that produces very narrow houses)

Initial Aims	Objectives	Measures taken	Performance
Energy/waste/ water considerations	<ul style="list-style-type: none"> Solar energy systems to be extensively applied Compulsory low energy standard (65 Kwh/m²) which became the norm in Germany in 2002. Low CO₂ Emissions 	<p>Solar collectors (450m² by year 2000) and photovoltaics (1,200m² by year 2000)</p>	<ul style="list-style-type: none"> 42 passive houses in the first phase (some of the first passive houses in Germany were built in Vauban) 50 passive houses in the second phase 10 plus energy houses (about 200 more in the solar settlement nearby)
	<ul style="list-style-type: none"> Solar energy systems to be extensively applied Compulsory low energy standard (65 Kwh/m²) which became the norm in Germany in 2002. Low CO₂ Emissions Waste management 	<ul style="list-style-type: none"> Bioclimatic building techniques (high insulation, south facing facades, triple glazing, ventilation systems with heat recovery) Green roofs Green facades Locally sourced materials Preference for building owners who reach passive house standard(15 Kwh/m²) Recycling facilities Extensive use of ecological building materials 	<ul style="list-style-type: none"> 42 passive houses in the first phase (some of the first passive houses in Germany were built in Vauban) 50 passive houses in the second phase 10 plus energy houses(about 200 more in the solar settlement nearby) Materials used for the internal fit-out of the buildings, which are usually lighter and thus easier to transport, but often more environmentally hazardous and energy-intensive to produce, were commonly audited towards energy performance and longevity (Buchert et al, 1999; Jensen et al, 1998).

Initial Aims	Objectives	Measures taken	Performance
Balance	Between living, working, and recreation areas	Fractality: Each part of the settlement is a district miniature: Live and work units, Commercial facilities, Offices, services, open space	<ul style="list-style-type: none"> • 600 new jobs created • Basic retail, leisure, and social infrastructure within walking distance
	Between different social groups	Baugruppen, Forum Vauban, SUSI	<p>People with low income had the chance to become house owners</p> <p>The lack of subsidies for social housing from the Federal Authorities made it difficult for them to be delivered although the initial plan incorporated approximately 25% social housing.</p> <p>The issue was to some extent mitigated by the Genova building initiative that created about 90 units in two projects in the second and third stages</p> <p>The formulation of different social groups was tolerated and encouraged by the City Council</p>
		Family orientated district	<p>Problems with the demographic balance: a third public kindergarten had to be constructed.</p> <p>One sided age structure of the population</p>
Reduce Mains Water Use	Infiltration of rainwater into the ground	SUDS, system of swales	<ul style="list-style-type: none"> • Covers 80% of the residential area • Risk of flooding reduced • Natural landscape enhanced
	Ecological sewage system	<p>One pilot project (Model house of the Baugruppe "Wohnen und Arbeiten")*.</p> <p>*Vacuum pipes transport faeces to the bio gas plant where along with other organic household waste are ferment and generate biogas. Remaining water is cleaned in biofilm plants and returned to the water cycle.</p>	Pioneer projects and technological innovations applied in Vauban influenced other similar initiatives

Initial Aims	Objectives	Measures taken	Performance
Public Infrastructure	Provision for social infrastructure, leisure facilities & retail to promote walkability	<ul style="list-style-type: none"> • District centre with shops for basic daily needs • Primary school and kindergartens • Public green spaces, designed collaboratively with local residents • Neighbourhood centre for social interaction, cultural events, etc 	<p>Mixture of uses easily reachable</p> <p>The viability of the different social groups is enhanced with the plethora of community rooms and public spaces available in the neighbourhood.</p> <p>Community activities and neighbourhood events foster solidarity and cooperation between the residents</p>
Traffic/Public Transport	Support of car-free living	<ul style="list-style-type: none"> • Prohibition of parking spaces on private properties • Community park on the edge of the district: All car owners were required to buy a parking space (€2K) and contribute to the ongoing costs by paying a monthly fee • Speed limit 5 km/h • Car sharing. The first residents who joined the scheme had 1 year free pass for all public transport and 50% off train tickets 	<ul style="list-style-type: none"> • 50% of the households in Vauban are car-free • 167 cars/1000 inhabitants • The high population density in Vauban (90-100 units per hectare), makes the public transport profitable • Cycle traffic sometimes causes conflicts with other users, especially with pedestrians
	Traffic calming measures	<p><u>Three types of streets:</u></p> <ol style="list-style-type: none"> 1. 30 km/h zone(the main street) 2. Play street(Spielstrasse) The rest of the streets are play streets, 3-5 metres wide, with permeable parts that allow for water infiltration. The streets are wide enough for the occasional vehicles to be able to go through. 3. Bicycle streets These are one-way streets for cars and two way streets for bicycles 4. Pedestrian paths that connect the different character areas in the quarter 	<p>Children can play in the streets unobstructed</p> <p>Walking and Cycling are encouraged</p> <p>Air and noise pollution minimised</p> <p>No traffic</p> <p>The introduction of "Trixi-Spiegel" mirrors in 2009 allowed for truck and car drivers to observe cyclists riding on cycle lanes. This improved cyclists' safety on interaction with traffic lights</p>
	Public transport concept	<ul style="list-style-type: none"> • Tram line (8-10 times per hour) • Suburban train line • 2 bus lines in operation 	<p>City of Freiburg easily accessible</p> <p>The lack of cars makes the movement of public transport more efficient</p>

Initial Aims	Objectives	Measures taken	Performance
<p>Increase social inclusion/ participation</p>	<p>Extended citizen participation</p> <p>Moto: “Learning while planning”</p>	<p>Acting Bodies created:</p> <p>"Projektgruppe Vauban" (Project Group Vauban). Administrative coordination of local authorities for the Vauban project</p> <p>"Gemeinderätliche AG". City council committee for Vauban</p> <p>Forum Vauban. Citizens' association and official body in decision making process</p> <p>Genova eG (Self Organised Building Co-operative Vauban)</p> <p>Other Partners: Oeko Institut (Institute for applied Ecology)</p> <p>ICLEI's International Training Centre(ITC)</p> <p>Freiburger Energieand Wasserversorgungs-AG-now Badenova(Freiburg's Public Utilities FEW)</p> <p>Freiburger Auto Gemeinschaft (Freiburg's Car Sharing Association)</p> <p>Wohnen and Arbeiten (Co-housing Initiative "living and Working")</p> <p>About 30 Baugruppen and Co-housing Initiatives</p>	<ul style="list-style-type: none"> • New standards for communication, interaction and integration were set • The City Council set the basic ecological specifications in the development plan. • Forum Vauban <ol style="list-style-type: none"> 1. Supported the formulation of community based projects (Baugruppen, co-housing, and co-building initiatives 2. Coordinated the social work, and implementation of the neighbourhood centre, 3. Although non-profit, it generated numerous economic activities (Genova, Baugruppen, housing groups) 4. Organised 40 major workshops and excursions, 3 district festivals and an international conference (UrbanVisions) 5. Co-organised events with the city of Freiburg to inform future housing owners, architects, the building industry, and financial institutions. These provided training on ecological building, energy saving technologies, green roofs, water management, financing building projects etc. 6. Releasing press reports, and issuing Vauban Actuel. • Genova built 76 ecological, inexpensive housing units in a collaborative, participatory way. Financial risks were shared by all members from the very beginning • Buergerbau AG was controlling costs, schedule, and quality for community building projects • Extended public participation, with 30 Baugruppen, co-housing groups, and residents participating in workshops and meetings. A large number of people committed to local initiatives (district festivals, farmer's market, private kindergartens, community gardens etc) • The involvement of different Baugruppens and other building initiatives resulted in a diverse architectural result and a unique political culture

Initial Aims	Objectives	Measures taken	Performance
Increase social inclusion and participation	Social work part of the development process	Baugruppens and Genova provided the grounds for stable neighbourhood and community structures	<ul style="list-style-type: none"> Balanced community life Further initiatives were developed through other groups (Co-operative Food group, Farmer's Market Initiative, the Mother's Centre)
	Community participation in the development of semi-public and public spaces created a strong community spirit	<ul style="list-style-type: none"> Genova and Baugruppen created the semi-public spaces Several meetings were held by the residents to decide on the design of public spaces 	<ul style="list-style-type: none"> Community galleries, community rooms, access-galleries were designed by the building groups Community decided upon the design and specifications of public green spaces, resident's streets, and neighbourhood centre
Diversity of population/ tenures/ housing types/ affordability levels	Diversity of housing types	Townhouses/Terraces Semi-detached	Integration of different social classes
	Division of land into small plots	Diversity of architecture	Interesting architectural result
	Family friendly neighbourhood with some provision for affordable housing and student dormitories	Diversity of population	<ul style="list-style-type: none"> Middle class population S.U.S.I. initiative has been given a plot in Vauban, where alternative thinkers have experimented with building their houses out of old reused materials. Alternative living is accepted in Vauban and is tolerated by the City Officials
Protecting/ enhancing the natural landscape	<ul style="list-style-type: none"> Retention of as many trees as possible Public green spaces to be carefully designed 	Green public spaces & 'green fingers': corridors which connect the neighbourhood centre with the adjacent countryside.	Lush vegetation in and around the neighbourhood, old trees are now the jewels of the new district
Achieve long term economic viability	<p>Jobs to be created</p> <p>Affordability of construction to be ensured</p> <p>Viability of transport plan to be ensured</p>	<ul style="list-style-type: none"> Mixed uses throughout the site Live & work units Building co-operatives High population density (90-100 Un/Ha) which makes the public transport profitable (Beim & Haag, 2010) 	<ul style="list-style-type: none"> Job opportunities in the retail, tourism, leisure, and construction sectors Building co-operatives helped people build inexpensively Tram system is profitable and affordable (households without cars receive discount).

Table 37: Vauban: Aims Criteria and Guidelines

Source: Summarised and tabled by the author using development documentation and data from interviews

8.3 Analysis of the key stakeholders' perceptions on the strengths and weaknesses of the project: Lessons learned

In the case of Vauban it was very important to investigate the views of residents who had participated in the initial planning stages for the neighbourhood since far-reaching participation was the main driver for the scheme.

Three individuals agreed to participate in the research. Interviewee E is a resident, a former member of SUSI (self-managed building cooperative), a member of the Forum Vauban, and a member of the management team of Genova (the main building cooperative in Vauban). Interviewee F has been a resident in Vauban since 2000, the year the construction of her house was completed and has been involved in the groups the neighbourhood association of Vauban was organising to discuss the different issues about the neighbourhood. Interviewee G has developed a keen interest in Vauban as a professional in the field of Sustainable Built Environment. In 2009, she became a co-founder of an agency for sustainability in Freiburg and is organising guided tours in Vauban on a regular basis.

Initial considerations

According to Interviewee E, if it had not been for the initial group of students and professionals, that begun discussing the concept of an eco-district in Vauban in 1993, the very ambitious plan for the development of a sustainable neighbourhood would have not been realised. The level of commitment demonstrated by this small group of people in the years between 1990 and 1993 was outstanding and facilitated fruitful dialogue with the City Council. Interviewee E emphasised the importance of this high level of commitment and explained that *“until 1994, people involved in the scheme were offering their services without even receiving any funding”*.

With regards to the initial considerations that mobilised the realisation of the district and moulded its unique sustainability profile, the interviewees highlighted the following generic themes:

- Limitation of traffic,
- Healthy living in a sustainable neighbourhood,

- Diverse aesthetical quality
- High environmental performance for the buildings

Satisfaction with outcomes

All interviewees expressed their satisfaction with the outcomes especially from a public participation point of view. Besides, as was discussed in the previous sections, residents of Vauban were from the very beginning pursuing shared objectives. As interviewee G remarked: *“The fact that the residents contributed largely to the decision-making process, united them and created a political culture of very dynamic involvement of the local community in the City Council’s decisions”*.

In line with the interview evidence, Forum Vauban was the key driving force behind this fundamentally significant political culture. The formulation of the forum provided a ground for exploring the best options for mutual gain and ensured a delivered outcome that was agreeable with the initial aspirations. Interviewee G highlighted that Forum Vauban *“succeeded in achieving a very good social balance with families, students and people of various incomes living in harmony”*.

Another contributing factor to the thriving outcome according to the interviewees has also been the aesthetical quality of the natural and urban landscape achieved. Interviewee G pointed out that Vauban is a great place to live: *“luring with rich vegetation and many public spaces”*.

Finally, interviewees were divided in their opinions about the environmental performance of the scheme. Those who considered the scheme successful from an environmental performance perspective emphasised the fact that the building energy standards were particularly high to the national average. More specifically, as Interviewee G said, *“15 years ago, the energy specification for the buildings in Vauban was 65 kwh per square metre per year, a number that didn’t become the federal norm until after 2002”*. Interviewee E again emphasised the impressive outcomes saying *“15% of the houses are passive, 45% of them are low energy, and 15% of them that are located in Vauban’s solar settlement are plus energy”*.

However, Interviewee E, the most passionate amongst the three about the vision for an eco-neighbourhood, implied that the outcome is not sustainable from an energy performance perspective. As he went on to say, *“80% of the buildings are far from being passive, and the building orientation has been the most serious mistake”*. He clarified his bold statement by explaining that the first priority for the construction of a passive energy building is the main axis orientation which should be kept aligned with the east-west axis. However, in Vauban the vast majority of the buildings are not appropriately orientated and as a result the natural heating benefits that a south facing façade can offer were not exploited. As he finally remarked, *“Vauban district would have been perfect if the masterplan had been rotated by 90 degrees”*.

Sustainable urban design: quality issues

The interviewees distinguished the following sustainable features of the masterplan as key elements of quality and success:

- The very detailed masterplan, which was chosen after a competition, managed to successfully transfer the city's and the resident's ideas into reality in the most constructive way
- The division of the land into small plots created aesthetical diversity and made the neighbourhood look more naturally developed.
- The efficient cycle and pedestrian networks combined with a sophisticated tram system created an almost car-free neighbourhood, truly accessible from all surrounding areas by all means
- The district combined heat and power plant fuelled with wood chips and gas, that provides electricity for around two thirds of Vauban, and its construction was a very bold initiative at a time when these systems were not being used in a broad scale
- The solar settlement that has been an exceptional project, comprising solely of passive and plus energy houses. Not only has it used very little primary energy for its construction since the houses are made of wood, but it also produces surplus energy that's transferred to the grid

Affordability

Although higher compared to the national average values, property values in Vauban are equivalent to the ones in the rest of the city of Freiburg, as far as the interviewees are concerned. The reason for the increased property values is *“the huge demand for properties in the area since it’s very well known as a healthy neighbourhood suitable for families with young children”*, as interviewee F explained.

Interviewee E, on the other hand, argued that *“the reduced cost of life due to the limited use of cars, balances the higher rental expenses, saving households €300 per month on average and additionally there are significant energy savings due to the highly efficient bioclimatic buildings”*.

Finally, tenure mix in Vauban shows that although buildings are overwhelmingly owner occupied, provision for social housing has somewhat balanced the social mix. *“200 units (10% of the building stock) have been provided for individuals reliant on state support and students”*, according to what interviewee E reported.

Transferability of successful aspects of the scheme

- Interviewees said that success is site specific. However, they all agreed that a flexible initial framework that can easily adapt to the new circumstances is an essential tool.
- *“Sustainable development as the way to achieve quality of life found in the old car free neighbourhoods should be the main transferable idea”*, as Interviewee F pointed out
- The very ambitious environmental standards (65 kwh of heat per square metre per year) that were exemplary at the time - *“at least within Germany”*, as interviewee E added. The number didn’t become the federal norm until after 2002. Since 2010, all houses being constructed in Vauban have to be passive
- According to Interviewee E, the point system the city council invented to assess the potential buyers of plots (instalment of PVC panels, family with young children, use of recyclable materials) was an exceptional concept that gave an incentive to the buyers to seek for the most environmentally friendly scenario for

each plot. *“Money would not be a substitute for a good environmental concept”*, as he further explained.

- The division of the planning and construction process into several different phases enabled the city council to apply the lessons learned from the previous stages on the next ones
- Building groups helped people built in the most cost effective way, saving them 20% of the cost of building individually and contributed to a diverse aesthetical result, higher densities and human scales
- The interviewees believe that keeping people informed on issues concerning sustainability gives and true meaning to the consultation process. *“People should be allowed to decide for themselves in every possible level-from global to local”*, according to Interviewee E
- According to Interviewee G, having the majority of the houses being owner-occupied, is more likely to create a sense of neighbourliness amongst them

Accessibility

All interviewees agreed that the fast and efficient tram system that has been operating since 2000, as well as the network of cycle lanes and pedestrian routes, have provided optimal connections both with the city centre and with the surrounding areas.

Vauban is also accessible by car, but the *“residents are required to park their cars in the parking garage at the entrance of the district whereas visitors can occupy the designated parking spaces along the main street”*, as Interviewee F added.

Environmental legislation

The zoning map of the city of Freiburg was particularly strict, with an emphasis being posed on car-free streets, and ambitious environmental specifications at the building and neighbourhood scales. The benchmark of 110 kWh of energy/square metre/year was, however, criticised by interviewees E and G, who characterised it as *“encouraging”* but also *“inferior to other European countries with much colder climates like Sweden”*.

The car-free policy also assisted in achieving a high environmental performance for the scheme but tough measures had to accompany it to ensure maximum compliance.

“Car owners were required to purchase a place in one of the multi storey car parks on the periphery, run by a council owned company for the impressive amount of 17,500€, plus a monthly fee to cover the on-going costs”, as interviewee F reported.

Furthermore, interviewees agreed that the update of the law for renewable energy in 2000 was very successful and encouraged the installation of passive solar systems. *“It was in fact copied by many other European countries”, as Interviewee E added. “Whoever decided not to install such passive energy systems, had to pay a small fee as a compensation”. He further clarified, “the fee had to be paid per kWh rather than in the construction phase, a system that ensured the legislation wouldn’t become dysfunctional over the years”.*

At a national level, Vauban created a snowball effect and influenced other cities in Germany. *“It was the stepping stone for the change of the federal regulations towards a course that involved stricter environmental standards”, according to what interviewee G reported.*

Impact on employment

The businesses that have been operating in the district since its completion have generally drawn on local employers and have had a local clientele. On the other hand, as Interviewee G said, *“since the industrial sector is absent from the area, Vauban cannot influence the employment sector of a broader geographical scale”.*

As was discussed in Section 8.2.5, in the initial planning stages, approximately 600 employment opportunities were estimated to be created in Vauban to boost the local job market and to open up choices to the residents. These jobs were meant to support the viability of local shops, cafes, bars, and services. Although the interviewees were not in position to confirm the exact number of employment positions created, they reported that the commercial and leisure facilities along the main street have certainly been of fundamental value to the local economy. Interviewees E and G also mentioned the noteworthy amount of jobs that have been created in tourism since there is *“a significant number of people that depend on tourism, offering guided tours to visitors”.*

Sustainable development and civic pride

The popularity of the district and the green city image that has been created, are factors that have contributed to the identity of the place according to all interviewees. However, as Interviewee F said, *this has also developed a movement of critics of the residents in Vauban*. The latter are often being characterised as *“eco-freaks”*.

According to Interviewee E, the enhanced feeling of civic pride in Vauban is also associated with the large percentage owner occupied properties. As he further explained, *“owners who also occupy their properties tend to be slightly more attached to their neighbourhoods”*.

Lastly, interviewees said that having participated in *“the renovation of some former military buildings has made people proud of their accomplishments”*.

Public/Private sector partnerships

All interviewees agreed that the public sector’s involvement in developing a robust and viable development policy was the key element in creating a good mix of housing and population and in initiating public participation. *“The absence of partners from the public sector in a development scheme drifts the focus from the social aspects to the maximisation of the private interest and profit”*, as interviewee G argued.

Interviewee F also added that, *“at the time the project was initiated it would have been impossible to persuade the private sector to take the unsafe decision to invest in such a unique and original project”*. Sustainability was a newly developed concept back then, so private companies wouldn’t have been willing to take the risk to invest.

Public participation

Public participation in decision-making is a requirement for the development of the zoning maps in Germany. Notwithstanding, it stemmed from the analysis of the interviews, that in the Vauban public involvement in decisions was particularly extensive and it became a unique political culture, interwoven with the mentality of the residents.

In fact, it was the public concern and the SUSI’s revolutionary ideas that provided the underlying ethos of the project’s strategy in the first place. As Interviewee E explained,

“In the beginning, a group of a few practitioners and students that belonged to SUSI begun the debate, trying to persuade the city council to develop plans for an eco-district in the area”. Through early work that involved many discussions and meetings, and with the help of the Forum Vauban, consensus was achieved on the scope of the framework for the new eco-district. The Forum supported people’s initiatives by organising workshops, meetings, a three-monthly magazine, special publications and internet presentations.

Interviewees commented highly on the benevolent character and transparent course of action Forum Vauban was following. They explained that the aforementioned were the keys to its success since *“its viability was ensured (it was exempt from taxes), and a safe cause was provided for the city council to recognise it as a formal partner”.*

Baugruppens (building cooperatives) were also recognised by the participants as vital for the maximum inclusion in the public participation process. Building cooperatives started being formed by families who were interested in moving to Vauban, for the collective acquiring of the plot and the construction of the residential unit. *“As more people were moving in, participation in the Forum and ecological awareness were gradually increasing. The Forum was counting as many as 400 members in 2003”*, as Interviewee F said. The close cooperation of the Baugruppens, SUSI, and Genova resulted in the implementation of further progressive ecological standards.

Different groups of residents were formed to discuss several different issues (schools, transport, etc). *“In the meetings of the city council, there was always a representative of Forum Vauban to make sure the people’s ideas were communicated”*, as interviewee F added.

Sustainability indicators: their contribution to success

The interviewees reported that although certain specifications for the environmental performance of the buildings and for the social infrastructure were used, a checklist of criteria that addressed all aspects of sustainability in a holistic manner was not utilised. *“These checklists have only just recently become mainstream”*, as Interviewee E added. Their assistance in benchmarking and monitoring progress was, however recognised by all interviewees. Interviewee E further suggested that it would have been very useful if

the regular monitoring of the Vauban project was embedded in the city council's programme.

Unsatisfactory points

Interviewee E was very critical about the environmental performance the scheme managed to achieve. As he said: *"the project has only partly been successful environmentally and is still far from being truly sustainable since it still consumes more energy than the amount it produces"*. He specifically referred to the incorrect orientation of the buildings that did not allow for the advantages that the south side offers, to be fully taken advantage of. Furthermore, an issue of concern raised by Interviewee E, was the transition period that intervenes between the official (theoretical) update of any environmental legislation and its practical enforcement. As he explained, *"whenever the environmental legislation is updated, owners, or developers who have already gained planning permission that complies with the old code, can only voluntarily conform to the new one"*. He suggested that this should be taken into consideration by the regulatory authorities who should therefore in turn limit the amount of exemptions.

Despite the success of the car-free policy in general, Interviewee G reported that the car reduction measures are not being respected by all. She particularly referred to *"incidents of residents occupying the parking spaces designated for the visitors along the main street, ruining the effort to preserve car free neighbourhood"*.

Further complications reported by the Interviewees concerned the funding the Forum Vauban was receiving from the European Union. The Forum, over the period of 6 years it was operating, received 2 million euros in total. This amount of funds was rewarded by the European Union, as part of the EUs LIFE programme, by the City Council, and by other local institutions. Membership fees, donations and moderate economic activities constituted a small contribution as well. However, according to what interviewee F reported, *"When the European Union stopped providing the Forum with the necessary funds, it went bankrupt, and had to be eventually shut down"*.

Interviewees also identified several challenges for an effective public participation process according to their experiences in Vauban. They all identified transparency of the participatory process and the availability of mechanisms that ensure the familiarisation of the public with the purpose and scope of the project as key drivers for success. As Interviewee F effectively put it, *“Participation in decision-making is not the privilege of the people who are more familiar with the jargon and whose profession is directly related to the field of the built environment”*.

With respect to community involvement, psychological factors and lack of spare time were identified as barriers by the participants. *Firstly, “Natural inertias as expected consequences of our busy and stressful everyday lives”* are threats to a truly inclusive process as Interviewee G stated. In addition, interviewees said that pessimism that once a decision has been taken by the city council it cannot be changed makes some people reluctant to attend the meetings. A third reason for the domination of consultation workshops by small minorities is that *“there is a group of people who are less open in nature and tend to hesitate to state their opinions publicly”*, as Interviewee F pointed out.

The participants also referred to a number of issues that are relevant to the public authorities’ attitude towards participatory processes. They said that public authorities are very difficult to cooperate with since they are always reluctant to give in to unsafe but yet innovative ideas. As Interviewee E put it, *“public critique makes the administration employees reluctant to embrace original concepts”*. He suggested that City Councils should therefore be staffed with courageous and creative employees.

The frequent change of persons in administrative positions in the city councils was also considered by the interviewees to have had a negative effect on the progress of the Vauban project. Interviewee E explained, *“When the personnel that occupied administrative positions were replaced, the focus on participatory processes diminished”*.

Finally, with regards to the use of checklists and indicators for the successful implementation of sustainable development initiatives, interviewees identified certain

barriers. According to their remarks, an issue that is considered problematic is the large number of unofficial checklists available, as each one of them produces different results. Interviewee G stressed, *“Comparisons between projects will only be possible if the same checklists and sets of indicators are used in every setting in the exact same way”*.

Interviewees also referred to common sense as a prerequisite for the appropriate use of checklists and indicators since sometimes *“their cynical use tends to prevent persons involved in urban planning from seeing the bigger picture”*.

8.4 Analysis of the questionnaire survey: Investigating residents’ satisfaction

General points about the demographics of the sample

In Vauban, 21 out of 50 questionnaires distributed were returned at a response rate of 42%. In the chart below, we can see that the vast majority of the respondents (67%) are occupants of the properties they own. Although there is some social housing in Vauban, no occupants of social housing units were found in the randomly selected sample.

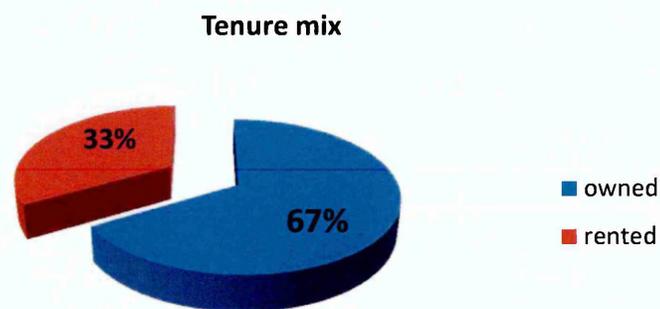


Chart 14: Vauban: Tenure mix

The household mix of the sample can be seen in the following chart. Every two in five individuals are children. Most households are comprised of two adults and two children, a fact that validates the findings of the literature review that Vauban is and was planned to be mainly a family neighbourhood with a high percentage of children.

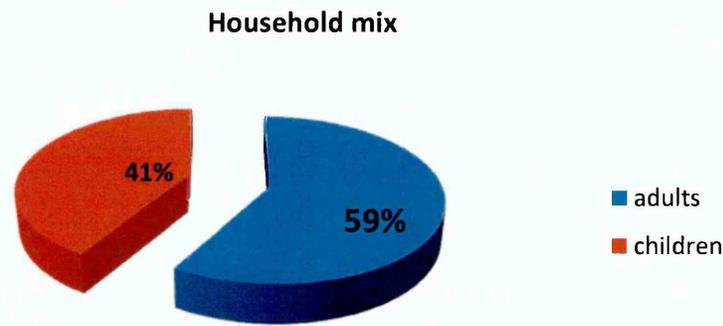


Chart 15: Vauban: Household mix

8.4.1 Correlations

Correlational statistical tests were executed to obtain results on residents' satisfaction with regards to their homes and certain attributes of their neighbourhoods. On the one hand, correlations were aiming at exploring differences in perceptions of satisfaction between occupants who were renting their properties and occupants who owned their properties. These tests intended to be a proxy for assessing the differences in quality between rented and owned properties.

Additional correlation tests were performed to explore perceptions of satisfaction with the neighbourhood influenced by the length of residency. These tests were intending to indicate differences in perceptions of newly settled residents who could have had biased positive first impressions of quality and residents who have lived in the neighbourhood for longer and were able to provide a more in depth insight on the quality of various neighbourhood aspects.

Your home/Type of property

General points about the property and its occupants' satisfaction with it.

As the following table indicates, very high rates of satisfaction were expressed by all subgroups with regards to most questions referring to their properties.

However, residents who live in rented properties are to some extent satisfied with the flexibility of their house/apartment.

Furthermore, on the negative side, Individuals who live in rented properties didn't report to have noticed any savings in their occupational costs since they moved in to an energy efficient house. This particular finding bears similarities with the findings from the other two case studies so far presented in the thesis. It appears that the retrofitting of sustainable technologies and systems for advanced energy performance on buildings relates to insignificant energy savings, which are, highly unlikely to offset the cost of green technology installed.

		Type of property		
		Rented	Owned	
Criteria	Enough Privacy (% within type of property)	57.1% very satisfied	71.4% very satisfied	
	Garden (% within type of property)	71.4% don't have a garden	71.4% have a garden	
	Enough space to socialize (% within type of property)	57.1% very satisfied	78.6% very satisfied	
	Enough space for children (% within type of property)	83.3% very satisfied	91.6% very satisfied	
	Flexibility of layout (% within type of property)	42.9% very satisfied	42.9% to some extent satisfied	57.1% very satisfied
	Eco home less bills (% within type of property)	42.9% not satisfied		85.7% very satisfied

Table 38: Vauban: Your home/Type of property

Community/Length of residency

General points about neighbourhood qualities correlated with individuals' length of residency.

From the table below, it appears that both sub groups gave similar responses with regards to satisfaction with community features about which they were asked.

The highest dissatisfaction rates are related to the availability of job opportunities and the affordability of properties in the area. Although the initial commitment for the

creation of approximately 600 job opportunities within the scheme was indeed materialized according to the interviewees that participated in this research, the survey was conducted at a time of recession that is likely to have influenced public perception about the availability of employment opportunities in the area.

With regards to the affordability of properties in the neighbourhood, the survey findings are in agreement with interview evidence that suggests a slight difference between property values in Vauban when compared to the national average. The green city image of Freiburg and Vauban, however, is likely to have influenced the property market since the demand for properties in the area is reasonably high.

Finally, another key finding deriving from the correlation tests is that residents who have lived in Vauban from one to five years appear to be moderately satisfied with the opportunities they have to participate in decision-making. In view of the dissolution of Forum Vauban as a constitutional body in decision-making, new residents' involvement in decision-making seems to currently be of moderate intensity. On the other hand, longer settled residents expressed a higher degree of satisfaction, which most likely stems from their active participation in Forum Vauban and other similar community networks throughout the development of the scheme.

		Length of residency	
		1-5 years	>5 years
Criteria	Employment opportunities (% within length of residency)	63.6% not satisfied	50% not satisfied
	Feeling safe (% within length of residency)	100% very satisfied	80% very satisfied
	Satisfied with opportunities to participate in decisions (% within length of residency)	54.5% to some extent satisfied	60% very satisfied
	Affordability of properties (% within length of residency)	54.5% not satisfied	60% not satisfied
	Feeling close to neighbours (% within length of residency)	72.7% very satisfied	60% very satisfied

Table 39: Vauban: Community/Length of residency

8.4.2 Frequencies

Further statistical tests were performed on the entire sample and provided information on people's satisfaction with different attributes that relate to sustainable development. The statistical results have been assembled in tables where different colours have been used to indicate the prevailing opinion of the sample. Green has been used to signpost satisfaction, yellow indicates moderate satisfaction and finally red has been used to highlight dissatisfaction with a certain attribute. The aforementioned tables follow below.

SATISFACTION WITH RESIDENCE		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
66.7%	House allows for enough privacy	
7.4%	Enough space to socialise in communal areas	
76.2%	Enough space for children	
52.4%	Flexibility of dwelling's layout	
66.7%	Eco home less bills	

Table 40: Vauban: Satisfaction with residence

All respondents were satisfied with the privacy, space, and flexibility their house allows for.

SATISFACTION WITH NEIGHBOURHOOD		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
71.4%	Public spaces	
100%	Everyday shopping needs being met within walking distance	
90.5%	Easy pedestrian orientation	
81%	High quality infrastructure amenities (community centres, residents' associations)	
85.7%	Distinctive neighbourhood character	

Table 41: Vauban: Satisfaction with neighbourhood

Questions about the neighbourhood attributes yielded satisfying responses. Worth mentioning is the fact that 100% of the people asked reported that their everyday shopping needs are being served within walking distance.

SATISFACTION WITH THE ENVIRONMENT		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
76.2%	Quality of air	

Table 42: Vauban: Satisfaction with the environment

All respondents were pleased with the public transport services in general. They expressed their satisfaction with all attributes of mobility about which they were asked (see table 43).

SATISFACTION WITH MOBILITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
100%	Public transport(in general)	
57.1%	Ticket prices	
81%	Frequency and speed of public transport services	
76.2%	Pedestrian and cycle friendly streets	

Table 43: Vauban: Satisfaction with mobility

As we can see from the table below, two community attributes leave residents dissatisfied. According to their responses, there are not enough opportunities for employment in the area and property values in Vauban are high compared to the national average values. These findings are further supported by the evidence that emerged from the interview analysis.

Furthermore, low rates of satisfaction were expressed with regards to the opportunities residents are given to participate in decision making and with the extent to which public authorities take into consideration the residents' thoughts and

aspirations about their neighbourhood. 66.7% of the sample believes that their voice is not taken into consideration by the public authorities.

SATISFACTION WITH COMMUNITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
57.1%	Opportunities for employment	☹️
57.1%	Affordability of properties	☹️
90.5%	Sense of safety	😊
66.7%	Good relationship with neighbours	😊
47.6% 47.6%	Opportunities to participate in decision making	😊 😐
66.7%	Is your voice being heard by public authorities?	😐

Table 44: Vauban: Satisfaction with community

Vauban is a safe neighbourhood according to the respondents. It is evident from the chart below that incidents of crime occur rarely or never.

Frequency Of Incidents Of Crime

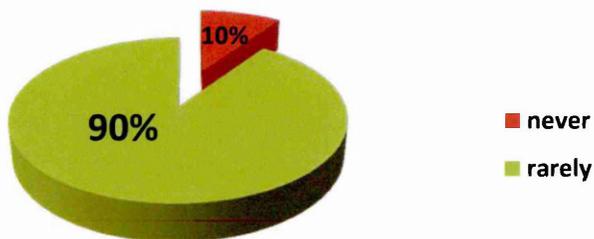


Chart 16: Vauban: Frequency of incidents of crime

Although the interviewees expressed their doubts about whether the car-free scheme has been 100% successful, the chart below indicates that residents of Vauban indeed use their cars less often. None of the respondents reported using a car on a daily basis. Most residents use a car on a monthly basis, while 28% of them never use a car. This leads us to assume that, although the car-free policy has not managed to eliminate the use of cars, it has significantly reduced it.

Frequency Of Vehicle Usage

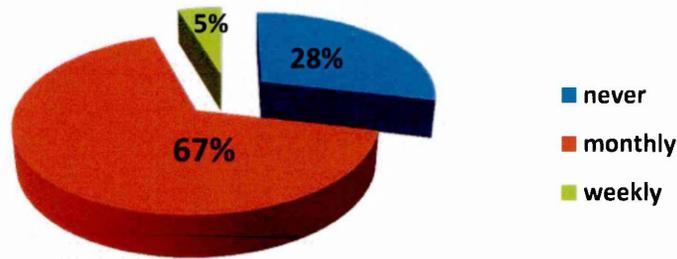


Chart 17: Vauban: Frequency of vehicle usage

With regards to the changes in people's behaviours, the prevailing affirming frequencies reveal that there has been indeed a drift in most people's lifestyles to a more sustainable course due to living in Vauban.

Sustainable Neighbourhood Influences Sustainable Lifestyles

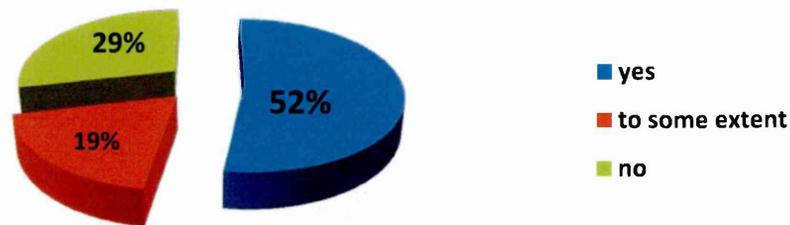


Chart 18: Vauban: Sustainable neighbourhood influences sustainable lifestyles

In the last question of crucial importance, respondents reported that their quality of life has been improved since they moved in to Vauban. The overwhelmingly positive result is an indication that the project has been successful and loyal to the initial aspirations of the partners.

8.4.3 Bivariate Analysis

The Spearman Rank Order Correlation coefficient (ρ) was run to measure the strength and direction of the relationship that exists between different sets of variables.

Where $df = 21 - 2 = 19$

At 0.05 level of significance with $df = 19$ a rho correlation coefficient of 0.460 is required for statistical significance.

Correlations				
		Provision for shopping needs		Frequency of vehicle usage
Spearman's rho	Provision for shopping needs	Correlation Coefficient	.	.
		Sig. (2-tailed)	.	.
		N		21 21
	Frequency of vehicle usage	Correlation Coefficient	.	1,000
		Sig. (2-tailed)	.	.
		N		21 21

Table 45: Vauban: "Provision for shopping needs" and "frequency of vehicle usage"

The positive coefficient (+1.000) in the Spearman's rho test shows that the existence of adequate shopping facilities in Vauban reduces the need for using a car on a frequent basis (table 45).

Correlations				
		Satisfaction with public transport		Frequency of Public transport
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	.	.
		Sig. (2-tailed)	.	.
		N		21 21
	Frequency and speed of Public transport	Correlation Coefficient	.	1,000
		Sig. (2-tailed)	.	.
		N		21 21

Table 46: Vauban: "satisfaction with public transport" and "frequency of public transport services"

The positive coefficient (+1.000) of the test above shows a strong direct relationship of statistical significance between the variables "satisfaction with public transport" and "frequency of public transport services". In other words, the regular public transport services are definitely one of the reasons why people are satisfied with the public transport system in Vauban.

Correlations				
		Satisfaction with public transport		Satisfaction with ticket prices
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	.	.
		Sig. (2-tailed)	.	.
		N		21 21
	Affordability of public transport	Correlation Coefficient	.	1,000
		Sig. (2-tailed)	.	.
		N		21 21

Table 47: Vauban: "satisfaction with public transport" and "satisfaction with ticket prices"

The bivariate analysis also revealed a strong direct relationship (+1,000) between the variables "satisfaction with public transport" and "satisfaction with ticket prices". It can, therefore, be suggested that one of the reasons why people claim to be satisfied with public transport in general is the fact that the ticket prices are affordable.

Correlations				
		Satisfaction with public transport		Frequency of vehicle usage
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	.	.
		Sig. (2-tailed)	.	.
		N		21 21
	Frequency of vehicle usage	Correlation Coefficient	.	1,000
		Sig. (2-tailed)	.	.
		N		21 21

Table 48: Vauban: "satisfaction with public transport" and "frequency of vehicle usage"

A strong direct relationship (+1.000) also exists between the variables “satisfaction with public transport” and “frequency of vehicle usage”. The conclusion that can be drawn is that the more satisfied residents are with public transport services the less often they use their cars.

Correlations				
			Pedestrian and cycle friendly streets	Frequency of vehicle usage
Spearman's rho	Pedestrian and cycle friendly streets	Correlation Coefficient	1,000	,224
		Sig. (2-tailed)	.	,330
		N	21	21
	Frequency of vehicle usage	Correlation Coefficient	,224	1,000
		Sig. (2-tailed)	,330	.
		N	21	21

Table 49: Vauban: “pedestrian and cycle friendly streets” and frequency of vehicle usage”

The low positive coefficient (0.224) in the table above indicates that there is a weak positive relationship between the variables “pedestrian and cycle friendly streets” and frequency of vehicle usage”.

Correlations				
			Frequency of incidents of crime	Feeling safe
Spearman's rho	Frequency of incidents of crime	Correlation Coefficient	1,000	,105
		Sig. (2-tailed)	.	,650
		N	21	21
	Feeling safe	Correlation Coefficient	,105	1,000
		Sig. (2-tailed)	,650	.
		N	21	21

Table 50: Vauban: “frequency of incidents of crime” and “feeling safe”

The very low positive coefficient shown in the table above (0.105) shows that there is a weak correlation between the residents' enhanced sense of safety and the rarity of incidents of crime in their neighbourhood.

Correlations				
			Feeling close to neighbours	Feeling safe
Spearman's rho	Feeling close to neighbours	Correlation Coefficient	1,000	,097
		Sig. (2-tailed)	.	,675
		N	21	21
	Feeling safe	Correlation Coefficient	,097	1,000
		Sig. (2-tailed)	,675	.
		N	21	21

Table 51: Vauban: "sense of safety" and "feeling close to neighbours"

The low positive coefficient in the above table (0.097) shows that there is a very weak positive relationship between the variables "sense of safety" and "feeling close to neighbours".

Correlations				
			Opportunities for participating in decision making	Frequency of attending community events
Spearman's rho	Opportunities for participating in decision making	Correlation Coefficient	1,000	,241
		Sig. (2-tailed)	.	,293
		N	21	21
	Frequency of attending community events	Correlation Coefficient	,241	1,000
		Sig. (2-tailed)	,293	.
		N	21	21

Table 52: Vauban: "opportunities to participate in decision making" and "frequency of attending community events"

The positive coefficient of the above table (0.241) indicates the likelihood of a direct relationship between the variables "opportunities to participate in decision making" and "frequency of attending community events". In other words, since residents are not being given enough opportunities to contribute to decisions by the public authorities, they rarely attend community events.

Correlations

			Frequency of attending community events	Voice heard by council
Spearman's rho	Frequency of attending community events	Correlation Coefficient	1,000	-,373
		Sig. (2-tailed)		,096
		N	21	21
	Voice heard by council	Correlation Coefficient	-,373	1,000
		Sig. (2-tailed)	,096	
		N	21	21

Table 53: Vauban: "frequency of attending community events" and "voice heard by the Council"

The negative coefficient shown in the table above (-0.373) shows that the frequency of residents attending community events does not depend on the extent to which public views influence the city council's decisions.

8.4.4 Discussion

In conclusion, the bivariate analysis conducted highlighted that the strongest positive correlations were between the following pairs of variables:

- *"Provision for shopping facilities" and "frequency of vehicle usage"*
- *"Satisfaction with public transport" and "Frequency and speed of Public transport"*
- *"Satisfaction with public transport" and "affordability of public transport"*
- *"Satisfaction with public transport" and "frequency of vehicle usage"*
- *"Opportunities to participate in decision making" and "frequency of attending community events"*

To summarise, as per the aforementioned outcomes, in order for car dependency to be reduced, it is vital that the necessary local retail infrastructure is developed. A neighbourhood centre that offers a range of retail services provides a convenient alternative to large shopping malls, usually located at the periphery of the city. It is evident from the Vauban example that this strategy of creating an easily accessible local market eliminates the need for commuting for the day-to-day shopping activities.

The survey outcomes also indicate that the frequency of automobile use is further determined by the level of satisfaction with public transport services. The level of

overall satisfaction was also found to be significantly influenced by the attributes of travel cost, frequency of services and duration of trip.

Finally, the correlation tests showed that the public's involvement in local democracy is highly dependent on the involvement strategy the City council has established. Failure to establish effective mechanisms for public inclusion will result in the loss of valuable opinions, perceptions, and concerns.

8.5 Summary

The uniqueness of the Vauban project lies in the creativity, pro-activeness and voluntary contributions of the local community. The success of the Vauban experiment is an indication that innovative thinking and openness, outside the socially constructed norms can deliver great sustainable places. Although to some extent the project did not manage to eventually deliver the envisioned social mix since the vast majority of households comprise of families with young children, however, the community is coherent and the sense of solidarity is apparent at every level. The encouragement of the establishment of numerous and diverse social groups provides an indication of a truly democratic way of thinking. Had it not been for this unique situation, the resourceful ideas of the community would have remained hidden behind the standard procedures the conventional planning structure promotes.

From an economic perspective, despite the lack of subsidiary funds from the federal government, unique solutions were found to cover the required amount of money to be used for public realm works and infrastructure. The compact urban structure of Vauban made the extension of the tram line a profitable solution and the vision of a car free neighbourhood an achievable target. The costs for public infrastructure (kindergartens, schools, community rooms) were received from the Redevelopment Fund of the Federal State of Baden-Württemberg (US \$ 5,000,000) and from credits raised by the City of Freiburg, but these had to be repaid from the selling of the building lots. Furthermore, joint building groups gave low income families the opportunity to build in Vauban with substantial cost savings while S.U.S.I. and Genova

offered rented apartments at an affordable cost. Although still far from being a self-sufficient district employment-wise, approximately 600 jobs have been created in Vauban, along with numerous live-work units that at least offer good possibilities for part-time employment for the locals within walking distance from their homes.

From an environmental perspective, the project managed to achieve a very high performance even though, in the beginning of the 1990s, the use of sustainable technologies and bioclimatic design were not applied as widely as nowadays. It was a requirement of the planning regulations in Vauban that very low energy consumption had to be achieved (65 kWh/sq m). The tightly sealed building envelope in combination with the powerfully insulated walls effectively increased the building's performance, so that the structures require less amounts of energy for heating. Furthermore, the passive houses constructed in Vauban were some of the first such structures to ever be built in Germany. However, the survey results have indicated that despite the green infrastructure installed, the building performance has not met the occupants' expectations. As one of the interviewees suggested, however, critical parameters of bioclimatic design have been neglected. Therefore, if the correct orientation of the buildings had been realised, the energy performance of the buildings would have been further enhanced.

At the district level, the research identified a number of initiatives that have increased the scheme's environmental performance. From a water management perspective, an effort has been made to increase the permeability of the surfaces in the neighbourhood, while sewage treatment is provided through centralised facilities outside Vauban. Furthermore, rainwater harvesting facilities have been installed in numerous buildings and some pilot projects have incorporated special appliances like toilets, or use the water harvested for garden watering purposes. From an energy perspective, the CHP unit operating with wood chips and natural gas, as well as the numerous solar collectors installed, provide approximately the 65% of the total needs for electricity and hot water in the area (Forum Vauban, 2003).

Overall, despite a number of drawbacks, it is clear from the research conducted that the Vauban project is an exemplary sustainable neighbourhood initiative in terms of

environmental planning and design, balance of population and land uses, and citizen participation. Its success has, to a large extent, been the result of a politically willing Local Council and a dedicated community that worked collaboratively to firmly establish targets for sustainability and materialise their visionary framework.

Chapter 9. Towards the development of a checklist of criteria for success: The Kronsberg project

9.1 Introduction

In the early 1990s, housing shortages in the area of Hannover and predictions for further population growth by the year 2000 caused great concern in the City Council. The urgent and pressing need for new homes was not an issue that was easy to handle, since there was not sufficient land space within the boundaries of the city for 20,000 new apartments to be constructed. The only remaining part of the city for large-scale development was the area in the South East, debates for the development of which dated back to as early as 1960s.

In 2000, the City of Hannover took the responsibility of organising the World Exposition. As part of EXPO, the municipality initiated the development of an exemplary urban settlement in close proximity to the EXPO grounds, to tackle the housing shortage and to experiment in exemplary sustainable solutions. In 1994, planning permission was granted for the development of Kronsberg where a mixture of EXPO apartments and ordinary housing would be accommodated.

9.2 Description of the project

9.2.1 The project's context

The general aim of the project was to *“set an example for the future of the World Exposition theme of Humankind-Nature-Technology”* (Hannover, 2000). An international Planning Competition took place in 1992 and planning permission was granted by the City Council in 1994 for Welp/Welp and Sawadda's simple grid structured masterplan which provided the legally binding planning rules for the development of the district. Further competitions were held for the development of individual projects thereafter.

The overall concept for the new district was based on the development of different high-density clusters, each of distinct character, where residential would be mixed

with commercial and leisure uses, community support facilities and social welfare infrastructure. Close proximity to jobs was also a priority for the partners, so the accommodation of offices was encouraged in an adjacent site to the west. Finally, excellent transport connections ensured easy access between the compact community and the city centre of Hannover.

The strict rules the municipality set through the framework for the development of the district were the milestones that ensured a high quality outcome with regards to ecological optimisation and social sustainability.

9.2.2 Site location and context

The 140-hectare rectangular site is located upon former agricultural land in the Southwest of the City of Hannover. The eastern border of the site is connected to the base of the Kronsberg hill and the surrounding countryside. Adjacent to the western border of the site is where the Bemerode district begins. The slope of the land ascends from the west to the east, reaching the highest point at the eastern border of the site with the adjacent countryside.

From an urban design perspective, priority was given to the formulation of clear margins that would form a distinct borderline, separate the district from the countryside and prevent urban sprawl. In that respect, the 3.5-km avenue of trees on the east creates a clear contrast with the neighbouring countryside, whereas the high rise block frontages along the western edge clearly identify the western border with the Bemerode district. The intermediary land between the two districts has been reserved for commercial and leisure uses.

The first residential development phase involved the establishment of two neighbourhoods, “Kronsberg Nord” and Kronsberg Mitte”, each of which evolved around a neighbourhood park. The rest of the site that extends to the North and the South has been reserved for future extensions.

Densities vary within the site, but they have been generally kept at high levels. The tallest 4-5 storey buildings have been located at the western part of the settlement, close to the tram connections, but building heights and densities gradually descend as we move uphill to the east. At the highest point, where the uphill building zones are located, densities have been kept in low levels, resulting in a residential conurbation that comprises of detached and semi-detached single family properties, constituting approximately 10% of the overall building stock.

9.2.3 Key stakeholders

The City of Hannover was the principal landowner having possession of 2/3 of the site, while the rest 1/3 was owned by one of the developer firms (IDB). As the principal landowner, the city was in a position to act as the principal contractor; therefore, on the basis of the expo project and Agenda 21 principles, the local council set high quality standards in the form of legally binding frameworks.

The responsibility and the cost of delivering the public infrastructure were shared by the Municipality and IDB. As per the guidelines set out in the access contract, IDB was assigned with the task of laying out the street network in its area. The land was then divided into plots and was eventually sold to the various developer practices that had to comply with the very strict set of quality standards included in the sale contracts (Hannover, 2000).

Unlike the process the common practice entailed, the development of Kronsberg was decentralised. Each city administration department was assigned different tasks, while the overall supervision and assessment was entrusted to quality assurance bureaux²⁰. The panel of experts was assigned the responsibility of conceiving a comprehensive method of assessment that had to be applied to every individual project within the scheme in order for the quality certification to be granted. This partnership with the private sector was particularly beneficial for the City Council, as it managed to ensure

²⁰ More specifically, the 7 independent quality assurance bureaux involved in the project were brought together to form a panel chaired by the City of Hannover.

the effective delivery of the quality objectives and sustainable construction principles which underpinned the overall vision for the project.

The main supervisory body for the design aspects of the scheme was Kronsberg Advisory Council (Kronsberg-Beirat). This was a municipality committee, whose main responsibility was to provide advice on design issues in order for a homogeneous result to be achieved. Suggestions for instance included the commissioning of urban planners that had to work with the individual developers and architects to agree on town planning aspects of each neighbourhood.

The effective incorporation of the ecological optimisation standards and the Agenda 21 targets was the responsibility of Kronsberg's Environmental Liason Agency (KUKA)²¹. Overall, KUKA supported the entire process, and was a key promoter and a credible source of information about sustainability.

Finally, an independent referee was appointed to effectively implement public participation, and a District Coordinator was appointed to supervise the cooperation between the different developers.

9.2.4 Development process

The site had been designated as a land for potential urban development from as early as 1960s (Hannover, 2000). The City Council was gradually buying the land until the early 1990s when it had managed to acquire approximately 80% of the area. In order to establish its planning authority over all plots, the city council established an urban development bylaw that froze property values and granted the municipality first option on all land purchases (Rumming, The Kronsberg Handbook, 2003).

The public debate around the plans for the development of the area commenced as soon as the City of Hannover took the responsibility of organising the EXPO 2000. The

²¹ Amongst KUKA's main tasks were "environmental education and counselling through workshops for stakeholders, craftsmen, developers and citizens; information and public relations; the organisation of exhibitions, meetings and guided tours; implementation of citizens participation in decision making; project management, development and implementation" (Hannover, 2000).

City Council rose to the occasion and initiated an international planning competition in 1992, which involved both the Kronsberg site and the EXPO grounds. The winning plan foresaw the development of a high density residential area and the EXPO facilities in the east of the Bemerode district. An urban design competition that followed in 1993 nominated the Welp/Welp and Sawadda's simple grid-structured masterplan, which was finally approved by the Council in 1994. Two years later, construction works began with an extremely tight schedule, as the majority of the site had to be delivered before the opening of the EXPO.

By the opening of the 2000 World Expo, the construction of approximately 2,000 units had been completed, 1,000 of which were initially put at the disposal of the personnel and exhibitors of the Expo. With a further 4,000 units planned before the project's completion, the population of the district would reach 15,000 inhabitants.

From a financial perspective, the funding of the project was to a large extent based on subsidies from the State of Lower Saxony, the European Union, the City Council, Waste Management Services, Expo 2000 GmbH, EU-Thermie and the Greater Hannover Local Government Association (KGH). Furthermore, subsidies were aiming at achieving the highest level of social mix within the district. Grants were awarded for the construction of most of the multiple occupancy buildings of the first phase. These were meant to accommodate tenants from the city council's social housing list and also first home buyers (Rumming, 2003). Finally subsidies covering 50% of the overall cost were offered for quality assurance purposes, skill sets and qualification, all of which were necessary prerequisites for the effective implementation of sustainable technology on the energy efficient housing units.

9.2.5 Planning and design: Aims, Criteria and guidelines

In Kronsberg, for the first time in the history of Expo, an actual project outside the exhibition grounds was to be demonstrated. By signing the contract to host the exposition, the City of Hannover committed itself *“to set an example on the World Exposition theme of Humankind-Nature-Technology”* (Article 1).

In line with the exhibition theme and the Agenda 21 targets, the City Council devised a set of very specific goals for sustainable development known as The Hannover Principles. These were the following (William McDonough & Partners, 1992):

1. Insist on rights of humanity to co-exist
2. Recognize interdependence (between human activities and the natural world)
3. Respect relationships between spirit and matter (community, dwellings, industries)
4. Accept responsibility for the consequences of design
5. Create safe objects of long-term value
6. Eliminate the concept of waste
7. Rely on natural energy flows
8. Understand the limitations of design
9. Seek constant improvement by the sharing of knowledge

The brief contains some broad directions under the sustainability umbrella but the project documentation (Model Kronsberg: Sustainable Building for the Future, 2000) created by the team of stakeholders, was prescriptive enough to ensure compliance with a number of social, environmental and economic criteria for sustainable development.

Social Sustainability objectives include the intention to create a balanced residential profile, advanced public infrastructure and cooperative project development. Environmental aspects have been addressed with the specific aims for an environmentally sound transport concept; the protection and enhancement of the natural and urban landscapes; and with clear priorities for a responsible soil, waste, water, waste and energy management. Finally, the project aimed for an economically viable transport concept, long term economic viability, and local food production, for a holistic approach towards economic sustainability.

The specific objectives and measures employed, as these were detailed in project documentation, as well as the scheme's performance in relation to the specific objectives, are summarised in the following table.

Initial Aims	Objectives	Measures taken	Performance
Compact structures/high building density	Minimization of the natural landscape area consumed for development	Rectangular grid layout of masterplan	<ul style="list-style-type: none"> High densities(decreasing as proximity to countryside decreases)
	Reduced construction cost	4-5 storey building blocks comprise the majority of the building stock	<ul style="list-style-type: none"> Mixed-use development but a number of local businesses closed shortly after they opened. Interview evidence suggests that the negative result relates to the owners' poor management skills (Section 9.3)
	Increase the viability of local businesses and create a public transport scheme	Public transport connections easily reachable within walking distance	<ul style="list-style-type: none"> Public transport alternatives (tram, bus services) have reduced the use of cars as the questionnaire survey conducted for this project has indicated (Section 9.4).
	Reduce journey lengths		
Varied Architecture & Accommodation	Numerous developers and architects to be involved	Design competitions	More than 40 architectural and open space planning offices contributed to a formidable architectural variety

Initial Aims	Objectives	Measures taken	Performance
Environmentally sound & economically viable transport concept	Environmental compatibility	Tram system that links the district with the city centre of Hannover Bus routes that provide cross-connections	Using the tram service, residents reach the city centre of Hannover in just 17 minutes
	Compact Community to provide the critical mass	Three tram stops provide easy access to public transport	Nobody has to walk more than 600 metres to catch the tram
	Traffic calming measures	Motorised traffic beside the tramline, on the edge of the residential area 30 kph zones, priority to the right at junctions	Traffic, air and noise pollution in the neighbourhood minimised
	Parking allowance	0.8 cars/apartment & 0.2 increase in the ratio for parking spaces on public streets	<ul style="list-style-type: none"> • 1/3 of car parking is underground • Reduction of the parking needs in the inner courts • Area designated for motorised access reduced
	Provision for alternatives to motorised transport	Cyclist lanes, pedestrian networks clearly distinguishable from the street surface through the use of different materials	Safe & well-designed cyclist and pedestrian networks promote physical activity
Public Infrastructure & mixture of tenures	Create a diverse urban spatial unity.	Provision for shopping facilities and office spaces along the tramline	<ul style="list-style-type: none"> • 1/3 of the area designated for infrastructure, access, and public greens pace • Mixture of uses allows for daily needs to be met on foot
	Decentralised public infrastructure	Primary school, 3 kindergartens, sports hall, accommodation for the elderly, KroKus, health centre, community rooms, church were allotted in the planning g area on the basis of perceived demand. Community rooms close to the apartments that could be used numerous social, cultural, and communal purposes.	<ul style="list-style-type: none"> • Of crucial importance was the fact that the social infrastructure of high quality was being developed parallel to the construction of the settlement. Therefore, when the first residents arrived, the necessary infrastructure was in place.
		Public green spaces and squares	<ul style="list-style-type: none"> • Community activities and neighbourhood events foster solidarity and cooperation between the residents
		3000 jobs located in the adjacent site(data processing companies, LBS, DVG, new commercial uses at the expo plaza, IBM)	

Initial Aims	Objectives	Measures taken	Performance
Balanced Residential Profile & Social Infrastructure	Strategy for a diverse population to be followed for each apartment block.	Account for the different cultural & religious needs of residents Small, legible housing blocks arranged around a green inner court to enhance the feeling of neighbourliness.	<ul style="list-style-type: none"> • Exceptional mixture of all social classes • Avoid social segregation by pepper potting social housing throughout the district & by mixing various forms of housing finance and ownership. • FOCUS housing project's decentralised care system allowed for elderly people to live self-sufficiently in their especially adapted apartments. • The HABITAT housing project encouraged harmonious living between Germans and foreign residents
	Stabilise the social structure	Majority of owner-occupied houses were constructed in the early stages of development	10% of the dwellings are owner-occupied and were constructed in the first stages
	Incentives for families with young children	The upper price limit of €163.361 was set by the developers	Neighbourhood attractive to families
	Flexibility of accommodation	Apartments and houses easily adaptable to changing housing needs	<ul style="list-style-type: none"> • Size of gardens allows for future extensions • In some apartments and community rooms configurations can be easily modified to suit the needs of people from different cultural backgrounds
	Diversity of residential building types	Apartment blocks of three or four storeys Two storey detached houses Terraced houses	Demographic diversity for a socially balanced community
	Diversity of tenures, building types & sizes	Apartments and houses for families with young children, for people with more contemporary lifestyles etc.	

Initial Aims	Objectives	Measures taken	Performance
Cooperative Project Development	Interdisciplinary dialogue	Developers, architects, civil engineers, building contractors, social services directorates involved in decision-making	The panel of experts ensured compatibility of the development strategy with sustainability principles.
	Public participation	Residents and users of the district were involved in the planning process from the very early stages	<ul style="list-style-type: none"> • Citizen engagement in collaborative decision-making • Citizen education on sustainability
	City Council of Hannover	<p>An urban development bylaw was passed according to which property values froze, and the municipality was granted the first option on all land purchases.</p> <p>Municipality defined all ecological standards for private developers through clauses in the land sale contracts.</p>	The involvement of the municipality ensured compliance with criteria for sustainability and safeguarded quality
	Kronsberg Advisory Council	<ul style="list-style-type: none"> • Provided advice to the City Council on main design issues • Providing recommendations and targets that would lead to the implementation of a homogeneous urban design concept according to planning aims. 	<ul style="list-style-type: none"> • Urban planners were required to work with participating property developers and architects on the basis of agreed planning concepts for each neighbourhood • Balance between density and usable open space • Water management concept suggested • Harmony between the topography and built structures was achieved
	KUKA GMBH (Kronsberg Environmental Liaison Agency)	<ul style="list-style-type: none"> • Counselling services to architects, planners, craftsmen, residents, visitors on ecologically exemplary & innovative measures (water, energy, waste, soil, agriculture, countryside, district centre, mobility) • Skills & qualification in: ecological building materials, living in a low energy house, energy saving programme, LEH construction methods, scientific monitoring, quality assurance) • Environmental education & awareness raising • Environmental publicity & public relations 	<ul style="list-style-type: none"> • Guided tours • Meetings and Conferences • Development and implementation of the citizens' participation programme • Management • Presentations about the district in close cooperation with the city council's specialist divisions & press office

Initial Aims	Objectives	Measures taken	Performance
Cooperative Project Development	Subsidies programme of the City of Hannover & the State of Lower Saxony to be reinforced	Conditions for publicly subsidised accommodation were relaxed Income limit raised for first tenants only	Subsidies compensated for the lack of private investment 2,700 homes received federal financial support Encouragement of a socially balanced community
Diversity of population/ tenures/ housing types/ affordability levels	Diversity of housing types Diversity of affordability levels	Division of land into small plots Numerous developers involved Subsidies and grants to facilitate the acquiring of property for families with low income or first home buyers.	<ul style="list-style-type: none"> • Diverse architectural result • Socially diverse community • Reduced residential mobility
Protecting & enhancing the natural and urban landscape	Protecting the Countryside	Minimising the impact from construction (EIA)	<ul style="list-style-type: none"> • The Environmental Impact Assessment provided quantitative information on the adverse effects of development and assisted the team of partners in deciding on measures to compensate for the negative effects • EIA showed that the flora and fauna located on the south and south west slopes was very sensitive to changes. Therefore the expanding of the settlement to those areas was avoided and main residential development was located on the northwest • The increase in the proportion of woodland balanced the increased emissions, and loss of natural resources from the construction of the new settlement

Initial Aims	Objectives	Measures taken	Performance
Protecting & enhancing the natural and urban landscape	Enhancing the natural landscape	Urban landscape design	<ul style="list-style-type: none"> • Different tree variety on each street associated with the different type of street and contributes to the unique character of the district • 1 tree every 200m² in mixed use areas and 1 tree or 5 shrubs every 100m² in residential areas • Transformation of a former agricultural land into an attractive countryside with designated locations for wetland, dry grassland, and field wild plant societies. • Hillside park corridors and green streetscapes with linking and dividing function. • Viewpoint plateaus on top of each corridor • The green spaces between the sections of the district (park corridors), designated for various activities also connect the residential area with the hilltop woodland, and with the countryside. • The distinct design of each park contributes to the unique identity of the neighbourhood
	Beautifying the urban setting	Landscape design at the building scale	<ul style="list-style-type: none"> • Communal Inner courts and private gardens located on the inner courts of residential complexes • Exposed roofs of underground garages and all roofs of less than 20% slope in commercial areas or single/2 story buildings are planted • Safe inner court green spaces for children with controlled access to the street • Private outdoor space for almost every home. (Balconies/rented gardens across the inner courts).
		High environmental specifications were set for these spaces by the municipality (variety of vegetation, rainwater infiltration)	

Initial Aims	Objectives	Measures taken	Performance
Protecting/ enhancing the natural and urban landscape	Water management	<p>Hydrological Survey part of the EIA: Semi-natural rainwater management system (3 litres/sec was set as the maximum volume of water released into the drainage system)</p> <hr/> <p>Paving, parking spaces and streets to allow for water infiltration</p> <hr/> <p>SUDS along main streets for controlled water release onto the stream</p> <hr/> <p>Rainwater retention basin</p> <hr/> <p>Minimise the amount of paving and buildings</p>	<ul style="list-style-type: none"> • Preservation of the natural drainage process • Maintaining stable ground water levels • Flood risk minimised • SUDS 8% more economical than conventional drainage systems (Cost: 11,599€. Approximately 1,000€ less than the cost of a conventional drainage system) • For private developers, the cost of the drainage systems they had to incorporate in the building design cost 25% more than conventional drainage
Soil management	Soil management scheme	<p>Excavated soil from foundations had to be passed to a soil management agency for reuse</p> <p>Standardised charge per cubic metre on all participants</p>	<ul style="list-style-type: none"> • 78% of the excavated soil was reused within 4km of its original location • Use of excavated soil for landscaping purposes (viewpoint hill), for a noise buffer embankment, to raise ground levels as part of the construction process, to seal an old landfill site nearby • Avoidance of truck journeys out of the site • Minimisation of mud, and dust • Cost reduction for service and access charges for the developers and the municipality • Preliminary survey ensured that the soil's functions would not be limited or altered after the excavations and reuse • Obligatory remediation of contaminated land before reuse

Initial Aims	Objectives	Measures taken	Performance
Energy considerations (Hannover Energy Policy Aims/ Hannover Energy Concept, Hannover Climate Protection Programme)	District	CHP plant every 8 blocks Obligatory connection of all buildings with the CHP units. Wind power exploited: Two wind turbines (1.8MW, 1.5MW) on the Kronsberg hill Photovoltaic installations (KroKus building, primary school, CHP station)	<ul style="list-style-type: none"> Overall 74% reduction in carbon dioxide emissions per resident compared to normal levels District heating system avoided 35,000 tonnes of CO2 emissions In 2011 total electricity production from photovoltaic installations was 11,900 kWh
	Buildings	Passive use of solar energy as the most important compensator of heat loss <hr/> Heating energy specification of 50kWh/m2/year through improved insulation in external building components (up to 40 cm thickness of external walls), minimisation of thermal bridges, instalment of triple glazing windows Penalties for exceeding the energy values specified <hr/> Electricity saving programme: <ol style="list-style-type: none"> No electrical heating systems to be installed Free distribution of energy saving light bulbs and water saving taps Grants for the purchase of electricity saving appliances Personalised advice offered by experts on energy saving <hr/> Exemplary/experimental sustainable building projects: Passive houses scheme(15kWh/m2/annum), Atrium houses scheme, Solar-city, Special terraced house programme	<ul style="list-style-type: none"> 10,000 tonnes of CO2 saved through Low Energy House Construction Methods Use of renewable energy sources saved 30,000 tonnes of CO2 Post-occupancy monitoring indicated problems associated with occupants' behaviour. The study highlighted occupants' difficulty to adjust to energy saving systems at the building scale: <ol style="list-style-type: none"> Incidents of occupants that were forgetting to adjust the water levels of different systems in their properties (e.g. toilets) Incidents of occupants that were leaving windows open, so the mechanical ventilation systems were being disabled and the system-controlled room temperature was increasing.

Initial Aims	Objectives	Measures taken	Performance
Waste	Construction waste reduced by 50%	<p>Obligatory participation of all developers in the city's waste management concept:</p> <ul style="list-style-type: none"> • Low waste building methods • Responsible use of building materials • Recyclable waste to be fed back into the materials cycle • Preference for materials delivered with limited packaging 	<p>80% of the construction waste was recycled</p> <p>Avoidance of chemical wood preservatives and tropical wood/ prohibition of materials containing asbestos, PVBs or PCPs/rejection of materials containing aluminium/use of paints and varnishes with no solvents</p>
	Domestic waste	<ul style="list-style-type: none"> • Recycling facilities • Obligatory instalment of recyclables containers and composting facilities for all owners of terraced houses. 	<ul style="list-style-type: none"> • Recyclables collection point every 400 residents • Recyclable and waste sorting in apartments • Areas for individual and communal composting
Long-term economic viability	Scheme's economic viability	<p>Incentives, grants, and discounts for:</p> <ul style="list-style-type: none"> • Buyers who had signed the contract by 1997 • Families with children • Low income households 	<ul style="list-style-type: none"> • Financial motives ensured quick selling of properties • Vibrant local centre with busy shops, cafes and restaurants • New employment opportunities in local businesses
	Sustainable Local Economy	<ul style="list-style-type: none"> • Mixed land uses to promote the foundation of leisure and commercial facilities • Promotion of local farming 	<ul style="list-style-type: none"> • Kronsberg Farm for local food production
Local food	<p>Environmentally-friendly Agriculture</p> <p>Disconnection of agriculture from the regional economies</p>	Herrmannsdorfer Landwerkstätten am Kronsberg farm	<ul style="list-style-type: none"> • Local food production • Food processing on site • Food sold locally • Farm faced financial issues that were solved eventually

Table 54: Kronsberg: Aims, Criteria and Guidelines

Source: Summarised and tabled by the author using development documentation and data from interviews

9.3 Analysis of the key stakeholders' perceptions on the strengths and weaknesses of the project: Lessons learned

In Kronsberg, two interviews were conducted with key professionals that have been involved in the project. Interviewee H was a member of the team of experts working on the realisation of the EXPO 2000 in Hannover. Interviewee H was also the director of Grundlach GmbH & Co, the company that undertook the development of the Habitat project in Kronsberg. Interviewee I was not involved in the initial stages of the scheme, but is now working closely with Hans Mönninghoff, the director of Economic and Environmental affairs in the Planning Department of the city council of Hannover.

Initial considerations

The interviewees agreed that the initial concept for Kronsberg was to implement the concept of the EXPO (Humankind-Nature-Technology) on a mixed development scheme. As Interviewee I said, *"Kronsberg was meant to be an experimental, pioneer project that would showcase to the rest of the world how the EXPO ideas and Agenda21 guidelines could be implemented on a Greenfield development"*.

Interviewee H explained the reasons why as a developer firm they wanted to be involved in Kronsberg. He said that their ultimate goal was to *"experiment with various economic, technical and most importantly social innovations to encourage harmonious co-living with Germans and migrants"*.

Satisfaction with outcomes

Both interviewees expressed high satisfaction with the result, which they described as of very high quality and sustainable in every sense. More specifically, they both referred to the post-occupancy assessment results which have indicated an outstanding environmental performance. However, as Interviewee H suggested, the project's biggest success is primarily associated with social qualities. He highlighted the fact that *"the scheme has achieved a very good social balance and has managed to ensure that the cultural needs of the different social groups have been met"*.

Sustainable urban design: quality issues

Interviewee H suggested that the exemplary assets of the scheme in terms of urban design have to a large extent stemmed from the financial incentives and public funds offered to developers and residents by the government. These financing models attracted the private sector's investment and captured the interest of households of different incomes.

The Municipality and the state of Lower Saxony played a critical role in influencing the nature of urban infrastructure in Kronsberg and they promoted the development of a sustainable district. Both interviewees highlighted the quality of community buildings, parks and squares that were developed prior to the residents moving into their new homes. These public realm facilities were developed to meet the recreational and cultural needs of a diverse population. As Interviewee H said *"these community places are meeting points for the residents...they are spaces where Germans and migrants can exchange ideas, and different social groups can exercise a variety of recreational activities"*.

Also from an urban design perspective, interviewees acclaimed the architectural diversity achieved. As Interviewee I said, *"there are buildings that range in height from one to five storeys, attached houses, single family houses, flats etc."*. In addition the involvement of numerous different developers and architects accounted for the incorporation of a variety of architectural styles.

Interviewee I also referred to the grid structure of the masterplan that greatly enhanced the urban design qualities of the scheme by creating a clear and highly efficient street layout. Although the applied design was the outcome of an urban design competition it was criticized by some as unsuitable for a hilly site. However, as opposed to a more organic and curvilinear physical foundation, the rectangular urban layout was beneficial in terms of economy, accessibility and walkability.

Participants finally referred to the importance of creating landmark buildings in prominent locations that represent the community values and create a sense of place. As interviewee mentioned *“the KROKUS centre and the protestant church define the distinct identity of the place”*. The association described in the latter statement is indeed prominent given the aims and objectives that characterise the vision for the scheme. Those iconic buildings are a physical and semiological representation of the municipality’s effort to satisfy the cultural needs of the diverse community.

Transferability of successful aspects of the scheme

Both respondents argued that, although lessons can be learned from the ambitious environmental policy, and from waste, water and soil management strategies that were applied on Kronsberg, a sophisticated analysis of the local circumstances and socioeconomic situation should precede the formulation of any strategy for development in a certain location.

Innovative sustainable technology not only enhances a projects environmental performance, but it is also usually subsidised by international, national, and local formal bodies and institutions. Both interviewees suggested that these opportunities should be fully exploited by the team of partners responsible for the development of similar schemes. The Kronsberg project for instance, *“utterly benefited from the innovative sustainable technology that was available at the time, and from the subsidies for sustainable construction offered by both the federal government, and by the county of Lower Saxony”*, as Interviewee H explained.

Another issue identified by the participants was the use of frameworks and indicators for sustainable development. As we have seen in Section 9.2.5, numerous such tools were utilised in the case of Kronsberg to maintain the quality set in the original vision for development. Interviewee I articulated the importance of checklists and indicators such as Agenda 21 and EIA that were used on the project *“to quantify the initial principles and targets and measure success”*. Those internationally acclaimed toolkits, combined with further indicators and criteria sensitive to the local context, incorporated ambitious sustainability targets and ensured outstanding performance in

the long term. Interviewee highlighted the transferability of that approach, *“especially nowadays that the availability of information facilitates learning from case studies of successful initiatives”*.

Finally, an important transferable idea identified by the interviewees was the establishment of organisations such as KUKA and the KROKUS centre for the familiarisation, skill sets, and qualification of planners, architects, craftsmen and residents, with the Low Energy House construction methods and the fundamentals of sustainability. As Interviewee I explained, *“Availability of information on sustainability, and successful case studies of other sustainable neighbourhoods assist partners and residents in fully comprehending the aims and objectives, and the processes that need to be followed, for the delivery of a successful sustainable scheme”*.

Affordability

According to Interviewee I, *“although the average values in Kronsberg do not differ from the average values in Hannover, there is a broad diversity of affordability levels within the site”*. Not only did the various forms of housing finance lower the acquisition cost for low-income households, but also the high energy performance of the buildings reduced the maintenance costs that pertain to the life-cycle of the buildings.

Interviewee H also referred to the exceptionally positive outlook for investment in Kronsberg. The quality of the building stock and the superior public realm infrastructure makes the neighbourhood attractive for various social groups, while at the same time, the convenient location of public transport hubs is a factor highly likely to influence the demand for properties in the area. Therefore, as Interviewee H suggested, *“property owners in Kronsberg will benefit from investing in the area, since the high demand for property will make the land and property values follow an ascendant course”*.

Accessibility

Both respondents commented positively on the exceptional transport strategy that was applied in Kronsberg. They reported that Kronsberg is very well connected to the

adjacent areas by all means, with the highly efficient tram system, several bus routes, networks of pedestrian and bicycle lanes, and the high speed autobahn.

Environmental legislation

The project was designed to improve energy efficiency both at the building and at the district scale so energy specifications were set to a very high standard. As Interviewee I said, *“the very strict set of environmental specifications with which all developers had to comply was indeed very encouraging and largely contributed to the success of the project”*.

Interviewee H, on the other hand, commented on the challenge and competitive advantage an energy efficient scheme offers to a developer. He said that, *“although encouraging for the developers who are forward-thinking and interested in experimenting with innovative solutions, strict environmental specifications can be at the same time discouraging for those who are more reluctant to move away from standard practice”*.

Impact on employment

Interviewees appeared to be critical about whether the mixed use nature of the scheme had an impact on employment on a geographical scale. Although a few retail spaces were developed in the area, these were not enough to meet the need for employment of a significant number of locals. Interviewee I referred to the companies located on the expo site, at the place where the nations pavilion used to be, to highlight the fact the fact that a few employment opportunities do exist, however, she suggested that the impact on employment has been insignificant since the scheme is mainly residential. According to her conclusive remark, *“The population still relies on the city of Hannover for employment”*.

Sustainable development and civic pride

The fact that Kronsberg was part of the exhibition, made people realise it was exceptional and innovative. As interviewee H said, *“Future buyers who had the chance to visit the site when the expo was taking place, could see how exceptional the project really was”*.

Based on her experiences and the feedback she has received, Interviewee I reported that, *“There are actually a lot of cases of people who were at first renting apartments in Kronsberg and when they decided to buy a property they remained in the same neighbourhood”*.

Nonetheless Interviewee I shared her observation that not many citizens of Hannover are aware of the numerous awards the project has received. As she explained, *“Its sustainable features mostly concern academics and practitioners in the field of the built environment”*.

Public/Private sector partnerships

The interviewees’ belief is that the effective cooperation between the public and the private sector in the development of Kronsberg was a very important part of its success.

The Kronsberg project was a success of the local authority in the sense that the latter demonstrated the political will and commitment to encourage a bold and innovative solution. Both participants highlighted the fact that *“the involvement of the public sector ensured the establishment of a strict set of environmental standards and regulations for sustainability with which all developers had to comply regardless of whether they owned the land or not”*.

According to Interviewee I, the involvement of the public sector also promoted a far reaching public participation from the initial steps of the planning of the expo, until the decision making for the Kronsberg site. Worth mentioning is the fact that *“there was even a referendum held on whether the expo should be held in Hannover”*.

On the other hand, Interviewee H characterised the private sector’s contribution as *“supplementary”* to the public sector’s weakness in not being fully aware of the market. As he said, the private sector benefited greatly from the unique set of regulations in Hannover, since companies that were willing to experiment managed to achieve even higher targets than the ones imposed by the regulations.

Public participation

Both interviewees agreed on the meaningful involvement of the local community in decision making for the Kronsberg scheme. Initially, opposition was expressed by the few households that were located in the site before the development of the project was commenced. However, the city council managed to *“convince them that the impacts of the development would be positive both for the locality and for the rest of Hannover”*, as Interviewee H explained.

Interviewees further identified three main bodies as the pioneers of an effective participation process in Kronsberg.

Firstly, the participants recognised the contributions of KUKA (Environmental Liason Agency), as *“vital”* in preparing the ground for meetings and discussions between the stakeholders. As Interviewee I said, KUKA organised specialist conferences and one-to-one consultations for architects, planners, craftspeople and residents *“to familiarise them with the basics of sustainability, and to raise key issues of concern”*. This agency was a prototype for Germany, and it ensured that the ambitious CO2 reduction targets could be met with the implementation of skilling and qualification measures.

Public participation was also enhanced with the assistance of the Krokus community centre that was established in 1997. As Interviewee I explained, *“It provided and still continues to provide training on sustainable living to the residents and assistance with people’s queries”*.

Finally, Interviewee H referred to the municipality’s communications agency that *“offered information on the Kronsberg project to anyone interested as well as training courses to the architects and professionals who were involved in the development of the site, so they could meet the targets that had been set”*.

Sustainability indicators: their contribution to success

Interviewees believe that the high environmental standards, as well as the waste, water and soil management strategies, applied on Kronsberg definitely contributed to its success. They also reported that these have informed standard practice regulations at a national level.

Unsatisfactory points

Some criticisms were revealed against local council's political failure to accurately predict the social infrastructure that would be required for the scheme. As Interviewee H said, *"The number of the children surpassed the initial predictions and consequently a new school and kindergarten had to be constructed with the assistance of several welfare organisations"*.

Furthermore, interviewees appeared let down by the failure of a number of public spaces that lack vibrancy. An example of such space is the square in front of the KroKus building where according to the author's observations; the absence of places to sit is an evident problem. Apart from the apparent mishandling of the urban design features and the inadequacy of the appropriate facilities, interviewee H raised another issue associated with the disappointing result. According to his view *"the drift in people's lifestyles that has been taking place over the last decade has discouraged outdoors activities"*. However, it is within the city council's intentions to at least address the urban design issues and to seek solutions for the redesign and revitalisation of the public spaces under concern. The interviewees reported that meetings and workshops on the redevelopment of these spaces are currently being held between the team of partners and the residents.

In the same question about unsatisfactory topics, Interviewee I also commented on the fact that Kronsberg has not managed to become a car-free neighbourhood although the existing level of public transport provision is excellent. In her point of view, Kronsberg should have been much closer to the city centre in order for it to succeed in reducing car dependency to a larger extent. She also appeared to be an advocate of the theory that *"special, environmentally conscious residents are a prerequisite for any car-free scheme to be successful in our highly car dependent societies"*.

Another issue that was discussed by the participants was community involvement in decision making. Although they acclaimed the valuable contribution of resident participation in decision-making in the sense that the diversity of opinions enriches the

process, the participants commented on the disproportionate resident representation. As Interviewee I explained, *“people sometimes may just be indifferent or uninterested in these matters”*, therefore natural inertia is a severe barrier to community involvement. Additionally the lack of information and resources was raised as an important issue that can potentially hinder the process of consultation. Ignorance can cause conflicts and misunderstandings between the stakeholders involved in the process, therefore it is of imperative importance that information pertaining to the proposed action is disclosed and made widely available prior to the meetings and workshops taking place. Finally the fair treatment of the diverse groups that participate was considered as a key criterion for a successful consultation. Amongst the lessons learned from the workshops and meetings held, as Interviewee I explained, was that *“sometimes participants don’t get the feeling that they have actually offered any actual contribution to decision-making”*. Therefore, it is essential to provide comprehensive responses to substantive comments and to give clear explanations as per the selection of one approach over others.

The effectiveness of sustainable development indicators and checklists was finally queried by the participants. They both admitted that further research is required since currently available systems of indicators are weak, often failing to envisage sustainability holistically, and frequently showing inadequacy in accounting for social and economic aspects. *“Most checklists are mainly focused on the environmental side, since it is easier to handle with all the necessary know how widely available”*, as Interviewee H pointed out.

Interviewees finally appeared supportive of a universal checklist that would measure in quantifiable terms the different aspects that relate to sustainability, also providing a ground for comparisons between different projects. However, as interviewee I added, the appraisal of the local circumstances should precede the use of any such checklist.

9.4 Analysis of the questionnaire survey: Investigating residents' satisfaction

General points about the demographics of the sample

The response rate for Kronsberg was the most satisfying in comparison to the three other case studies. The survey yielded 25 responses out of 40 questionnaires that were distributed, at a response rate of 62,5%.

In the chart below the distribution of property types is shown. The chart indicates that the majority of the sample resides in rented properties. Owner-occupied properties account for the 32% of the sample, while social housing units account for approximately 4%.

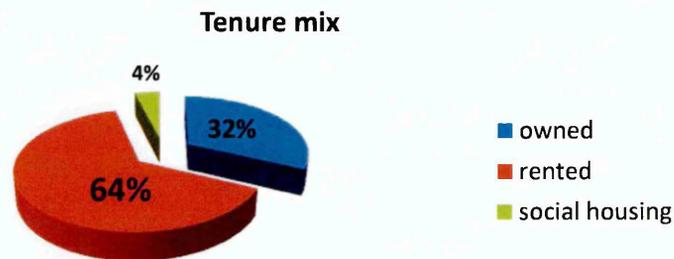


Chart 19: Kronsberg: Tenure mix

From a demographic perspective, the survey was also intending to investigate the age distribution of the population, examining the number adults and children that make up the total number of household members in each property. As can be seen in the chart below, 71% of the individuals occupying the households are adults while most households are composed of 2 adults with no children.

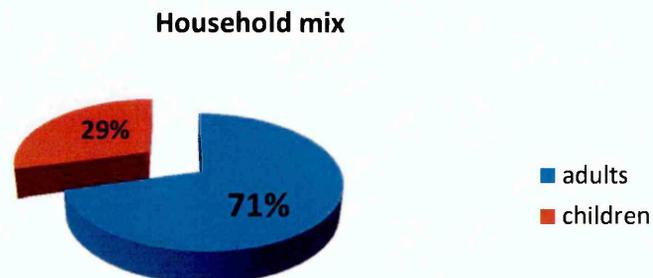


Chart 20: Kronsberg: Household mix

9.4.1 Correlations

Your home/Type of property

General points about the property and its occupants' satisfaction with it.

As per the correlational tests executed, high rates of satisfaction were expressed by most sub groups with attributes of their properties included in the questionnaire.

The subgroup that expressed the lowest satisfaction rates was the *social housing* one. In more detail, the vast majority of the occupants of social housing units are only to some extent satisfied with the amount of space in their properties and with the flexibility of the property layout. Moreover none of the respondents from this subgroup reported to have access to a private garden. Although the communal spaces intersecting the residential blocks compensate for that inadequacy to a certain degree, the lack of private outdoors space for those properties indicates that the architectural design treatment of social housing units was somewhat different from that applied on rest of the residential units in the scheme.

On the other hand, owners who also occupy their properties seem to be the most satisfied with their home. More specifically, questions regarding attributes of space, layout and flexibility of the properties yielded positive responses within the *owner-occupied* subgroup.

Similar satisfaction rates were expressed by the '*rented*' subgroup. Occupants of rented properties are very satisfied with the space, layout and privacy their home offers, however, not all of the properties have access to a private outdoors space.

Finally, from the chart below, it is apparent that the savings in occupational costs were not considered significant by the sample with the exception of the *social housing* subgroup. Considering the similarity of those findings with findings from the rest of the case studies, the fact that the application of green technology on buildings is not necessarily associated with reduced occupational costs is a notable conclusion. In other words, those findings provide evidence for the fact that the cost of sustainable technologies for enhanced energy performance is not likely to be offset by the occupant's energy savings, at least in the short term.

		Type of property		
		Rented	Owned	Social Housing
Criteria	Enough Privacy (% within type of property)	56.3% very satisfied	87.5% very satisfied	100% very satisfied
	Garden (% within type of property)	63.5% don't have a garden	100% have a garden	100% don't have a garden
	Enough space to socialise (% within type of property)	87.5% very satisfied	100% very satisfied	100% to some extent satisfied
	Enough space for children (% within type of property)	70% very satisfied	100% very satisfied	100% to some extent satisfied
	Flexibility of layout (% within type of property)	68.8% very satisfied	87.5% very satisfied	100% to some extent satisfied
	Eco home less bills (% within type of property)	56.3% not satisfied	50% to some extent	100% very satisfied

Table 55: Kronsberg: Your home/Type of property

Community/Length of residency

In this set of statistical tests, the length of residency was correlated with attributes of a sustainable community in order to investigate the possibility of emotional attachment to the neighbourhood. Occupants of recently bought or rented properties are likely to be less familiar with the aspects under consideration. Furthermore, there is a possibility that the excitement with moving to a different location might prevent people from being critical and objective about certain aspects under discussion.

From table 55, we can see that, unsurprisingly, new residents who have resided in the neighbourhood for less than six months do not feel close to their neighbours. However, within this subgroup the sense of safety is enhanced, and there is a great degree of satisfaction with employment opportunities in the area, and with the opportunities they have been given to gain entry in the decision making panel.

On the other hand, the more mature residents pertaining to the *“one to five years”* and *“more than five years”* subgroups seem to be critical towards the participatory approaches followed in Kronberg. The more mature residents forming these groups are more familiar with the collective experience of decision making for matters relating

to the development of the scheme and, therefore, they are in a position to form a more complete judgement of the decision making structure. According to the survey results, average satisfaction rates were recorded with regards to opportunities for participation. As per table 55, this discontent mainly relates to the fact that participants felt that their voices were not audible to the city council officials. The scepticism exhibited indicates a contradiction between the city council's initial willingness to encourage the involvement of the community and with how the participants perceived the implementation of participatory techniques. As a result consultation in Kronsberg seems to have been a technical method of project work rather than a meaningful process of political nature.

Another unsatisfactory point stemming from the table below relates to the real estate market in the area. Respondents of all subgroups reported moderate satisfaction with the affordability of properties in Kronsberg. Although the first residents were privileged to receive extensive grants and subsidies from the federal government, a decade after the Expo took place, property values seem to have followed an ascending course, making difficult the acquiring of property in the area. This fact is reflected in the table below, where it is clearly indicated that satisfaction rates with the affordability of properties decrease as the length of residency decreases.

Amongst the positive points recorded, was the enhanced feeling of safety in the area, as well as the great degree of satisfaction with employment opportunities expressed by the *"less than six months"* and *"one to five years"* subgroups. Satisfaction with the latter is highly likely to be linked to the close proximity to the city of Hannover that unquestionably provides a variety of job opportunities for the local population.

		Length of residency		
		<6 months	1-5 years	>5 years
Criteria	Employment opportunities (% within length of residency)	66.7% very satisfied	60% very satisfied	47.1% not satisfied
	Feeling safe (% within length of residency)	66.7% very satisfied	60% very satisfied	76.5% very satisfied
	Satisfied with opportunities to participate in decisions (% within length of residency)	33.3% very satisfied	60% to some extent satisfied	58.8% to some extent satisfied
	Affordability of properties (% within length of residency)	100% to some extent satisfied	80% satisfied or to some extent satisfied	70.6% to some extent satisfied
	Feeling close to neighbours (% within length of residency)	100% not satisfied	60% very satisfied	58.8% to some extent satisfied

Table 56: Kronsberg: Community/length of residency

9.4.2 Frequencies

Identical frequency tests that were conducted for the rest of the case studies in this research were conducted to investigate resident satisfaction in Kronsberg. These tests involved the entire sample and the results have been assembled in the tables that follow below.

SATISFACTION WITH RESIDENCE		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
68%	House allows for enough privacy	
88%	Enough space to socialise in communal areas	
78.9%	Enough space for children	
72%	Flexibility of dwelling's layout	
36%	Eco home less bills	

Table 57: Kronsberg: Satisfaction with residence

Generally high levels of satisfaction were expressed with regards to property attributes. The only issue that yielded high dissatisfaction rates relates to the

occupational cost of the energy efficient houses. Survey results show that residents question the fact that green technology and measures for improved energy efficiency are associated with reduced occupational costs.

SATISFACTION WITH NEIGHBOURHOOD		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
84%	Public spaces	
96%	Everyday shopping needs being met within walking distance	
88%	Easy pedestrian orientation	
80%	High quality infrastructure amenities (community centres, residents' associations)	
60%	Distinctive neighbourhood character	

Table 58: Kronsberg: Satisfaction with neighbourhood

The respondents were also asked to report their satisfaction with a number of neighbourhood attributes that were identified in the literature review. A great level of satisfaction was expressed in all relevant questions (Table 58).

SATISFACTION WITH THE ENVIRONMENT		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
56%	Quality of air	

Table 59: Kronsberg: Satisfaction with the environment

With regards to the quality of air in the neighbourhood, respondents reported moderate satisfaction. The close proximity to the city centre and to the high-speed autobahn indicates the probability that the quality of air is somewhat deteriorated because of the vehicular traffic. In addition, the area is surrounded by vast agricultural land, a fact that has a negative effect of equal significance. However, the woodland adjacent to the northern border of the settlement and the green spaces that have

been created within the neighbourhood mitigate the negative effects and enhance the microclimate of the area.

SATISFACTION WITH MOBILITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
84%	Public transport(in general)	
40%	Ticket prices	
80%	Frequency and speed of public transport services	
84%	Pedestrian and cycle friendly streets	

Table 60: : Kronsberg: Satisfaction with mobility

Respondents' opinions on the mobility attributes selected for this study was another predictor of the overall satisfaction with the neighbourhood. All respondents reported satisfaction with the mobility attributes of their neighbourhood. The results described above suggest that the transport plan implemented in the area has been highly successful and has made the area highly accessible by all means of transport.

SATISFACTION WITH COMMUNITY		
PREVAILING FREQUENCY	INDICATOR	DEGREE OF SATISFACTION
52%	Opportunities for employment	
68%	Affordability of properties	
72%	Sense of safety	
40%	Good relationship with neighbours	
56%	Opportunities to participate in decision making	
52%	Is your voice being heard by public authorities?	

Table 61: Kronsberg: Satisfaction with community

The most extensive dissatisfaction or moderate satisfaction expressed was in response to questions regarding community attributes. More than half of the respondents were dissatisfied with the access to employment opportunities in the area, but as we have seen in table 55, these were predominantly the more mature residents.

Public participation in decisions was one further significant source of dissatisfaction for residents. A problem consistently experienced by community members who participated in decision making meetings and workshops is that city officials failed to successfully take into consideration the community's ideas and aspirations, compromising in that way the bottom up nature of the consultations.

Sustainable Neighbourhood Influences Sustainable Lifestyles

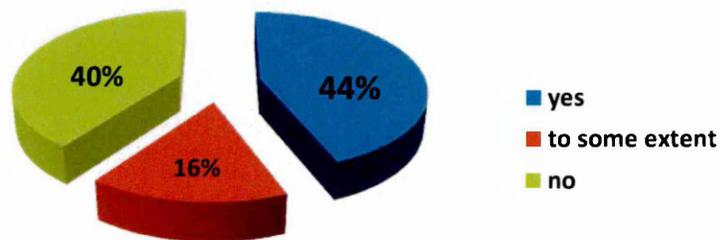


Chart 21: Kronsberg: Sustainable neighbourhood influences sustainable lifestyles?

Along with the numerous planning and design interventions, the success of the project with regards to sustainability also depends on the residents' effort and commitment to maintain a sustainable lifestyle. Therefore, residents were asked whether they think that living in Kronsberg has inspired a behavioural change. As per Chart 21, most people agree that moving to Kronsberg has indeed motivated a behavioural change in the way they respect the recycling norm, in the way they use the water wisely and in the way they have incorporated energy efficient retrofits in their homes.

Frequency Of Vehicle Usage

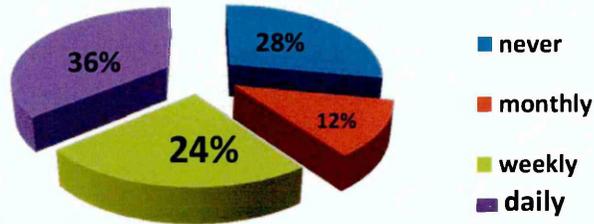


Chart 22: Kronsberg: Frequency of vehicle usage

Although Kronsberg was never meant to become a completely car-free district, only 36% of the residents use their cars on a daily basis. 28% never use their cars, while 12% use their cars on a monthly basis. The frequencies above in combination with the rates of satisfaction with public transport services the residents reported, indicate that the coherent transport concept envisioned and eventually developed in the area, significantly reduced the dependency on cars.

Frequency Of Incidents Of Crime

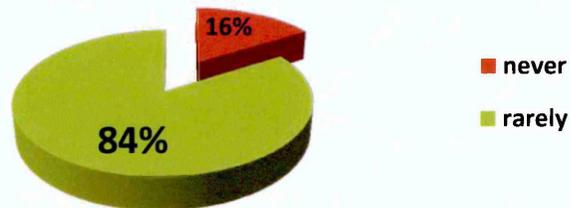


Chart 23: Kronsberg: Frequency of incidents of crime

The sense of safety in Kronsberg is high according to the charts and tables that were discussed earlier. The above chart shows the frequencies of incidents of crime according residents' perceptions. Crime rates appear to be either very low or nil.

Quality Of Life Improved

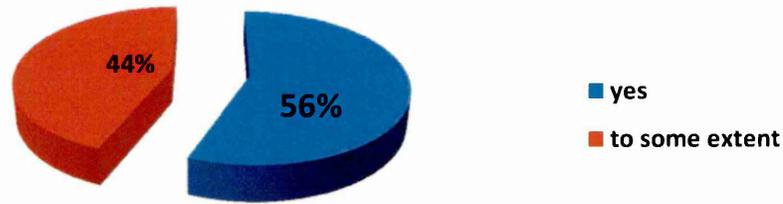


Chart 24: Kronsberg: Quality of life improved?

The last question investigates the overall feeling of satisfaction. Residents were asked whether they think that their quality of life has been improved and the reported levels of agreement with the statement were high. The indicator is of crucial importance since it is an important indicator of the project's success.

9.4.3 Bivariate analysis

The Spearman Rank Order Correlation coefficient (ρ) was run to measure the strength and direction of the relationship that exists between different sets of variables.

Where $df = 25 - 2 = 23$

At 0.05 level of significance with $df = 23$ a rho correlation coefficient of 0.415 is required for statistical significance.

In the table below, the positive coefficient of 0.236 indicates a direct relationship between the variables "provision for shopping needs" and "frequency of car usage". This means that the commercial units that are located in Kronsberg are enough to meet the everyday shopping needs of the residents and are within walking distance, so people don't need to use their cars for their everyday shopping needs.

Correlations				
			Provision for shopping needs	Frequency of vehicle usage
Spearman's rho	Provision for shopping needs	Correlation Coefficient	1,000	,236
		Sig. (2-tailed)	.	,255
		N	25	25
	Frequency of vehicle usage	Correlation Coefficient	,236	1,000
		Sig. (2-tailed)	,255	.
		N	25	25

Table 62: Kronsberg: "provision for shopping needs" and "frequency of car usage"

The table below shows that there is a positive (0.33) relationship between the variables "satisfied with public transport" and "frequency and speed of public transport".

Correlations				
			Satisfaction with public transport	Frequency and speed of Public transport
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	,033
		Sig. (2-tailed)	.	,876
		N	25	25
	Frequency and speed of Public transport	Correlation Coefficient	,033	1,000
		Sig. (2-tailed)	,876	.
		N	25	25

Table 63: Kronsberg: "satisfied with public transport" and "frequency and speed of public transport"

The table below shows that the pricing of the public transport option positively impacts on the overall sense of satisfaction with public transport as there is a positive relationship (0.233) between the variables "satisfaction with public transport" and "affordability of public transport".

Correlations				
			Satisfaction with public transport	Affordability of public transport
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	,233
		Sig. (2-tailed)	.	,262
		N	25	25
	Affordability of public transport	Correlation Coefficient	,233	1,000
		Sig. (2-tailed)	,262	.
		N	25	25

Table 64: Kronsberg: "satisfaction with public transport" and "affordability of public transport"

Further correlation tests were conducted to investigate whether the existence of satisfactory public transport modes reduces private automobile dependence. As per the table below where a negative relationship (-0.053) is observed between the variables “satisfaction with public transport” and “frequency of vehicle usage” people prefer the private vehicle option regardless of the quality of the transit system.

Correlations				
			Satisfaction with public transport	Frequency of vehicle usage
Spearman's rho	Satisfaction with public transport	Correlation Coefficient	1,000	-,053
		Sig. (2-tailed)		,802
		N	25	25
	Frequency of vehicle usage	Correlation Coefficient	-,053	1,000
		Sig. (2-tailed)	,802	
		N	25	25

Table 65: Kronsberg: “satisfaction with public transport” and “frequency of vehicle usage”

Addressing car dependency when it stems from personal preferences can be challenging. However providing people with alternatives to the automobile mode is a strategy that has been identified as successful in the literature (Novem, 2002). In Kronsberg the creation of a multimodal centre, where a range of community facilities were introduced, was intended to reduce the number of people’s journeys for the everyday routine. The correlation test presented in the table below proves that the aforementioned strategy was indeed a successful one as the positive coefficient (0.253) between the variables “provision for community facilities” and “frequency of vehicle usage” indicates a direct relationship. Therefore, the accommodation of a range of community facilities within the neighbourhood has resulted in fewer trips being done by car.

Correlations				
			Provision for community facilities	Frequency of vehicle usage
Spearman's rho	Provision for community facilities	Correlation Coefficient	1,000	,253
		Sig. (2-tailed)	.	,222
		N	25	25
	Frequency of vehicle usage	Correlation Coefficient	,253	1,000
		Sig. (2-tailed)	,222	.
		N	25	25

Table 66: Kronsberg: “provision for community facilities” and “frequency of vehicle usage”

The effort to reverse the perception that the automobile option is the optimal one can be further enhanced when the urban layout of a neighbourhood encourages walking and cycling. In Kronsberg measures like the low speed limit (30 kph), limited on-street parking, as well as the safe, attractive and continuous cycling and pedestrian routes and facilities have given clear priority to pedestrians and cyclists alike. In addition, the three tram stops cleverly located in the district have ensured that the public transport links are easily accessible within less than 600 metres from any point in the neighbourhood. The walking environment is, therefore, supportive of the public transport system and thus the need to use a car has been minimised. Indicative of the above statement is the table below, which shows the positive correlation (0.134) between the variables “pedestrian and cycle friendly streets” and “frequency of vehicle usage”.

Correlations				
			Pedestrian and cycle friendly streets	Frequency of vehicle usage
Spearman's rho	Pedestrian and cycle friendly streets	Correlation Coefficient	1,000	,134
		Sig. (2-tailed)	.	,524
		N	25	25
	Frequency of vehicle usage	Correlation Coefficient	,134	1,000
		Sig. (2-tailed)	,524	.
		N	25	25

Table 67: Kronsberg: “pedestrian and cycle friendly streets” and “frequency of vehicle usage”

As per the frequency tests conducted in the previous sub-chapter, the sense of safety in Kronsberg is particularly enhanced. The mixed-use planning pattern has ensured that there are several busy areas and activity nodes spread throughout the

neighbourhood, so that natural surveillance takes place during most hours of the day. In addition, pedestrian oriented areas are well lit to provide safety and comfort for night time use. As a result incidents of crime occur rarely (chart 23), a fact that enhances the overall feeling of safety for the residents. The aforementioned association is clear from the table below where a positive correlation (0.272) is observed between the variables “frequency of incidents of crime” and “feeling safe”.

Correlations				
			Frequency of incidents of crime	Feeling safe
Spearman's rho	Frequency of incidents of crime	Correlation Coefficient	1,000	,272
		Sig. (2-tailed)	.	,188
		N	25	25
	Feeling safe	Correlation Coefficient	,272	1,000
		Sig. (2-tailed)	,188	.
		N	25	25

Table 68: Kronsberg: “frequency of incidents of crime” and “feeling safe”

Alongside matters that pertain in the sphere of the physical environment, psychological factors are equally important for the community’s enhanced feeling of safety. Community cohesion, as described by N. Dempsey, has seven dimensions: social interaction, social networks, sense of community, participation in organised activities, trust and reciprocity, perceived safety and sense of place attachment (Dempsey, 2009). Most of the aforementioned aspects are directly associated with the relationships formulated between the members of the community. In theory, the stronger those relationships are, the more cohesive the community is. In an effort to empirically prove the aforementioned seemingly obvious association, a correlation test was conducted for the variables “feeling close to neighbours” and “feeling safe”. Although a direct relationship was detected (0.099) it was too weak to allow for meaningful conclusions to be drawn and for generalisations to be made.

Correlations

			Feeling close to neighbours	Feeling safe
Spearman's rho	Feeling close to neighbours	Correlation Coefficient	1,000	,099
		Sig. (2-tailed)	.	,638
		N	25	25
	Feeling safe	Correlation Coefficient	,099	1,000
		Sig. (2-tailed)	,638	.
		N	25	25

Table 69: Kronsberg: “feeling close to neighbours” and “feeling safe”

Along the same line of thinking about social cohesion, resident participation in community activities and decision making has proven to be of imperative importance for the bottom-up approach in governance (see Chapter 2). Through correlational tests the efficacy of the community participation model applied in Kronsberg was sought. Table 70 shows that there is an indirect relationship (-0.40) between the variables “opportunities for participating in decision making” and “frequency of attending community events”. This indirect relationship between the two variables shows that the attendance in community events is not entirely dependent on how encouraging the participatory system is.

In addition, another correlational test (Table 71) indicates that attendance in community consultation events is not associated with how well the city council integrates the citizens’ wishes and aspirations in decisions made. The negative results might seem contradictory to what common sense directs, but in fact, there is a wealth of literature referring to other crucial drawbacks that relate to an effective public participation process. Numerous scholars have, for instance, pointed out constraints relating to individual’s natural inertia, lack of understanding of the context of information or limited citizen engagement with technology tools.

Correlations				
			Opportunities for participating in decision making	Frequency of attending community events
Spearman's rho	Opportunities for participating in decision making	Correlation Coefficient	1,000	-,040
		Sig. (2-tailed)	.	,850
		N	25	25
	Frequency of attending community events	Correlation Coefficient	-,040	1,000
		Sig. (2-tailed)	,850	.
		N	25	25

Table 70: Kronsberg: "Opportunities to participate in decision making" and "frequency of attending community events"

Correlations				
			Frequency of attending community events	Voice heard by council
Spearman's rho	Frequency of attending community events	Correlation Coefficient	1,000	-,300
		Sig. (2-tailed)	.	,146
		N	25	25
	Voice heard by council	Correlation Coefficient	-,300	1,000
		Sig. (2-tailed)	,146	.
		N	25	25

Table 71: Kronsberg: "frequency of attending community events" and "voice heard by the Council"

9.4.4 Discussion

This survey reports on the attitudes to the sustainable attributes of the Kronsberg district of a sample of 25 residents.

The statistical tests conducted in this chapter were intending to demonstrate resident perceptions about several aspects of their neighbourhood, designed and developed in line with policies that have encouraged the formation of a sustainable community.

The results prove that there is a high level of satisfaction with most property and neighbourhood attributes. However, similarly to the results obtained from the other case studies, the environmental performance of the buildings has proven to be controversial. The statistical survey has indicated that despite the ambitious plans and projections for low energy consumption, residents are dissatisfied with the energy saving attributes of their properties. The identified gap may be associated with the

complexity of the highly sophisticated retrofits that have been utilised in the building structure and which require a great deal of effort and commitment exercised by the user.

The survey also indicates a high degree of dissatisfaction or moderate satisfaction with certain community attributes such as opportunities for employment in the immediately adjacent area, opportunities for involvement in decision making and affordability of properties. The survey has, in addition, indicated that awareness of local problems escalates as the length of residency increases. This makes the sub sample of the residents that have lived in Kronsberg for more than five years the most credible one with regards to questions related to the community.

On the other hand, it appears that the successful transport policy has influenced a reduction in the car use, although it was never intended by the team of partners that the district would become entirely car-free. A number of intervening indicators were identified through a series of statistical correlational tests. More specifically, positive correlations were identified between the reduction in car dependency and the provision for retail and community facilities in the neighbourhood.

Furthermore, the development of a highly efficient tram system that provides good connections with the city centre of Hannover appears to have had a positive impact on reduced car usage as well. In the questionnaire residents were asked to criticise the ticket fares and frequency of routes and a satisfactory performance was acknowledged by the sample.

Finally a key finding that has emerged is the fact that the encouragement of walking and cycling through traffic calming measures and well-designed walking and cycling routes has provided an attractive alternative to driving.

9.5 Summary

To summarise, the Kronsberg project is an exemplary one in every aspect. The partners managed to address the ecological, social and economic concerns incorporated in the Agenda 21 programme in a very effective way.

From an economic point of view, the numerous subsidies offered by the State of Lower Saxony, the Federal Government and the Municipality ensured the viability of the scheme. For instance, while for the first tenancy agreements higher tenant income levels were set by the Municipality, at later stages apartments that were intended to be used as social housing were incorporated in the scheme. These eventually constituted 20% of the overall building stock. The effective utilisation of the numerous subsidies resulted in lower property values (5.60 euros/square metre), a fact that facilitated the quick selling of the properties. Furthermore, the accommodation of approximately 2,000 jobs in the former EXPO grounds, in close proximity to the western border of the site in commercial and office buildings stimulated economic development and, therefore, offered some possibilities for employment for the local residents.

From an ecological perspective, the project met very high standards of energy efficiency, water waste and soil management, while the post-occupancy monitoring proved that it managed to achieve a significant overall reduction of CO₂ emissions. A longitudinal study (over three years after occupancy: 1999-2001) indicated that the measures taken (heating, hot water, electricity) had led to a 28% reduction in CO₂ emissions, while district heating and the wind turbines installed saved a further 47% of CO₂ emissions. According to these calculations, the project managed to accomplish the 80% initial target of less CO₂ emissions set in the initial plan (IFEU, 2003)

The district has been exceptional from a social standpoint too. Every effort was made for a balanced mix of residents to be established not just at a neighbourhood scale but also even more impressively at the scale of individual housing blocks. The residents of the owner-occupied properties were the first to move in, a decision taken by the Municipality intending to stabilise the neighbourhood's social structure. Since a balanced residential profile was a primary concern amongst the group of stakeholders,

the objective was to encourage the establishment of different social groups in the district. By promoting a variety of housing finance schemes and tenures the team of partners managed to successfully realise that vision. Approximately 10% of the units were destined for home ownership, while the other 90% were meant to cover the huge demands for rented accommodation in the area. Finally, grants and other financial incentives were used as motivators for the attraction and integration of disadvantaged groups, particularly elderly and disabled people, as well as ethnic minorities.

Furthermore, all the necessary public infrastructure amenities were developed concurrently with the construction of the housing to ensure that all the basic amenities would be available for the first residents. Infrastructure support for community development further included community rooms within each block, in addition to the necessary amenities (schools, kindergartens etc.), which were flexible enough to accommodate the different social and cultural needs of the diverse population. The community rooms mostly located on the ground floors of apartment blocks provided an opportunity for the tenants to socialize and to co-organise numerous activities and events. Moreover, the contribution of the prototype KROKUS centre has been of fundamental importance for the social cohesion of the neighbourhood, and for the education of both the practitioners in the field of the built environment that were involved in the project, and of the residents of the district, especially during the initial stages of development.

As the interviewees stated, environmental communications has been on-going even after the completion of the project, but in a more modest form. The KROKUS centre is still, however, a very important hub for the community, since it continues to administrate various cultural, social, and environmental events, and it continues to work in close collaboration with the locality.

From an operational perspective, cooperation between the partners was absolutely essential in the case of Kronsberg since the time schedule that had been set due to the forthcoming EXPO was particularly tight. The planning and development process was decentralised and interdisciplinary dialogue was facilitated under the supervision of

the City Council. The prevailing role of the Municipality as the general coordinator of the project allowed for the development of an effective monitoring mechanism, and ensured that the decision making process would embrace a bottom up approach. Numerous workshops and consultation meetings allowed for appropriate opportunities for the involvement of future residents in decision-making. The application of this participatory model resulted in better integration of the values and concerns of the future locality in decisions regarding the environmental, social and economic dimensions of the project. *“And it is only when the interplay of the components is coordinated over the long timescale of a project that the aims of the original empowering resolution can be achieved. This has been achieved at Kronsberg for a wide range of components of the new vision”* (Rumming, 2004).

One of the basic components of this vision was the scenario for the designing and shaping of the district along the lines of the sustainability agenda. Through the urban development and architectural design concept that was envisioned by the group of stakeholders, the urban landscape was guided through a compact, high density building form. This concept emphasized the beneficial qualities of open space, respected the adjacent countryside and agricultural land, and, therefore, succeeded in reconciling the competing philosophies of urban and countryside living.

In addition, the strict development contracts included regulatory measures for the ecological optimisation of all building structures. The Ecological optimisation of the building stock was not however the only environmental concern. The unavoidable damage to the natural landscape due to Greenfield development was compensated through tree planting, maximisation of the open space areas, maximisation of permeable surfaces and waste and water management strategies. Furthermore, the Environmental Impact Analysis (EIA) conducted prior to the development of the project, indicated that a semi-natural rainwater management system had to be developed in order for the flooding risk to be minimised, and that the flora and fauna species that were located at the south and southwest of the site had to be protected, as they were particularly sensitive to changes.

In addition to the adopted concerns above, the partners envisioned and delivered an environmentally responsible transport concept for the compact community. The tram line was extended to reach the new district and facilitated an easy connection with the city centre of Hannover in just 20 minutes. Further traffic calming measures were also taken, with 30-kph zones within the district, barriers in several spots, and a parking allowance of 0.8 parking spaces per apartment (usually the ratio is 1.0 per apartment). Although the remaining 0.2 parking spaces were allocated on the streets, the street landscape has remained an attractive public space for pedestrians and cyclists due to the traffic calming measures and the SUD system, which does not only accommodate a utility service, but it is also a luring aesthetical feature that encourages walkability.

Overall, the Kronsberg experience documented in this chapter highlights how the co-operation between the public and the private sectors can lead to innovative neighbourhood design solutions. More specifically, the project has indicated that a tight set of sustainability benchmarks clearly established from the initial stages of planning in detailed design plans and specific environmental indicators, can lead to the incorporation and testing of novel technological solutions and can eventually encourage progress in terms of sustainable neighbourhood development. Furthermore, the resident satisfaction survey combined with the interviews conducted for the purposes of this research have illustrated that the project has been successful both in terms of quality of life and loyalty to the original ambitious sustainability targets. Although some limitations were revealed (e.g. limited opportunities for economic development, failure of a number of public spaces, problems with sustainable technologies in building design) these are to some extent justified given the fact that Kronsberg was an experimental prototype. However, the on-going contributions of the KROKUS centre and KUKA, that encourage the participation of the local community and secure the Local Council's commitment, ensure the constant rethinking of sustainability concepts and assist in the effective resolution of any potential problems.

Chapter 10. The development of the checklist of criteria for successful urban development at the neighbourhood level

10.1 Introduction

The need for a holistic and integrated framework for sustainable development has been pinpointed by numerous researchers, institutes, and organizations (Brandon & Lombardi, 2011). According to Brandon and Lombardi, the more 'fuzzy' dimensions of sustainable development (political, cultural, aesthetic and so forth) are still poorly addressed in decision making, while contemporary analytical tools do not handle them adequately. The methods experience noticeable difficulties in dealing with the complexity of institutional structures and the range of stakeholder interests that this introduces into such assessment (Lombardi, 2001).

This chapter aims to describe the establishment of the checklist of criteria and evaluate its significance. The checklist specifically refers to the scale of the neighbourhood which is considered to be the ideal unit to assess or deliver sustainable development by combining physical (built environment) and social aspects. The matrix proposed, provides a generic set of targets and suggestions for action, for the delivery and assessment of sustainable development. Elements of success across different contexts (environmental, economic, social) have been consolidated into a single, overall matrix that refers to different stages of the urban development process (planning, implementation, monitoring). It is the starting point for a holistic appreciation of the subject of sustainable development by the local community and other stakeholders that are involved in the different stages of the decision-making, urban planning and building and cycle.

Instead of being prescriptive, the checklist aims at providing a ground for further discussion amongst the community and other partners. Its on-going assessment and refinement are unavoidable and necessary since local conditions differ from place to place, sustainable technologies are rapidly advancing, and national and international standards and regulations are continuously refined.

10.2 The checklist of criteria

This section of the thesis will discuss the formulation of the checklist of criteria and the development of a more elaborate matrix that breaks down the generic criteria into more tangible sub-criteria, specific methods and existing indicators when possible.

In the literature for the development of sustainability indicators two different approaches are identified: The 'top - down' approach, originating from the researchers' and the experts' initiative; and the 'bottom - up approach' which entails the participation of different stakeholders (Reed, Freser, & Dougill, 2006). The establishment of the matrix in this research has followed a top-down methodology; however, multi-stakeholder contribution in the evaluation of the guidelines proposed and in the improvement of the matrix is necessary to ensure its operability. Validation issues will be discussed in more detail in Section 10.4.

As a starting point for the development of the index, the researcher built upon contributions of previous research. In Chapter 2, the goals and objectives for sustainable development were analysed and several existing advanced toolkits for sustainability were examined. The review of relevant literature allowed for the identification of basic themes and objectives for sustainability and enabled the consequent compartmentalization of criteria under the themes identified.

Following the synthesis of baseline themes and criteria, the generic index was established and was used in the selection of appropriate projects to be used as case studies (Section 4.4). The index was then further informed and improved by the analysis and evaluation of the four projects conducted in Chapters 6, 7, 8, and 9. The thorough investigation of the four projects included a wide range of methods, such as the analysis of key project documentation, interviews with key stakeholders, as well as resident satisfaction surveys. This stage of analysis revealed further criteria, sub-criteria and methods that informed the initial checklist and allowed for the establishment of a matrix that holistically addresses sustainable neighbourhood development.

The matrix proposed is self-explanatory in the sense that each column provides a more detailed insight of the previous one. This allows for a holistic appreciation of each sub-theme, criterion, method, or indicator, and for an overall understanding of the decision-making process.

Firstly, the themes and the subsequent sub-themes make up the topmost and most generic level and have been validated by the 9 interviews with the key stakeholders that were involved in the projects investigated in this research. The five primary themes that emerged from the literature and the thematic analysis of the interviews are the following:

- **Design quality**
- **Mobility**
- **Ecological Optimisation**
- **Community**
- **Long-term Economic viability**

A sub-categorisation of the six themes in principal criteria follows in the matrix's third column (see table 71). Although the themes provide clear directions for the stakeholders involved in decision-making, they are far too generic to ensure tangible outcomes. In the matrix proposed, the 31 preliminary criteria provide an explanatory insight into the basic characteristics of the themes and give more specific directions for sustainable neighbourhood development.

The list of the preliminary criteria proposed follows below:

1. **Considering the local vernacular**
2. **Enhancing Aesthetical quality**
3. **Improving construction quality and efficiency**
4. **Providing Good space standards**
5. **Ensuring Flexible layout of properties**
6. **Providing privacy for users**
7. **Catering for indoor and outdoor comfort**
8. **Protecting and enhancing/creating the identity of the neighbourhood**
9. **Ensuring a balanced mixture of uses/boosting liveability**
10. **Providing adequate public infrastructure in close proximity**
11. **Defining the right density**

12. Defining **character areas**
13. Defining **hierarchy of streets**
14. Defining **building heights**
15. Defining **building types**
16. Devising a **public transport concept**
17. Creating **pedestrian paths and cyclist networks**
18. Taking into account **private vehicles**
19. Considering **energy efficiency at the building scale**
20. Considering **energy efficiency at the urban scale**
21. Devising a **water management concept**
22. Devising a **waste management concept**
23. Devising a **soil management concept**
24. Assessing and enhancing the **micro-climate of the neighbourhood**
25. Producing **low carbon food**
26. Enhancing **social diversity and balance**
27. Increasing **crime safety**
28. Increasing **social interaction, participation, and neighbourliness**
29. Providing **availability of information** for community and stakeholder groups to enhance consultation and encourage change of lifestyle
30. Creating **opportunities for employment**
31. Carefully **investigating the economic viability of the project**
32. Encouraging **“green” practices** for all sectors of economy

The third column equals a third level of understanding and enumerates the list of 44 secondary criteria. This secondary segregation provides a more detailed guidance for decision-making and policy formulation. The criteria included in this list have derived from a rigorous thematic analysis of the interview data collected from the four case studies (Appendix 2) and they convey further clarity in regards to essential components for successful sustainable neighbourhood development.

The fourth column suggests a range of methods that can be used to achieve each criterion. The corresponding methods enumerated in the fourth column are mere suggestions based on the individual projects that were investigated for the purposes of this research. However, the methods enumerated do not cover every possible scenario available, but provide a basis of reference for the stakeholders. Alternative

paths are available but could not all be exhausted in a single matrix. Consequently, this particular column can be prone to many modifications or additions, as long as the stakeholders involved decide so.

The last column aims at benchmarking the effects of the methods chosen and at measuring the progress of a project towards sustainability. The literature has explicitly shown the need for measurable figures that assist in catalysing the required actions and provide a basis for comparison between different projects. Most of the indicators proposed in the matrix are based on the work of other researchers, while a few have been suggested by the author. In some cases, criteria could not be expressed in quantitative terms. For instance, the assessment of variables qualitative in essence such as “the attractiveness of a pedestrian route” or “the identity of a place” is complicated and subjective and the only way to obtain data on the progress towards success is by conducting resident or user surveys. A more detailed discussion on that subject follows in Section 11.3.

Theme	Sub-theme	Principal Criteria	Secondary Criteria	Methods	Indicators	
DESIGN QUALITY (design code)	Architectural Quality	Considering the local vernacular	Drawing inspiration from traditional styles and features	Using local materials or evolving the traditional styles and features into more contemporary forms	Not measurable	
		Enhancing Aesthetical quality	Enhancing diversity	Division of land into small plots to enable the Involvement of different developers and architects	Not measurable	
			Considering attractive views	Enable visual interaction with the attractive outdoor spaces	Not measurable	
	Improving construction quality & efficiency	Using Modern Methods of Construction for quick delivery, low environmental impact and lower defects		Offsite solutions with special focus on kitchens, bathrooms, external walls, timber frame structures and roofs (Pan, Gibb, & Dainty, 2007)	Performing regular assessments	Not measurable

		Providing good space standards	Indoor space standards should ensure functionality	Large kitchens to allow for space for appliances Large bedrooms with space for private study Ample storage space (depending upon number of beds)	Use Lifetime Homes Criteria
DESIGN QUALITY (design code)	Architectural quality	Ensuring flexible layout of properties	Adaptability to new technologies	E.g. Instalment of openings (doors, windows) to ensure less heat losses	Use: Lifetime Homes Criteria
			Adaptability to different user's needs	E.g. Admit more light.	
			Adaptability to changing circumstances	E.g. Future alterations to be facilitated on building's basic components (roof, façade).	
		Providing user privacy	Provide public, private & guest rooms to meet the religious/cultural needs of the future or current occupiers	Public territories/private territories within the house/apartment (Martsin & Niit, 2005) Avoid excessive overlooking	Not measurable
		Catering for indoor & outdoor comfort	Provide occupants with control over their environment	E.g. 'Openable' windows, movable shades, overrides on the building management system (Ritchie & Thomas, 2009) Natural lighting, artificial lighting, mechanical & natural ventilation, thermal comfort, acoustics.	Winter temperatures: 20-23.5 °C Summer temperatures: 23-26 °C Use: ASHRAE international standards for minimum performance (ASHRAE, 2010)
		Providing a small private (communal for a block of flats) piece of land for recreational activities	Slightly increasing densities can allow for space for gardens, conservatories or communal yards	Use: BREEAM (BREEAM, 2008), LEED (USGBC, 2009) assessments & accreditation	
	Urban design quality	Protecting/enhancing/creating the neighbourhood identity	Preserving the historically or architecturally important urban heritage	Creating landmark buildings and distinctive neighbourhood elements Preserve the existing land form Naming the neighbourhood and its elements(streets, squares, parks)	Not measurable

				Identifying existing spatial elements with a function, name, or appearance that contributes to the local distinctiveness	
DESIGN QUALITY (design code)	Urban design quality	Ensuring a balanced mixture of uses/boosting liveability	Reducing journey lengths by mixing common uses vertically and horizontally	Including retail, leisure, residential, work spaces and services in the masterplan within a 2km distance from people's homes.	Allotments within 300m RAD Local centre within 800m RAD Primary school & surgery within 1km RAD (Barton, Grant, & Guise, 2010)
		Providing public infrastructure in close proximity	Stimulating the formulation of social groups & networks	Providing Community spaces to meet the needs of a diverse population	Toddler's play area & local shops within 200m RAD Playground within 400m RAD Local centre, neighbourhood hall, kindergarten & social facilities within 800m RAD (Barton, Grant, & Guise, 2010)
		Defining the right density	Considering the critical mass for a district energy system to be developed Considering the critical mass for an efficient public transport scheme to be established.	Relatively dense agglomerations that contribute positively to lower energy demand, and lower transport cost (Gordon, 2008) Higher densities along the high street, and lower closer to the green space	50 DPH or 100-120 PPH ²² (Barton, Grant, & Guise, 2010)

²² This is a fair average density according to Barton while densities above 70DPH are not appropriate since the need for other uses such as schools increases

MOBILITY		Defining character areas	Defining the location of the neighbourhood centre, neighbourhood boundaries etc	Creating a distinctive character for each area through urban design and architectural interventions	Not measurable
		Defining hierarchy of streets	Creating a variety of street types, not only to meet the needs of vehicles, but to meet the needs of the pedestrians and children that play	Main street, avenue, boulevard, high street etc.	Not measurable
	Urban Design Quality	Defining building heights	Considering character areas, landscape conditions, proximity to public transport stops etc.	Varying building heights according to the aforementioned	Varying according to location
		Defining building types	Considering local conditions, traditional practice, character areas	Apartment blocks, terraces, townhouses etc.	% of buildings of each type(author)
	Accessibility & environmentally sound modes	Devising a public transport concept	Giving preference for more environmentally sound transport solutions	Light rail & rail networks when funding, urban topology, and population densities permit it.	Number of public transport routes to local centre within 10' journey (Kim, 2002)
			Ensuring the Efficiency of the transport solution proposed	Frequent Bus and tram services Buses run along high speed lanes High quality designs of buses and bus stops make them more attractive to users	

		Creating pedestrian paths & cyclist networks	Considering safety issues in mixed use areas ²³	<p>Ease of access with small block sizes, no obstacles & interaction with cars being carefully considered</p> <p>Subways to be avoided or to be carefully designed</p> <p>Adequate lighting</p> <p>Keep up sidewalks and eliminate sidewalk obstruction</p> <p>Incorporate route information into standard road signage boards</p> <p>Traffic control devices(traffic lights, roadway signs etc)</p> <p>Traffic calming measures</p> <p>Safety education campaigns (Loukaitou-Sideris, 2006)</p>	% of public transport routes dedicated to non-car use within the neighbourhood (Kim, 2002)
MOBILITY	Accessibility & environmentally sound modes	Creating pedestrian paths & cyclist networks	Creating Attractive cyclist and pedestrian routes	<p>Benches and seating spots where pedestrians can rest</p> <p>Providing cyclist parking spaces</p> <p>Artwork</p> <p>Routes aesthetically pleasing along attractive landscapes</p> <p>Routes passing through vibrant places that increase social interaction (Brown, Werner, Amburgey, & Szalay, 2007)</p>	Not measurable
		Taking into account private vehicles	Minimising car use if local conditions allow	<p>Discouraging through traffic</p> <p>Car Sharing Clubs</p>	<p>% of residents owning a car(resident survey)</p> <p>Frequency of car use (resident survey)</p>
		Encourage the acquiring of more environmentally friendly vehicles	Electric vehicle charging stations and power sockets on external dwelling walls	Not Measurable. (Depends on demand)	

²³ According to G. Cho *et al.* perceived risk of accidents is more prominent in low density residential areas while the actual risk is higher in mixed use areas (Cho, Rodriguez, & Khattak, 2009)

			Cater for the car users	Provide adequate parking spaces	Parking spaces per dwelling ²⁴	
ECOLOGICAL OPTIMISATION	EIA: Compensating for the environmental damage from construction Protecting & enhancing the local environmental capital	Considering Energy Efficiency at the Building scale	Bioclimatic design	Low energy standards	BREEAM standards	
				Exploiting the benefits of passive solar gain (e.g. South facing facades) Reduce the demand for fueling, maximize daylight	% of dwelling units with good solar orientation (Kim, 2002)	
				Insulation, good sealing, and double or triple glazing	National standards depending on local climatic conditions	
				Use of passive energy sources (solar thermal panels, solar electric 'photovoltaic' panels, wind turbines, ground source heat pumps)	% of reduction of energy consumption for a typical dwelling within the neighbourhood (Kim, 2002)	
ECOLOGICAL OPTIMISATION	EIA: Compensating for the environmental damage from construction Protecting & enhancing the local environmental capital	Considering Energy Efficiency at the Building scale	Responsible use of materials	Local sourcing if possible	% of building materials locally sourced (author)	
				Recyclable materials to be fed back to the materials cycle	% of materials recycled per household (author)	
				Use of ecological materials:	0% harmful substances ²⁵ & 0% tropical timber.	
			Considering Energy Efficiency at the Urban scale	District heating provision when critical mass is existent	Combined Heat and Power Plant (every 8 blocks in Kronsberg)	% of buildings connected to a CHP/district energy system (Kim, 2002)
				Urban form to be designed according to the sun's path	Preference for east-west street patterns to maximise solar gain	% of dwelling units with good solar orientation (Kim, 2002)
				Passive energy sources to be exploited, according to location	Use of Solar/water/wind power or biomass wastes, earth energy systems	% of electricity production from alternative sources (Kim, 2002)

²⁴ 1.5 parking spaces per dwelling (UK policy) for residential areas may be adequate for two bedroom properties, but should be increased for 4 or 5 bedroom ones (Stubbs, 2002)

²⁵ For instance: Chemical wood preservatives, asbestos, PVBs/PCPs, lindane, paints & varnishes with solvent (Schottkowski-Bahre, 2000).

ENVIRONMENTAL PERFORMANCE OPTIMISATION

	Devising a Water Management concept	Water management at the building scale	Water Infiltration: permeable pavings, green/brown roofs	% of reduction of water consumption (Kim, 2002)	
			Rainwater Harvesting: water butts in gardens		
		Water management at the urban scale	Water Infiltration through Permeable pavings, green spaces, SUDS		
	Devising a Waste management concept	Construction waste	Low waste building methods	% of construction waste that was recycled (Kim, 2002)	
			Preference for materials delivered with limited packaging		
		Domestic waste	Waste sorting in flats	% of domestic waste that is recycled (author)	
			Community & individual waste bins		
	Community & individual composting				
	Community recyclables collection point	1 every 400 residents (Schottkowski-Bahre, 2000)			
EIA: Compensating for the environmental damage from construction	Devising a Soil management concept	Reusing soil	Excavated soil from foundations to be remediated if contaminated and reused on site for landscaping or for raising ground levels as part of construction	% of excavated soil that was reused within 4km of its original location	
	Protecting & enhancing the local environmental capital	Assessing and enhancing the micro-climate of the neighbourhood	Ambient temperature to be or become more temperate	Biodiversity assessment frameworks & systems of indicators (Slootweg, 2005)	
			Wind turbulence to be considered,		Tree survey/Habitat survey
			Local biodiversity to be enhanced		Tree planting along streets and vegetation in parks and open spaces
		Air pollution to be minimised	Water features that minimize the heat island effect	% of land with significant habitat value (Kim, 2002)	
Producing Low Carbon Food	Encouraging local food production and supply networks		E.g. Internet deliveries	% of food consumed locally that is also produced locally (author)	
		Making local food competable in the wider food market	E.g. Cooperation with local farm		
			E.g. Local grocery stores should distribute fresh food		

COMMUNITY	Equity	Enhancing Social Diversity and Balance	Attracting various population groups to the area ²⁶ to maintain a social balance	Provide a mixture of housing sizes, tenures and affordability levels	Number of housing types by habitable room (Kim, 2002)
				Making accommodation handicap-accessible	
			Discouraging the formulation of housing ghettos	Social housing to be indistinguishable from the rest of the housing stock and pepper-potted in the site	Groups of 3-4 units can work well (Barton, Grant, & Guise, 2010)
	Sense of Safety	Increasing crime safety	Maximising natural surveillance	Create diverse and active frontages to attract people at all times of day	% of residents that feel safe (author)
	Empowerment	Increasing social interaction, participation & neighbourliness	Formalising the role of the Community Forum to increase local debate & inclusive, bottom up neighbourhood governance	Community/Stakeholder Group initiatives for the organisation of workshops, meetings, referendums or web votes.	% of residents that regularly engage with community events (author)
COMMUNITY	Education	Providing availability of information ²⁷	Ensuring availability of data ²⁸ to enhance consultation and encourage change of lifestyle	IT: Detailed databases using local information to increase awareness & educate	Not measurable
LONG-TERM ECONOMIC VIABILITY	Income Prosperity	Creating opportunities for employment	Maximise opportunities for employment for local full-time, & part-time job seekers to reduce journeys from home to work	Live/work units create opportunities to attract companies, retail & leisure within the neighbourhood	Job/housing ratio within the neighbourhood (Kim, 2002)
				Local applicants to be preferred by local employers	% of residents that work in the neighbourhood or district (author)

²⁶ Different income levels, different housing needs, different cultures

²⁷ Information should be accessible by the community, stakeholder groups, property owners, landlords, caretakers, architects, engineers and craftsmen

²⁸ Data is referring to air quality, energy stores, security, the electricity production of the residents' PV panels, their energy consumption etc. (Ritchie & Thomas, 2009)

Profitability of investment	Carefully investigating the economic viability of the project	Ensuring the project is a sound investment for the developer, land owner & commercial partners	Exploit subsidies Regeneration funding in downgraded, low market areas Invest in public realm	% of vacant commercial spaces 2 months after project completion (author)
		Ensuring the project provides good investment opportunities for the property buyers	Effective marketing strategy tailored to the specific local context	% of vacant dwellings 2 months after project completion (author)
Development of Green Businesses	Encouraging green practices for all sectors of economy	Educate upon the use of renewable energy, recycling, low energy transport of goods, low emission production & manufacturing methods	Workshops & seminars organized by the local council, the Neighbourhood forum, or voluntary organisations	% of Green Businesses in the area (author)

Table 72: The checklist of criteria for success

10.3 Strengths and weaknesses

As Gahin *et al.* suggest that “indicators cannot accomplish, nor are they intended to accomplish, all of the change that is desired” (Gahin, Veleva, & Hart, 2003). On the other hand it is widely recognised that they are very successful in optimizing implementation and dissemination by making it possible to identify not only progress, but also problematic developments. Their use is beneficial for all stakeholders involved because to some extent they ratio—nalise the complexities of the multi-disciplinary field of the built environment.

Furthermore, quantitative indicators provide a valuable source of data about several components of a sustainable neighbourhood and as such they offer the possibility for comparisons to be drawn between different projects. The prerequisite for this however, is the use of a common set of indicators nationally, or even internationally, otherwise valid conclusions cannot be drawn. The selection of indicators in the matrix

suggested has been based on what is currently used in common practice and on the suggestions of the research community. However, the selection of the right indicators should be a matter of international debate and institutional assessment (Deakin, Huovila, Rao, Sunikka, & Vreeker, 2002). Validation from various educational and research institutions and empirical testing should therefore take place before such a matrix starts to be seen as a standard component of the national planning regulations.

Regarding the usability of the matrix, although it incorporates all aspects of sustainability that emerged from the data analysis and literature review, it does not aim to be exhaustive or prescriptive. The complexities of the field of the built environment as well as the risk of oversimplification when trying to incorporate all aspects of sustainable development in a single matrix should be taken into account. In order to overcome the aforesaid risks and difficulties, the creative insight of all stakeholders and the expert input of the practitioners involved should be sought from the very initial stages of the planning of any project.

As far as the non-measurable elements of sustainable development are concerned, it is the author's suggestion that surveys of representative samples should be carried out by means of the most cost effective way.

There are various benefits in researching resident experience and satisfaction. Firstly, it reduces guesswork in the development of more responsive services to the members of the community. Secondly, it is a process that empowers the community and builds a relationship of trust between the locality, the council and the stakeholder group involved in the project. As literature and Local Governments throughout Europe acknowledge, community empowerment and citizen participation in decision making are central in any sustainable development initiative. It is, consequently, important for the local councils to devote the necessary personnel and financial resources required for such a vital process to become part of the standard practice.

The author suggests that a preliminary household survey should be carried out six months after the completion of any urban intervention, while community satisfaction surveys should be conducted on an annual basis.

Postal questionnaires or telephone interviews are very effective methods and provide valuable data from which valid conclusions can be drawn. This research has indicated that amongst important issues that need to be addressed are the different satisfaction levels of the community with regard to issues concerning their quality of life and physical aspects of their neighbourhood and home. Also, in cases of urban regeneration or brownfield developments, surveys should be designed to collect complementary data that refer to the community's evaluation of the current condition, and suggestions for the improvement of the neighbourhood. Finally, the lack of demographic data that pertain to the neighbourhood scale, identified in this research, both in the cases of Germany and the UK, implies the need for such data to become available. It would therefore be useful for every household survey to involve questions that relate to the demographics of the neighbourhood so that levels of satisfaction or dissatisfaction can be related to variables such as age, income and gender.

In the UK, a body that could be assigned the task could be the Local Government Association which already conducts quarterly public polls on resident satisfaction with local councils (Local Government Association, 2014). The organisation collaborates with most of English and Welsh councils and one of its primary aims is local economic growth, jobs and housing. LGA could also collaborate with universities throughout the country. This would be a cost-effective way of carrying out the surveys and it would concurrently serve as an opportunity for students to undertake practical training in various research activities.

10.4 Modifications of the checklist

As was explained before, the flexibility of the matrix is of paramount significance. Unavoidably, the matrix proposed will undergo changes mainly in the methods and indicators suggested.

One of the methods chosen for the validation of the checklist for the purposes of this study is the validation through experts' input – in that case by the individuals that were interviewed. The matrix was distributed to the interviewees electronically, and their feedback was requested on the results presented. Unfortunately only one out of 9 participants responded with feedback and addressed the following points:

- a) The list of public infrastructure amenities should be expanded to include kindergartens and social facilities.
- b) Under the criterion "Creating attractive pedestrian and cyclist routes", the method "Incorporate route information into standard road signage boards" should be added.
- c) The list of criteria under the theme "enhancing social diversity" should be expanded to include making accommodation handicap-accessible
- d) Under the theme "Profitability of investment" the marketing strategy the team of partners should follow should be tailored to the context of the specific location where the scheme is being developed and is also dependent on which part of the population the partners are interested in attracting.
- e) Finally, Interviewee I suggested that workshops and information sharing should be expanded to include owners, landlords, caretakers, architects, engineers and craftsmen.

The comments and suggestions on the adequacy and suitability of the system of criteria were taken into account, and the matrix was modified accordingly.

Improved usability and adoption of the matrix can be further achieved through its testing on different contexts. The scope for the adaptation of the secondary criteria, methods, and indicators, is a matter that needs to be discussed amongst the group of stakeholders. Further modifications shall involve the addition of more specific goals

and criteria, depending on funding opportunities, local conditions, different priorities, needs and so forth. It is however important that these modifications are matters of mutual consensus between the team of partners for the best outcomes to be achieved. Different approaches and perspectives will therefore be particularly relevant at that stage, since the input of diverse disciplines and stakeholders is necessary for all aspects of sustainability to be addressed holistically.

Given the time and financial constraints of a PhD project, the testing of the matrix on a real life project was not an achievable goal. A cross-comparative analysis of the four projects that follows in Chapter 11 will, however, test its usability, and will provide evidence that it can function as an assessment tool for a small scale sustainable development project.

Nonetheless, it is within the author's intentions that the matrix is eventually tested on a real urban development project.

10.5 The applicability of the checklist in different settings and contexts

Although checklists are helpful instruments that envisage sustainability and define it in quantitative and qualitative terms, flexibility is critical. All individuals interviewed for the purposes of this study agreed on that issue which has also been highlighted by a great number of researchers (Brandon & Lombardi, 2011). The field of the built environment is a multi – disciplinary one, and as such, it is constantly evolving and incorporating different perspectives. Correspondingly, a matrix such as the one suggested in this thesis should be adaptable to what new research indicates in the different relevant fields of practice and to what new sustainable technologies have to offer. It should be dynamic, constantly adjusting, and periodically reviewed and refined. Metrics should in all cases be endorsed by shared learning between researchers, key stakeholders, and the local community, and the methodology should be evolving as each project progresses.

Furthermore the research has shown that methods aiming at enhancing environmental sustainability and ecological optimisation should be above all adaptable to the local landscape and climatic conditions. For instance the instalment of wind turbines might

be the suitable solution in a certain location, but this might not be the case somewhere else. Hence common sense and resourceful thinking should be exercised alongside checklists while the utilization of innovative sustainable technologies should be done with great care.

The applicability of the checklist also depends to the highest degree on the level of the residents' awareness and knowledge on sustainability issues. Since the process involves a great deal of community contribution and action, information and public awareness are necessary to mobilise action. Only when collaboration and openness to small ideas is the case, an agreement on a framework for sustainable development can be meaningful and easily reached. As we have seen in the case of Vauban, the citizens had a significant contribution to the development of the scheme, but hadn't it been for the unique political culture of the community, and most importantly for the variety of workshops, seminars and meetings that were organized by the local council, the achievement of the ambitious aims wouldn't have been possible.

Consequently, it needs to be highlighted that the adequate briefing of all stakeholders and their familiarization with the specialised vocabulary should be preceding any decision-making workshops or meetings, otherwise, the applicability of the matrix will be compromised.

10.6 Summary

This section of the thesis describes in detail the methodology employed for the development of a matrix of criteria for sustainable development at the neighbourhood scale and evaluates its significance.

The present chapter explains how the baseline themes and criteria deriving from existing literature were drawn together in Chapter 2 to populate a generic index of criteria for sustainable development. This index was further informed by the analysis of the case studies conducted in Chapters 6, 7, 8 and 9 which allowed for the final matrix for sustainable neighbourhood development to be generated and presented in Section 10.2.

In the discussion that followed about its strengths and weaknesses, the following points emerged:

1. The matrix rationalises the complexities of the built environment field
2. The association of some of the criteria with commonly used indicators enables the quantitative assessment of progress and success
3. Its quantitative qualities offer possibilities for comparison between different projects
4. The lack of commonly used indicators for the non-measurable elements of the matrix (e.g. enhancing aesthetical quality/protecting the identity of the neighbourhood) can be substituted by data extracted from community evaluation surveys
5. The checklist is not meant to be exhaustive but it is meant to be used alongside common sense in a flexible manner that allows for expert/key stakeholder and public input to be utilised in the different stages of planning and implementation of a project

In Section 10.4, validation was sought through experts' input and the matrix was sent to the interviewees for feedback.

Their comments and suggestions were taken into account and the matrix was modified accordingly. However, the low response rate revealed the need for further validation, an issue that has been considered in Chapter 11 that follows.

Finally, in Section 10.5, a number of factors that affect the applicability of the matrix in different settings and contexts were highlighted and have been listed below.

1. The matrix has to be flexible enough to accommodate novel research findings and progress in sustainable technologies and has to be constantly reviewed and revised.
2. In terms of enhancing environmental sustainability and ecological optimisation, the methods included in the matrix have to be adaptable to the local landscape and climatic conditions

3. As public involvement is focal to the effective utilisation of the matrix suggested, resident awareness on sustainability issues and collaboration between the public, the key stakeholders and the local community is of fundamental importance.

In the chapter that follows, a cross-comparative analysis of the four projects' performance towards sustainability is conducted. This process is meant to test the usability of the matrix developed and to identify driving forces that affect differences in progress towards sustainability.

Chapter 11. A cross comparative analysis of the four case studies

11.1 Introduction

In this chapter, a cross comparative analysis of the four case studies will be conducted. Their relative levels of performance towards sustainability will be analysed, factors affecting performance will be identified, and key lessons for future sustainable neighbourhood development will be considered.

This cross-comparative exercise is also meant to test the usability of the checklist to validate its functionality as an assessment tool for sustainable development initiatives.

The method that has been used to evaluate the numerous tangible and intangible elements of sustainable development is the Analytic Hierarchy Process (AHP). This method enables multi-criteria evaluation, which is very suitable for the assessment of sustainable development initiatives (Hai-yang & Fang, 2009).

The AHP is a Multiple Criteria Decision Making (MCDM) method, first developed by Thomas L. Saaty. It allows for the synthesizing of different measurement scales that pertain to multiple criteria, to eventually obtain an overall relative scale (Saaty, 2004).

There is a plethora of MCDA methods available, namely PROMETHEE, TOPSIS or other platforms that combine several methods such as DECERNS (Ishizaka & Nemery, 2013). They differ on the basis of the philosophy underpinning them, the types of problems they focus on, or on the basis of the desired outcomes they aim at achieving. AHP has been chosen as the preferred method for this research on the basis of the output sought. Unlike the rest of the methods available that focus on choice, description or sorting of variables, AHP enables the ranking of the different criteria that will allow for a quantitative assessment of the projects to be conducted in 11.3.

AHP rationalises the complexity of thinking and making judgements for the assessment of a domain that incorporates diverse components. In comparison to other MCDM methods, AHP has the competitive advantage of providing a hierarchical decision – making structure for the solution of a multifaceted problem while it provides a calculus for the weighted – factor procedure which gauges consistency (Banai, 2005).

In addition, *'AHP has an excellent performance in dealing with interdependent criteria and the local problems involving both quantitative and qualitative issues'* (Lee & Chan, 2008). It has been discussed in previous chapters that the vast majority of the checklists and sets of indicators used nowadays to assess sustainability mostly focus on the quantifiable aspects, and fail to recognize the importance of subjective features and human aspects (Lee & Chan, 2008). AHP is very suitable for simplifying complex problems, in which intangible and tangible factors cannot be separated, and is also flexible enough to allow for revisions. Based on the aforementioned, this particular method is appropriate to use for the assessment of sustainable development problems, where qualitative and quantitative aspects have to be addressed.

The novelty of the approach in this research is the utilisation of the AHP method in decision making for sustainable neighbourhood development. In the following section the AHP is applied on the assessment of the sustainability progress of the four projects and on the comparison of their tangible and intangible characteristics, in a mathematically grounded, robust manner.

It was previously suggested that this process is also a validation of the matrix proposed and it has, as it has validated its functionality. The author acknowledges that the weighing of the criteria was based on a biased evaluation of pair-wise comparisons; however, the prioritisation of the criteria has not informed the matrix proposed in Section 10.2. On the contrary, the purpose of this exercise is to test the usability of the matrix as a tool as well as to demonstrate how the AHP method can be used by decision-makers to assign top and least priorities and to assess progress.

11.2 Methodology

Using AHP-specific software (Expert Choice 2000), pairwise comparisons were carried out on the criteria level to indirectly assign a specific value to each criterion. Expert Choice is widely used decision support software, co-developed by the originator of AHP (Saaty), which is easy to use, both in individual, as well as in group, multi-criteria evaluation (Banai, 2005).

The comparison process followed the hierarchical structure of the checklist (see Section 10.2) where sets of criteria have been grouped under certain sub-themes. The criteria forming each group were compared pairwise with respect to their relative importance towards each sub-theme, belonging to the previous level of hierarchy, as shown in Figure 14.

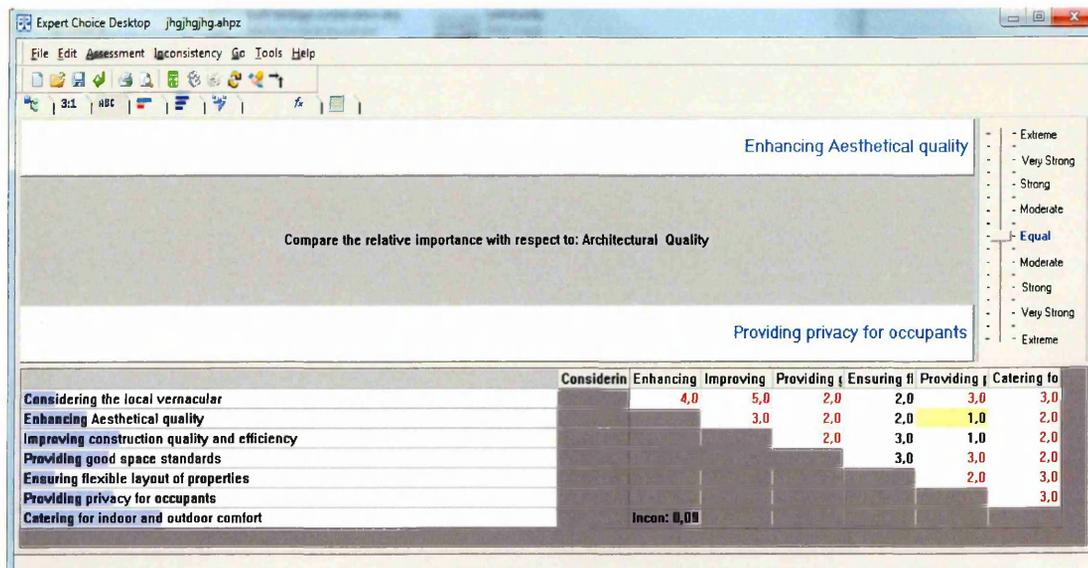


Figure 14: Pairwise comparison of criteria

The pairwise comparison then becomes very simple as the expert is in a position to indicate how much more important a particular criterion may be compared with another, with respect to the general theme. For instance, for the assessment criteria “enhancing aesthetical quality” and “providing privacy for the occupants”, the question that has to be answered is the following: What is the importance of enhancing aesthetical quality over providing privacy for the occupants with respect to architectural quality? The nine point preference scale used to answer those questions, and therefore compare the different criteria, is based on Table 73, which shows the fundamental scale of absolute numbers according to Saaty (Saaty, 2004).

1	Equal importance
2	Weak or slight importance
3	Moderate importance
4	Moderate plus importance
5	Strong importance

6	Strong plus importance
7	Very strong or demonstrated importance
8	Very, very strong importance
9	Extreme importance

Table 73: Saaty's fundamental scale of absolute numbers

As per the scale of absolute numbers illustrated on the table above, the numerical values assigned to each criterion will be defined in terms of similarity or equivalence. The evaluation then ranges from 1, indicating equal significance, to 9, when one criterion is of extreme importance in comparison to the other one, with respect to the overall goal. In other words, instead of assigning numbers ($W_1...W_n$) to the different criteria ($C_1...C_n$), we assign a number to represent the ratio $(W_i/w_j) / 1$ (Saaty, 2004). The derived scale will eventually reveal what W_i and W_j are.

For instance, the relative importance of the criteria that pertain to the domain Architectural Quality was calculated based on the judgement matrix below (Table 74), where $C_1...C_7$ are the shortlisted criteria and $W_1...W_9$ are the estimated weights using the relative comparison method.

	C1	C2	C3	C4	C5	C6	C7
C1	W_1/W_1	W_1/W_2	W_1/W_3	W_1/W_4	W_1/W_5	W_1/W_6	W_1/W_7
C2	W_2/W_1	W_2/W_2	W_2/W_3	W_2/W_4	W_2/W_5	W_2/W_6	W_2/W_7
C3	W_3/W_1	W_3/W_2	W_3/W_3	W_3/W_4	W_3/W_5	W_3/W_6	W_3/W_7
C4	W_4/W_1	W_4/W_2	W_4/W_3	W_4/W_4	W_4/W_5	W_4/W_6	W_4/W_7
C5	W_5/W_1	W_5/W_2	W_5/W_3	W_5/W_4	W_5/W_5	W_5/W_6	W_5/W_7
C6	W_6/W_1	W_6/W_2	W_6/W_3	W_6/W_4	W_6/W_5	W_6/W_6	W_6/W_7
C7	W_7/W_1	W_7/W_2	W_7/W_3	W_7/W_4	W_7/W_5	W_7/W_6	W_7/W_7

Table 74: The judgement matrix

The assigning of numerical values for the relative importance of the criteria according to the expert's judgement, leads to the system of equations below, the solving of which will eventually reveal the value for w, as per $w = (w_1, \dots, w_n)$.

$$AW = \begin{bmatrix} w_1/w_1 & w_1/w_2 & \dots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \dots & w_2/w_n \\ \vdots & \vdots & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \dots & w_n/w_n \end{bmatrix} \cdot \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix} = n \cdot \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix} = nW$$

Figure 15: System of linear equations for the value of w (Saaty, 2004)

The solving of this homogenous system of linear equations assists in finding the value for w. In mathematical terms, the eigenvector and the maximum eigenvalue is calculated using the equation $AW = nW$ where A is the pairwise comparison matrix, n is the largest eigenvalue of A, and w is the column vector of the comparative weightings of the criteria. Finally, the synthesised eigenvector provides a universal priority order for each criterion.

The benefits of organising the criteria in the hierarchical system proposed by Saaty are numerous. Firstly, this classification simplifies the complex relationships between the criteria and sub-criteria, secondly, it illustrates the influence that each sub-criterion has on the general criteria, and finally, it simplifies the process of making judgements for the stakeholders, as it measures the effect alternative solutions have on the problem.

In this study, the criteria for sustainable development at the neighbourhood scale were proposed based on an in-depth literature review and on a detailed investigation of four case studies, and have explicitly been discussed in Chapter 10. Ideally, experts that were involved in the decision-making process of the projects should have decided the weighting of the different criteria. However, due to time constraints, the weighting was conducted by the researcher using Saaty's 9-point scale (Saaty, 2004), and considering the facts and findings from the investigation of the four case studies, and the literature review (Appendix 3). The results from the pairwise comparison were imported into *Expert Choice* and the weights were then calculated. The resultant weights of the 32 sustainability criteria are displayed in Figure 16:

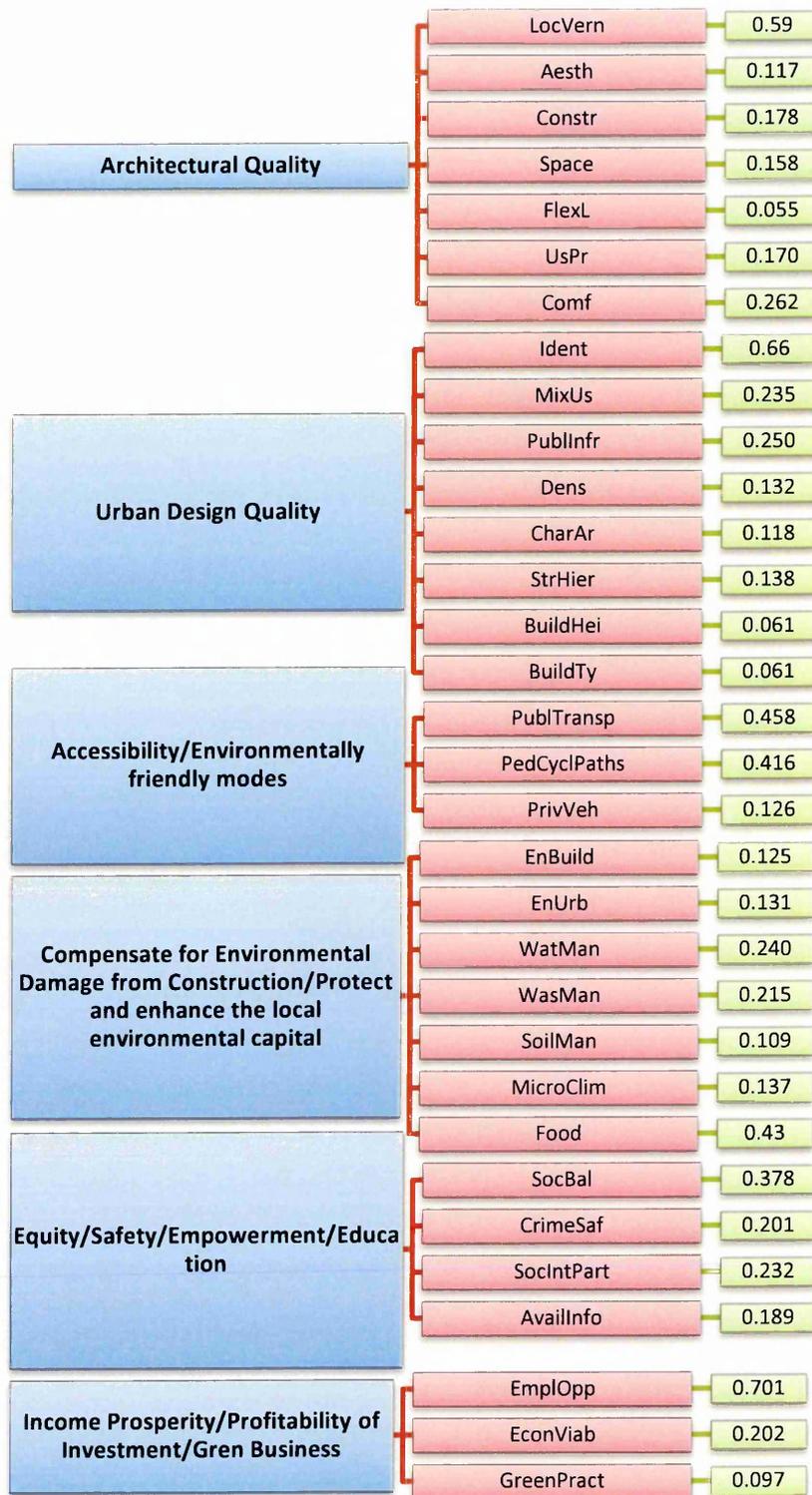


Figure 16: The weights of the sustainability criteria (Author, 2013)

Following the calculation of the levels of significance of the different criteria, the performance of the projects with respect to each criterion was assessed. For the purposes of this task, a three point ranking scale ²⁹was introduced, where 0=not met, 1=met to some extent, 2=fully met. The resulting figures were then multiplied by the rate of significance of each criterion and the final score was calculated and converted on a ratio scale bounded by 0 and 100.

There are various benefits associated with the use of the AHP method. The process has not only allowed for the assessment of urban projects in terms of sustainability, but it has also facilitated the comparison of different projects of a similar scale. It is furthermore particularly flexible in the sense that it can be used multiple times during the development of a project, to review how progress in each criterion affects the global weights and the overall score. In other words, it can be utilised to determine how alternative strategies employed to satisfy each criterion affect the overall performance of the project. Moreover, in the likelihood of different priorities set in a certain locality, other criteria may be added, and the AHP can be used again to recalculate the weights of the new set of sustainability criteria.

For the purposes of this study, the four projects have been rated by the researcher to firstly facilitate the cross-case analysis conducted in this chapter and secondly to provide an indication of how the AHP method can be utilised in the process of assessing the success a neighbourhood project in terms of sustainability. In real life projects, the rating can be conducted by any group of stakeholders and, depending on the outcomes, alternative criteria, methods and actions can be introduced. This process of making suggestions, taking actions, and then using the AHP method to evaluate the outcomes can be on-going and can be repeated many in the lifetime of the project to assess its success at any given time.

29 The three-point scale was deemed more appropriate instead of a 5-9-point Likert scale as the outcome we are focusing on is a rough comparison between the projects to provide a quantitative input in the cross-case analysis conducted in this chapter. A 5-9-point scale of a more sensitive nature would potentially prove problematic as justifying the scale point descriptions would require robust quantitative evidence for each of the criteria selected. Due to the subjective nature of any type of rating scale, a very sensitive one, comprising of a large number of points could lead to errors or inconsistencies.

In the following section, the four projects' level of performance in terms of sustainability will be displayed in tables and the results will be discussed.

11.3 The four projects' level of performance towards sustainability

UPTON: ARCHITECTURAL QUALITY

As was discussed in Chapter 7, the design code played a very important role for the Upton project. Consequently, the project was assigned a high score in the architectural and urban design quality domains. All criteria have been met, so a value of 2 was awarded for the partner's sensitivity in preserving elements of the town's local character, for the diverse aesthetical result that stemmed from the involvement of various developers and for promoting the use of MMC. In addition the statistical analysis revealed the resident's satisfaction with privacy and space, as well as their moderate satisfaction with the issue of flexibility. Therefore, the values of 2, 2 and 1 were awarded accordingly.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality	Architectural Quality(10)	Considering the local vernacular (0.59)	Drawing inspiration from traditional styles and features	2
		Enhancing Aesthetical quality (1.17)	Enhancing diversity	2
			Considering attractive views	
		Improving construction quality and efficiency (1.78)	Using Modern Methods of Construction for quick delivery, low environmental impact and lower defects	2
		Providing Good space standards(1.58)		2
		Ensuring Flexible layout of properties (0.55)	Considering Adaptability to new technologies, different user's needs and different circumstances	1
		Providing privacy for users (1.7)	Provide public, private, and guest rooms to meet the religious and cultural needs of the future or current occupiers	2

	Catering for indoor and outdoor comfort (2.62)	Provide occupants with control over their environment (openable windows, movable shades, overrides on the building management system) (Ritchie & Thomas, 2009)	2
		Providing a small private (or communal for a block of flats) piece of land for recreational activities	

Table 75: Architectural design quality assessment of Upton

URBAN DESIGN QUALITY

Urban design quality was also a key issue within the project. The masterplan was very detailed in defining character areas, a rational hierarchy of streets, as well as building types and heights. This meticulous configuration of these important urban design aspects has created a very coherent urban form in Upton. However, although it was within the initial aims of the team of partners to establish a mixed-use community, in September 2010, when the quantitative survey took place, the commercial site was still vacant. Resident dissatisfaction with the lack of leisure, commercial facilities and public infrastructure was expressed in the results of the quantitative survey conducted in Chapter 7. The overall project's performance with regards to urban design quality is reflected in the following table.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality	Urban Design Quality	Protecting and enhancing/creating the identity of the neighbourhood (0.66)	Preserving the historically or architecturally important urban heritage	2
		Ensuring a balanced mixture of uses/boosting liveability (2.35)	Reducing journey lengths by mixing common uses vertically and horizontally	1
		Providing adequate public infrastructure in close proximity (2.5)	Stimulating the formulation of social groups and networks	1
		Defining the right density (1.32)	Considering the critical mass for a district energy system to be developed and for an efficient public transport scheme to be established	1

	Defining character areas (1.18)	Defining the location of the neighbourhood centre, neighbourhood boundaries etc.	2
	Defining hierarchy of streets (1.38)	Creating a variety of street types, not only to meet the needs of vehicles, but to meet the needs of the pedestrians and children that play	2
	Defining building heights and building types (0.61)	Considering character areas, landscape conditions, proximity to public transport stops etc.	2
		Considering local conditions, traditional practice, character areas	

Table 76: Urban design quality assessment of Upton

MOBILITY

Mobility issues were addressed in the initial framework, but the resident survey demonstrated that the project's performance in the specific area was average. Although the frequency of the bus route to the city centre of Northampton was initially every 30 minutes, in September 2010, it was reduced to every 60 minutes. Thus, the vehicle use remains high and residents appear to be dissatisfied with the public transport services. The mobility assessment follows in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Mobility	Accessibility Environmentally sound modes	Devising a public transport concept (4.58)	Giving preference to more environmentally sound transport solutions	0
			Ensuring the efficiency of the transport solution proposed	
	Creating pedestrian paths and cyclist networks (4.16)	Considering safety Issues in mixed use areas (According to G. Cho <i>et al.</i> perceived risk of accidents is more prominent in low density residential areas while the actual risk is higher in mixed use areas (Cho, Rodriguez, & Khattak, 2009))	1	
			Creating Attractive cyclist and pedestrian routes	

	Taking into account Private vehicles(1.26)	Minimising car use if local conditions allow it	1
		Encourage the acquiring of more environmentally friendly vehicles	
		Cater for the car users	

Table 77: Mobility assessment of Upton

ENVIRONMENTAL PERFORMANCE OPTIMISATION

Environmental performance optimisation in Upton was addressed through the use of the BREEAM standards for the building scale. At the urban scale, although the instalment of a wind turbine provides a more environmentally friendly solution for the generation of electricity, the development of a district heating plant was not considered.

The water management strategy, on the other hand, has been exemplary, as the severe flooding issues of the nearby Nene valley required detailed strategies and guidelines. The drainage scheme (SUDS) developed, mitigated the risk of floods and created a green network that encouraged the establishment of wildlife habitats.

Waste management involved provision for recycling facilities for all properties while the Modern Methods of Construction that were employed by the developers, reduced the amount of construction waste. However, evidence of a soil management strategy was not found and there was no progress in regards to the production of low carbon food.

The following table was used to help assess the performance of the project in connection with ecological optimisation.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Environmental Performance Optimisation	EIA: Compensating for the environmental damage from construction	Considering Energy Efficiency at the Building scale (1.25)	Bioclimatic design	2
	Protecting and enhancing the local environmental capital	Considering Energy Efficiency at the Urban scale (1.31)	Responsible use of materials	
			District heating provision when critical mass is existent	1

		Urban form to be designed according to the sun's path	
		Passive energy sources to be exploited, according to location	
	Devising a Water Management concept (2.40)	Water management at the building scale	2
		Water management at the urban scale	
	Devising a Waste management concept (2.15)	Construction waste	2
		Domestic waste	
	Devising a Soil management concept (1.09)	Reusing soil	0
	Assessing and enhancing the micro-climate of the neighbourhood(1.37)	Ambient temperature to be or become more temperate, wind turbulence to be considered, and local biodiversity to be enhanced and air pollution to be minimised	1
	Producing Low Carbon Food (0.43)	Encouraging local food production and supply networks and making local food competitive in the wider food market	0

Table 78: Ecological optimisation assessment of Upton

COMMUNITY

The concept of “pepper-potting” was adopted as key strategy towards social sustainability. Affordable housing accounted for 22% of the building stock, in line with planning regulations on affordable housing, but units were clustered in small groups in an effort to prevent the formulation of housing ghettos.

Notwithstanding, the efforts to infuse social balance in the community, the attempts to increase community empowerment in decision-making for the project were limited. Public participation was encouraged at the Enquiry by Design workshops that were held, but these workshops were limited and information on sustainability issues was not provided prior to the meetings. Indeed, the resident satisfaction survey in 8.5 revealed that people are only to some extent happy with the opportunities they have to participate in decision-making.

In the table below, a detailed evaluation of the project's performance with regards to the theme of community has been conducted.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Community	Equity	Enhancing Social Diversity and Balance (3.78)	Attracting various population groups to the area (different income levels, different housing needs, different cultures) to maintain a social balance Discouraging the formulation of housing ghettos	2
	Sense of Safety	Increasing crime safety (2.01)	Maximising natural surveillance	2
	Empowerment	Increasing social interaction, participation, and neighbourliness (2.32)	Formalising the role of the neighbourhood Forum to increase local debate and inclusive, bottom up neighbourhood governance	1
	Education	Providing availability of information for community and stakeholder groups to enhance consultation and encourage change of lifestyle e(1.89)	Providing availability of data on air quality, energy stores, security, the electricity production of the residents' PV panels, their energy consumption etc (Ritchie & Thomas, 2009)	0

Table 79: Community assessment of Upton

LONG TERM ECONOMIC VIABILITY

Long term economic viability was pursued, judging from the initial framework for the project, but the research findings have presented considerable doubts over the project's success in that particular domain. The qualitative and quantitative evaluation of the project's success in Chapter 7 revealed that the economic viability of the project

was to a large extent undermined by the recession that made the commercial partners reluctant to invest. Nevertheless, the development of the project is still ongoing, so further progress in that domain should be expected, and an additional assessment at a later stage should be undertaken to reveal more accurate results. The value of 1 is indicative of positive intentions, but mediocre outcomes.

The synopsis of the project’s performance towards the goal of long term economic viability follows in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Long- Term Economic Viability	Income Prosperity	Creating opportunities for employment (7.01)	Maximise the opportunities for employment for local full time, and part time job seekers and, therefore, reducing journeys from home to work	1
	Profitability of investment	Carefully investigating the economic viability of the project (2.02)	Ensuring the project is a good investment for the developer, land owner and commercial partners	1
			Ensuring the project provides good investment opportunities for the property buyers	
Development of Green Businesses	Encouraging green practices for all sectors of economy(0.97)	Educate upon and encouraging the use of renewable energy, recycling, low energy transport of goods, low emission production and manufacturing methods	1	

Table 80: Long-term economic viability assessment of Upton

Overall Score

The overall evaluation of the Upton project in relation to the sustainability criteria of the matrix is presented in the table below. The project’s overall score depicts its positive reputation. However, it is evident that by improving the public transport concept and with an effort to improve its economic viability aspects the overall performance could be improved to a large extent.

Upton Project Sustainability Assessment

INDICATORS	SCORE
Architectural Quality	19.43/20
Urban Design Quality	13.83/20
Mobility	5.42/20
Ecological Optimisation	14.28/20
Community	13.9/20
Long Term Economic Viability	10/20
TOTAL SCORE	76.86/120

Table 81: Overall assessment of Upton

NEW ISLINGTON

ARCHITECTURAL QUALITY

Amongst the key targets the Millennium Communities had set was the promotion of design quality. An emphasis was placed on the aesthetics, with the involvement of various popular developers and architecture offices, such as Urban Splash, FAT and Will Alsop. Contemporary architectural solutions were preferred over imitating the local style of the terraced house, but at the same time, some of the old listed building stock was refurbished to preserve the local identity. Furthermore, the prominence of iconic architecture did not overshadow other important criteria related to technical issues, such as the improvement of construction efficiency, the minimisation of construction waste, or aspects of indoor and outdoor space and comfort, as was identified in Chapter 6 and as can be seen in the following assessment table.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality (design code)	Architectural Quality(10)	Considering the local vernacular(0.59)	Drawing inspiration from traditional styles and features	1
		Enhancing Aesthetical quality (1.17)	Enhancing diversity	2

		Considering attractive views	
	Improving construction quality and efficiency (1.78)	Using Modern Methods of Construction for quick delivery, low environmental impact and lower defects	2
	Providing Good space standards (1.58)		1
	Ensuring Flexible layout of properties (0.55)	Considering Adaptability to new technologies, different user's needs and different circumstances	1
	Providing privacy for users (1.7)	Provide public, private, and guest rooms to meet the religious and cultural needs of the future or current occupiers	1
	Catering for indoor and outdoor comfort (2.62)	Provide occupants with control over their environment (openable windows, movable shades, overrides on the building management system) (Ritchie & Thomas, 2009)	2
		Providing a small private (or communal for a block of flats) piece of land for recreational activities	

Table 82: Architectural quality assessment of New Islington

URBAN DESIGN QUALITY

Will Alsop's masterplan was the most notable contribution to the success of the scheme as interviewees reported. The water features and the reopening of the canals that Will Alsop envisaged were the flagships of the masterplan and were materialised to create an outstanding urban landscape. The different character areas (waterpark, tutti-frutti, canals) and the mixing of unconventional architectural volumes and densities compose a diverse urban entirety that bears little resemblance to the old dilapidated estate. At the same time, the investment in the necessary public infrastructure (clinic, play areas) has greatly improved the quality of life of the residents and has enhanced the viability of the scheme. In the evaluation table that follows, all criteria that refer to the issue of urban design quality have been enumerated and the urban design quality of the project has been assessed.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality (design code)	Urban Design Quality	Protecting and enhancing/creating the identity of the neighbourhood (0.66)	Preserving the historically or architecturally important urban heritage	2

	Ensuring a balanced mixture of uses/boosting liveability (2.35)	Reducing journey lengths by mixing common uses vertically and horizontally	2
	Providing adequate public infrastructure in close proximity (2.5)	Stimulating the formulation of social groups and networks	1
	Defining the right density (1.32)	Considering the critical mass for a district energy system to be developed and for an efficient public transport scheme to be established.	2
	Defining character areas (1.18)	Defining the location of the neighbourhood centre, neighbourhood boundaries etc	2
	Defining hierarchy of streets (1.38)	Creating a variety of street types, not only to meet the needs of vehicles, but to meet the needs of the pedestrians and children that play	2
	Defining building heights and building types (0.61)	Considering character areas, landscape conditions, proximity to public transport stops etc	2
		Considering local conditions, traditional practice, character areas	

Table 83: Urban design quality assessment of New Islington

MOBILITY

One of the Millennium Communities' principal aims was to ensure the scheme was accessible in every sense. The project is in fact part of the Manchester's city centre core and, therefore, a significant intervention was not necessary to ensure access to a variety of services for the New Islington Community. Frequent bus routes and the close proximity to the city centre were factors that guaranteed ease of access for the residents by all means. Nonetheless, the partners took the public transport concept a step further by deciding to extent the tram line to reach New Islington. However, a cyclist network, separated from the street network that provides safe access to the city centre has not been developed, so the residents believe that the streets are only to some extent pedestrian and cycle-friendly, as was revealed in the questionnaire survey.

The mobility assessment for New Islington follows in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade	
Mobility	1. Accessibility	Devising a public transport concept (4.58)	Giving preference for more environmentally sound transport solutions	2	
			Ensuring the Efficiency of the transport solution proposed		
	2. Environmentally sound modes		Creating pedestrian paths and cyclist networks (4.16)	Considering Safety Issues in mixed use areas	1
				(According to G. Cho <i>et al.</i> perceived risk of accidents is more prominent in low density residential areas while the actual risk is higher in mixed use areas (Cho, Rodriguez, & Khattak, 2009))	
	Creating Attractive cyclist and pedestrian routes				
	Taking into account Private vehicles (1.26)			Minimising car use if local conditions allow it	1
Encourage the acquiring of more environmentally friendly vehicles					
Cater for the car users					

Table 84: Mobility assessment New Islington

ENVIRONMENTAL PERFORMANCE OPTIMISATION

In line with the Millennium Communities targets for minimisation of the use of fossil fuels and reduction of the energy consumption, a district heating system has been planned for the New Islington Scheme. Environmental performance optimisation was also pursued at the building scale, by following the BREEAM sustainability directions to achieve the *eco homes excellence* certification. Unlike other conventional urban projects, strengthened concerns for a soil management strategy were incorporated in New Islington development. As soon as the decontamination of the land took place, soil extracted during the excavation process was reused for landscaping.

Overall, the project scored very high with regards to ecological optimisation with the exception of not having a strategy for low carbon food production.

The project's score in the ecological optimisation domain follows below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Environmental Performance Optimisation	EIA: Compensating for the environmental damage from construction	Considering Energy Efficiency at the Building scale (1.25)	Bioclimatic design	2
			Responsible use of materials	
	Protecting and enhancing the local environmental capital	Considering Energy Efficiency at the Urban scale (1.31)	District heating provision when critical mass is existent	2
			Urban form to be designed according to the sun's path	
			Passive energy sources to be exploited, according to location	
		Devising a Water Management concept (2.40)	Water management at the building scale	2
			Water management at the urban scale	
		Devising a Waste management concept (2.15)	Construction waste	2
			Domestic waste	
		Devising a Soil management concept (1.09)	Reusing soil	2
		Assessing and enhancing the micro-climate of the neighbourhood (1.37)	Ambient temperature to be or become more temperate, wind turbulence to be considered, local biodiversity to be enhanced and air pollution to be minimised	2
		Producing Low Carbon Food (0.43)	Encouraging local food production and supply networks and making local food competeable in the wider food market	0

Table 85: Ecological optimisation assessment New Islington

COMMUNITY

Public participation held great gravity for the partners in New Islington. As we have seen in the data analysis in Chapter 6, every effort was made for the maximum resident inclusion to be achieved. The locality was a consultant in all workshops and meetings that took place and, according to the interviewees, the process proved to be extremely beneficial, especially in the initial stages of site appraisal. Furthermore, an emphasis was laid on having a variety of affordability levels, tenures and building types, in order to create a mixed community. Finally, community interaction and neighbourliness was fostered by a series of events, hosted by the lead developer, that were meant to encourage residents to come closer and bond.

The assessment of the community theme follows in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Community	Equity	Enhancing Social Diversity and Balance(3.78)	Attracting various population groups to the area(different income levels, different housing needs, different cultures) to maintain a social balance	1
			Discouraging the formulation of housing ghettos	
	Sense of Safety	Increasing crime safety (2.01)	Maximising natural surveillance	2
	Empowerment	Increasing social interaction, participation, and neighbourliness (2.32)	Formalising the role of the neighbourhood Forum to increase local debate and inclusive, bottom up neighbourhood governance	2
Education	Providing availability of information for community and stakeholder groups to enhance consultation and encourage change of lifestyle (1.89)	Providing availability of data on air quality, energy stores, security, the electricity production of the residents' PV panels, their energy consumption, etc (Ritchie & Thomas, 2009)	1	

Table 86: Community Assessment New Islington

LONG TERM ECONOMIC VIABILITY

Focusing on public realm ensured profitability of investment for the developer firms and for the property buyers as well. The water park and the marina are key elements of the scheme and have contributed to the transformation of the area from a deserted estate to a place of focal interest for the city of Manchester. In the coming years, these interventions are expected to attract visitors and raise the overall profile of the area. On the other hand, the high unemployment rates will not easily decrease, but some job opportunities created in the commercial and leisure facilities on the ground floor of the Chips building will undoubtedly have a positive effect on the income prosperity of the local community.

The long term economic viability assessment has been conducted in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Long Term Economic Viability	Income Prosperity	Creating opportunities for employment (7.01)	Maximise the opportunities for employment for local full time, and part time job seekers and therefore reducing journeys from home to work	1
	Profitability of investment	Carefully investigating the economic viability of the project (2.02)	Ensuring the project is a good investment for the developer, land owner and commercial partners Ensuring the project provides good investment opportunities for the property buyers	2
	Development of Green Businesses	Encouraging green practices for all sectors of economy (0.97)	Educate upon and encouraging the use of renewable energy, recycling, low energy transport of goods, low emission production and manufacturing methods	0

Table 87: Long-term economic viability assessment New Islington

Overall Score

In the case of New Islington, the regeneration plan sparked a process of transformation of the character of the neighbourhood from a neglected estate to a place of international attention. The urban components (water features, iconic

buildings) have been the key focus of this exercise and have added value to the issue of sustainable development as viewed from the partner's, as well as from the community's, perspective.

Yet, there is still latitude for improvement in criteria that pertain to the generic sub-theme of community, most importantly in maintaining a balance of population. More specifically, while the effort to improve the physical features of the urban environment responds to the problem of social decline, it does not resolve it. Social housing, although upgraded, remains clustered and therefore issues of antisocial behaviour remain a concern for the local police force. Income prosperity is also an issue that needs to be considered further, but it is a matter of doubt whether the partners alone are in a position to come up with a breakthrough solution. Unemployment is a matter that should be mostly considered at a strategic level in a long-term perspective, and interventions at the local level can only to some extent provide an effective resolution.

The table below summarises the scheme's progress towards sustainability.

New Islington Project Sustainability Assessment

INDICATORS	SCORE
Architectural Quality	15.56/20
Urban Design Quality	17.5/20
Mobility	14.58/20
Ecological Optimisation	19.14/20
Community	14.33/20
Long Term Economic Viability	11.05/20
TOTAL SCORE	92.06/120

Table 88: Overall assessment of New Islington

VAUBAN

ARCHITECTURAL QUALITY

Architectural quality in Vauban has been fostered mainly by the significant architectural diversity cultivated by the work of building cooperatives (Baugruppens). Land was divided into small plots; a fact that ensured the inclusion of many different architects in the scheme. Additionally, as per the resident survey conducted in chapter 8, space standards leave residents largely satisfied, but on the other hand, the flexibility and privacy of the properties have proven to be issues of concern.

The assessment of the scheme's architectural quality follows in the matrix below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
DESIGN QUALITY (design code)	Architectural Quality(10)	Considering the local vernacular (0.59)	Drawing inspiration from traditional styles and features	1
		Enhancing Aesthetical quality (1.17)	Enhancing diversity	2
			Considering attractive views	
		Improving construction quality and efficiency (1.78)	Using Modern Methods of Construction for quick delivery, low environmental impact and lower defects	1
		Providing Good space standards (1.58)		2
		Ensuring Flexible layout of properties (0.55)	Considering Adaptability to new technologies, different user's needs and different circumstances	1
		Providing privacy for users (1.7)	Provide public, private and guest rooms to meet the religious and cultural needs of the future or current occupiers	1
		Catering for indoor and outdoor comfort (2.62)	Provide occupants with control over their environment(openable windows, movable shades, overrides on the building management system) (Ritchie & Thomas, 2009)	2
Providing a small private (or communal for a block of flats) piece of land for recreational activities				

Table 89: Architectural quality assessment: Vauban

URBAN DESIGN QUALITY

With regards to urban design, the team of partners in Vauban decided to encourage the formulation of a mixed-use community, where basic services and public infrastructure would be available within walking distance. The concept of “fractality” was explored, according to which each part of the settlement is a district miniature, where retail, residential, work and services units are located (Soja, 2000). The project was very successful in that respect. Furthermore, densities have been kept rather high (90-100 units/hectare) and consequently more open space is available for the neighbourhood for the development of public amenities and green spaces. The high densities have also ensured the existence of the necessary critical mass in order for the extension of the tram line to be viable option. In that respect, and under the principle of creating a car free neighbourhood, car ownership is particularly low, and therefore, the majority of the streets are dedicated to pedestrians and serve as play areas for the children.

In the table that follows aspects of urban design have been valued according to the aforesaid.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality	Urban Design Quality	Protecting and enhancing/creating the identity of the neighbourhood(0.66)	Preserving the historically or architecturally important urban heritage	2
		Ensuring a balanced mixture of uses/boosting liveability (2.35)	Reducing journey lengths by mixing common uses vertically and horizontally	2
		Providing adequate public infrastructure in close proximity (2.5)	Stimulating the formulation of social groups and networks	2
		Defining the right density (1.32)	Considering the critical mass for a district energy system to be developed and for an efficient public transport scheme to be established.	2
		Defining character areas(1.18)	Defining the location of the neighbourhood centre, neighbourhood boundaries etc	2
		Defining hierarchy of streets(1.38)	Creating a variety of street types, not only to meet the needs of vehicles, but to meet the needs of the	2

		pedestrians and children that play	
	Defining building heights and building types (0.61)	Considering character areas, landscape conditions, proximity to public transport stops, etc.	2
		Considering local conditions, traditional practice, character areas	

Table 90: Urban design quality assessment: Vauban

MOBILITY

The mobility concept in Vauban was focused on reinforcing pedestrian and cyclist movement rather than on encouraging vehicle circulation. Although this aspiration called for dedicated residents to materialise, it was one of the biggest drivers behind the success of the project. The use of cars was indeed reduced, as the resident survey revealed, and the activities of walking and cycling were encouraged to large extent. The project has therefore met all criteria in the mobility matrix as can be seen below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
MOBILITY	Accessibility Environmentally sound modes	Devising a public transport concept (4.58)	Giving preference for more environmentally sound transport solutions	2
			Ensuring the Efficiency of the transport solution proposed	
		Creating pedestrian paths and cycling networks (4.16)	Considering Safety Issues in mixed use areas	2
			(According to G. Cho et al. perceived risk of accidents is more prominent in low density residential areas while the actual risk is higher in mixed use areas (Cho, Rodriguez, & Khattak, 2009)) Creating Attractive cyclist and pedestrian routes	
		Taking into account Private vehicles (1.26)	Minimising car use if local conditions allow it	2
			Encourage the acquiring of more environmentally friendly vehicles	
Cater for the car users				

Table 91: Mobility assessment: Vauban

ENVIRONMENTAL PERFORMANCE OPTIMISATION

As we have seen in Chapter 9, the ambitious low energy considerations in Vauban were enshrined in high environmental and energy specifications for the buildings (65 kWh/sq m). Further progress in that area was enhanced with the point system the city council invented for the acquiring of the plots (Chapter 8). Waste and water management was, in addition, audited towards ecological optimisation with the maximisation of permeable surfaces that cover 80% of the residential area and a recycling programme in operation. Soil management and low carbon food were not addressed, but overall the project has fully met the majority of the criteria included in the environmental performance optimisation matrix.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Environmental Performance Optimisation	EIA: Compensating for the environmental damage from construction	Considering Energy Efficiency at the Building scale (1.25)	Bioclimatic design	2
			Responsible use of materials	
	Protecting and enhancing the local environmental capital	Considering Energy Efficiency at the Urban scale (1.31)	District heating provision when critical mass is existent	2
			Urban form to be designed according to the sun's path	
			Passive energy sources to be exploited, according to location	
		Devising a Water Management concept (2.40)	Water management at the building scale	2
			Water management at the urban scale	
		Devising a Waste management concept (2.15)	Construction waste	2
			Domestic waste	
		Devising a Soil management concept (1.09)	Reusing soil	0
		Assessing and enhancing the micro-climate of the neighbourhood (1.37)	Ambient temperature to be or become more temperate, wind turbulence to be considered, local biodiversity to be enhanced and air pollution to be minimised	2

	Producing Low Carbon Food (0.43)	Encouraging local food production and supply networks and making local food competitive in the wider food market	0
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Table 92: Ecological optimisation assessment: Vauban

COMMUNITY

The community in Vauban was the motivating force for the city council to encompass sustainability principles in the framework for development, especially at a time when the wealth of information around the issue of sustainability was not widely available. Because the decision-making process was community centred and community activated, a very dynamic political culture was formed in Vauban. The website of Forum Vauban as well as the community magazine, were both invaluable sources of information that educated the residents around sustainability and raised awareness.

On the other hand, social diversity is not one of the project's most popular assets. The initial aim of attracting families with young children to the neighbourhood was identified by the interviewees as a factor that hindered the formulation of a diverse locality and has proven to be a problematic issue now that the district's population is ageing, as further amenity provision will be required.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Community	Equity	Enhancing Social Diversity and Balance (3.78)	Attracting various population groups to the area(different income levels, different housing needs, different cultures) to maintain a social balance Discouraging the formulation of housing ghettos	1
	Sense of Safety	Increasing crime safety (2.01)	Maximising natural surveillance	2
	Empowerment	Increasing social interaction, participation, and neighbourliness (2.32)	Formalising the role of the neighbourhood Forum to increase local debate and inclusive, bottom up neighbourhood governance	2
	Education	Providing availability of information for community and stakeholder groups to enhance consultation and encourage change of lifestyle (1.89)	Providing availability of data on air quality, energy stores, security, the electricity production of the residents' PV panels, their energy consumption, etc (Ritchie & Thomas, 2009)	2

Table 93: Community assessment: Vauban

LONG TERM ECONOMIC VIABILITY

The economic performance of the project in Vauban was, to a large extent, satisfactory with regards to all criteria that were incorporated in the matrix. According to the interviewees, though, the exceptional environmental performance was not reflected in higher market value of properties. The reason for that was the formation of building co-operatives, which assisted people in building inexpensively and minimised the overall building costs. However, the investment in the long term proved to be particularly viable, as the popularity the neighbourhood received due to its green image increased the demand for properties in the area.

From an employment planning perspective, the opening of commercial spaces and leisure facilities in the area facilitated the acquiring of jobs for the residents within the district. Finally, the information and other invaluable resources provided by Forum Vauban raised awareness around environmental issues, a fact that promoted the formulation of green businesses.

The long term economic viability assessment table follows below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Long Term Economic Viability	Income Prosperity	Creating opportunities for employment (7.01)	Maximise the opportunities for employment for local full time, and part time job seekers and therefore reducing journeys from home to work	2
	Profitability of investment	Carefully investigating the economic viability of the project (2.02)	Ensuring the project is a good investment for the developer, land owner and commercial partners Ensuring the project provides good investment opportunities for the property buyers	2
	Development of Green Businesses	Encouraging green practices for all sectors of economy (0.97)	Educate upon and encouraging the use of renewable energy, recycling, low energy transport of goods, low emission production and manufacturing methods	2

Table 94: Long-term economic viability: Vauban

OVERALL SCORE

Now that a decade has passed, it is possible to consistently examine the successes and failures of the approach that was followed in Vauban. At the heart of the initial framework were the limitation of traffic and the enforcement of demanding environmental specifications for the buildings, both of which influenced a significant progress towards sustainability. However, moderate satisfaction about issues of privacy and flexibility, according to the resident survey means that the project has only, to some extent, met these criteria. Nevertheless, the scheme greatly benefited from the active public involvement and from the highly inclusive decision-making model that was established, which ensured that no compromises were made in regards to urban design quality, mobility and long-term economic viability.

The following table summarises the previous assessment of all aspects of sustainability in Vauban.

Vauban Project Sustainability Assessment

INDICATORS	SCORE
Architectural Quality	15.36/20
Urban Design Quality	20/20
Mobility	20/20
Ecological Optimisation	16.96/20
Community	16.22/20
Long Term Economic Viability	20/20
TOTAL SCORE	108.54/120

Table 95: Overall assessment: Vauban

Kronsberg

ARCHITECTURAL QUALITY

Varied architecture was one of the key themes of the initial framework for Kronsberg. Design competitions that took place fostered the involvement of more than 40 developer firms. The planning specifications did not include obligatory conformation with traditional styles and features and as a result, contemporary design solutions were sought. The post occupancy resident survey conducted in Chapter 9 for the purposes of this research further revealed that residents are pleased with attributes of internal comfort space and flexibility of their properties.

The overall progress of the project in terms of architectural quality is described in the following table.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality (Design Code)	Architectural Quality(10)	Considering the local vernacular (0.59)	Drawing inspiration from traditional styles and features	1
		Enhancing Aesthetical quality (1.17)	Enhancing diversity	2
			Considering attractive views	
		Improving construction quality and efficiency (1.78)	Using Modern Methods of Construction for quick delivery, low environmental impact and lower defects	2
		Providing Good space standards (1.58)		2
		Ensuring Flexible layout of properties (0.55)	Considering Adaptability to new technologies, different user's needs and different circumstances	2
		Providing privacy for users (1.7)	Provide public, private, and guest rooms to meet the religious and cultural needs of the future or current occupiers	2
		Catering for indoor and outdoor comfort (2.62)	Provide occupants with control over their environment(openable windows, movable shades, overrides on the building management system) (Ritchie & Thomas, 2009) Providing a small private (or communal for a block of flats) piece of land for recreational activities	2

Table 96: Architectural assessment: Kronsberg

URBAN DESIGN

The magnitude of the task was impressive. The urban design qualities in Kronsberg have not been limited to the actual form of the masterplan but serve a broader sustainability agenda. The neighbourhood has a clearly defined centre, represented by the main square, and features well-defined boundaries that have been meticulously designed, with respect to the adjacent natural landscape. A variety of different amenities located around the neighbourhood green spaces and squares have promoted liveability at all hours of the day and have ensured that the basic daily needs of the residents are met within walking distance. Densities and building heights are transport and nature orientated, with high-rise apartment blocks being closer to the main avenue and the tram stops, and with the low-rise town houses located closer to the boundaries with the nearby woodland.

The assessment of the physical aspects of the Kronsberg district follows in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Design Quality (Design Code)	Urban Design Quality	Protecting and enhancing/creating the identity of the neighbourhood (0.66)	Preserving the historically or architecturally important urban heritage	1
		Ensuring a balanced mixture of uses/boosting liveability (2.35)	Reducing journey lengths by mixing common uses vertically and horizontally	2
		Providing adequate public infrastructure in close proximity (2.5)	Stimulating the formulation of social groups and networks	2
		Defining the right density (1.32)	Considering the critical mass for a district energy system to be developed & for an efficient public transport scheme to be established.	2
		Defining character areas (1.18)	Defining the location of the neighbourhood centre, neighbourhood boundaries etc	2
		Defining hierarchy of streets (1.38)	Creating a variety of street types, to meet the needs of vehicles, pedestrians and children alike	1
		Defining building heights and building types (0.61)	Considering character areas, landscape conditions, proximity to public transport stops etc Considering local conditions, traditional practice, character areas	2

Table 97: Urban design quality assessment: Kronsberg

MOBILITY

Similarly to the case of Vauban, in Kronsberg the tram service was selected as the optimum means of public transportation, and consequently, the tramline was extended to reach the district. Densities are relatively high, so the viability of this solution has been secured. Ease of access has been safeguarded for the pedestrians and cyclists alike, with networks that connect the neighbourhood to the countryside.

However, despite all aforementioned incentives, residents in Kronsberg remain highly dependent on cars as the questionnaire survey revealed. However, a behavioural change requires more extreme measures and a high degree of resident commitment, as we have seen in the case of Vauban.

The vehicular orientated main streets may be a reason for this. The car has been accommodated but it has not been allowed to dominate by reducing traffic speed. The provision for on-street parking throughout minimised the need for parking lots and reduced vehicular speed. In the following table the mobility sub-theme has been assessed.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Mobility	Accessibility Environmentally sound modes	Devising a public transport concept (4.58)	Giving preference to more environmentally sound transport solutions	2
			Ensuring the Efficiency of the transport solution proposed	
		Creating pedestrian paths and cyclist networks (4.16)	Considering Safety Issues in mixed use areas (According to G. Cho <i>et al.</i> perceived risk of accidents is more prominent in low density residential areas while the actual risk is higher in mixed use areas (Cho, Rodriguez, & Khattak, 2009))	2
			Creating Attractive cyclist and pedestrian routes	
		Taking into account Private vehicles (1.26)	Minimising car use if local conditions allow it	1
			Encourage the acquiring of more environmentally friendly vehicles	
Cater for the car users				

Table 98: Mobility assessment: Kronsberg

ENVIRONMENTAL PERFORMANCE OPTIMISATION

In Kronsberg, much was achieved on the scale of the individual building with regards to environmental optimisation. Environmental concerns were rationalised in the formulation of strict energy optimisation standards (i.e. space heating standard at 50KWh/m²/year). The measures taken in the form of bioclimatic building design (passive use of solar energy, improved thermal insulation, minimisation of thermal bridges, etc) had a positive effect on the energy performance of the buildings, but this was, to some extent, undermined by the difficulty the occupiers had to adjust to the energy saving systems (e.g. mechanical ventilation), as was explained in Chapter 9.

At the urban scale, the Kronsberg project had the most complete approach compared to the rest of the cases. Thorough waste, water and soil management and treatment strategies were formulated at the planning stage, and energy efficiency was further enhanced with the establishment of two district heating systems that contributed to the reduction of CO₂ emissions by 35,000 tonnes (Chapter 9, Table 54).

The rainwater management concept serves a dual purpose. On the one hand it preserves the water lifecycle as the water is collected from roofs or paved areas and is gradually released to the ground, or to retention ponds. On the other hand, the watercourse has remained visible in the form of SUDS and therefore serves as a didactic and recreational instrument for the residents.

Finally, the waste management strategy involved the reduction in construction waste (i.e. "Low Waste Building Sites Model") in which it achieved an overall 80% reduction of construction waste through recycling. It also incorporated a domestic waste reduction programme with the installation of pre-sorting bins in the apartments and with compost facilities in the gardens.

As per the discussion above, the project has achieved an exceptional performance in all criteria and therefore, has scored high in the environmental optimisation domain summarised in the table below.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Environmental Performance Optimisation	EIA: Compensating for the environmental damage from construction	Considering Energy Efficiency at the Building scale (1.25)	Bioclimatic design	2
			Responsible use of materials	
	Protecting and enhancing the local environmental capital	Considering Energy Efficiency at the Urban scale (1.31)	District heating provision when critical mass is existent	2
			Urban form to be designed according to the sun's path	
			Passive energy sources to be exploited, according to location	
		Devising a Water Management concept (2.40)	Water management at the building scale	2
			Water management at the urban scale	
		Devising a Waste management concept (2.15)	Construction waste	2
			Domestic waste	
		Devising a Soil management concept (1.09)	Reusing soil	2
	Assessing and enhancing the micro-climate of the neighbourhood (1.37)	Ambient temperature to be or become more temperate, wind turbulence to be considered, local biodiversity to be enhanced and air pollution to be minimised	2	
	Producing Low Carbon Food (0.43)	Encouraging local food production and supply networks and making local food competeable in the wider food market	2	

Table 99: Ecological optimisation: Kronsberg

COMMUNITY

Demographically, the development features a varied profile of all classes, ethnicities and ages. The strategy for the formulation of a balanced community was carefully devised by the decision-makers from as early as the initial stages of urban planning. Rather than being zoned into estates, social housing was scattered throughout the district, and was accommodated in diverse housing types, side by side, and indistinguishable from the rest of the private housing building stock. Harmonious living between people of different ethnic backgrounds was further encouraged with the development of specially adapted apartments which successfully accommodated the different cultural needs of the diverse population.

Finally, KUKA (Environmental Liaison Agency) and the Krokus centre both engendered sensitivity with regards to sustainability, fostered community involvement in decision making and provided guidance and information to the developers and architects involved in the scheme.

The following table reflects the excellence of the project in the community theme.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Community	Equity	Enhancing Social Diversity and Balance (3.78)	Attracting various population groups to the area(different income levels, different housing needs, different cultures) to maintain a social balance	2
			Discouraging the formulation of housing ghettos	
	Sense of Safety	Increasing crime safety (2.01)	Maximising natural surveillance	2
	Empowerment	Increasing social interaction, participation, and neighbourliness(2.32)	Formalising the role of the neighbourhood Forum to increase local debate and inclusive, bottom up neighbourhood governance	1
Education	Providing availability of information for community and stakeholder groups to enhance consultation and encourage change of lifestyle (1.89)	Providing availability of data on air quality, energy stores, security, the electricity production of the residents' PV panels, their energy consumption, etc (Ritchie & Thomas, 2009)	2	

Table 100: Community assessment: Kronsberg

LONG TERM ECONOMIC VIABILITY

The sophisticated ecologically efficient systems that were incorporated in building construction in Kronsberg had a negative effect on the construction cost chargeable to the developers as the interviewees reported. However, the ecological optimisation concept will undoubtedly prove to be cost-effective in the long term imperative, as fossil fuel costs are increasing. In that respect, the focus on environmental factors in Kronsberg has contributed towards the long-term economic viability theme. The Municipal authorities made a further effort to prove the economic feasibility of sustainable solutions in comparison to conventional systems. For instance, a cost comparison study that was undertaken after the development was completed concluded that the minimisation of paved surfaces reduces the cost for rainwater retention systems and, therefore, the rainwater management is financially advantageous. The same study revealed that the cost for developers was increased by 25% in comparison to the conventional drainage system approach, however, the 70% reductions in rainwater disposal charges compensate for the increased installation cost (Stadtentwässerung Hannover, 2005).

Investment wise, the interviewees reported that the area has become very popular. The perpetual ascending of the demand for properties in the area is directly linked to the ascending property values and, therefore, has a considerable economic value for the owners.

The integration of working spaces in the district has only, to some extent, been successful as managerial and administrative complications resulted in the closure of a number of leisure and retail establishments (Chapter 9.3). However, the development has encouraged the establishment of a number of companies (i.e. LBS, dvg, IBM) in the immediate vicinity, bringing approximately 3,700 jobs to the adjacent area (Landeshauptstadt Hannover, 2000).

In accordance to the previously mentioned arguments, the assessment of the long-term economic viability theme has been outlined in the following table.

Themes	Sub-themes	Principal Criteria	Secondary Criteria	Grade
Long Term Economic Viability	Income Prosperity	Creating opportunities for employment (7.01)	Maximise the opportunities for employment for local full time, and part time job seekers and therefore reducing journeys from home to work	1
	Profitability of investment	Carefully investigating the economic viability of the project (2.02)	Ensuring the project is a good investment for the developer, land owner and commercial partners	1
			Ensuring the project provides good investment opportunities for the property buyers	
Development of Green Businesses	Encouraging green practices for all sectors of economy(0.97)	Educate upon and encouraging the use of renewable energy, recycling, low energy transport of goods, low emission production and manufacturing methods	2	

Table 101: Long-term economic viability assessment: Kronsberg

Overall Score

The overall assessment of Kronsberg along the 6 criteria has indicated that the scheme has achieved exceptional results, especially in terms of ecological optimisation. In particular, the experience of the project has highlighted the need for of the early establishment of clear strategies and benchmarks for energy, water and waste efficiency. The participants in this study, acknowledged the benchmarks and indicators as fundamental for the simplification of the highly complicated theme of ecological optimisation, and as a crucial aspect for the efficient monitoring of the project. Furthermore, interviewees and residents alike highlighted the success of the mobility concept. The in-depth research into the viability and economic efficiency of the public transport plan ensured long-term success and provides invaluable lessons for sustainable urban interventions of similar scale.

The study, on the other hand, also pointed out certain limitations and indicated areas in which there is room for improvement. Firstly, the failure of a number of commercial

and leisure establishments located within the neighbourhood makes necessary the reviewing of land uses in the area as the market changes. The unsuccessful mixed-use aspect of the scheme has resulted in a number of ground-level spaces being left vacant and unattractive. As these spaces are small and scattered around the neighbourhood they only serve the locality, rather than attracting users from other areas. The use of these spaces could, therefore, be changed to accommodate other more appropriate uses – for instance live-work units that have been gaining popularity or hotels for the large number of tourists that visit the district for educational purposes. Possibilities for the establishment of further retail units also emerge, especially in the immediate vicinity to the office establishments at the margins of the neighbourhood, as the office employees can generate a significant repetitive customer flow for these facilities. To summarise, a comprehensive response to the constantly evolving market environment is necessary to ensure the economic viability of the mixed-use aspects of the scheme.

Despite the small number of weaknesses, the project is a successful example of sustainable neighbourhood development. Its impressive achievements stated in previous chapters demonstrate that political commitment, integrated project management and project-based monitoring can lead to successful results.

The table below presents a synthesis of the project’s overall performance in the six domains.

Kronsberg Project Sustainability Assessment

INDICATORS	SCORE
Architectural Quality	19.41/20
Urban Design Quality	17.96/20
Mobility	18.74/20
Ecological Optimisation	20/20
Community	17.68/20
Long Term Economic Viability	10.97/20
TOTAL SCORE	104.76/120

Table 102: Overall assessment: Kronsberg

11.4 Cross-Comparative analysis of the projects' performance

In this section, the performance of the four projects, with respect to sustainability, will be highlighted and their achievements will be compared. In Table 103, the results of the AHP conducted in Section 11.3 have been summarised to illustrate variations in performance, and to facilitate comparison between the four projects. The comparative analysis will be conducted in turn next.

THEMES	CRITERIA	UPTON	NEW ISLINGTON	VAUBAN	KRONBERG
Architectural Quality	Considering the local vernacular	1.18	0.59	0.59	0.59
	Enhancing Aesthetical quality	2.34	2.34	2.34	2.34
	Improving construction quality and efficiency	3.56	3.56	1.78	3.56
	Providing Good space standards	3.16	1.58	3.16	3.16
	Ensuring Flexible layout of properties	0.55	0.55	0.55	1.1
	Providing privacy for users	3.4	1.7	1.7	3.4
	Catering for indoor and outdoor comfort	5.24	5.24	5.24	5.24
Urban Design Quality	Protecting and enhancing/creating the identity of the neighbourhood	1.32	0.66	1.32	0.66
	Ensuring a balanced mixture of uses/boosting liveability	2.35	4.7	4.7	4.7
	Providing adequate public infrastructure in close proximity	2.5	2.5	5	5
	Defining the right density	1.32	2.64	2.64	2.64
	Defining character areas	2.36	2.36	2.36	2.36
	Defining hierarchy of streets	2.76	2.76	2.76	1.38
	Defining building heights and building types	1.22	1.22	1.22	1.22
Accessibility	Devising a public transport concept	0	9.16	9.16	9.16

Environmentally Sound Transport Modes	Creating pedestrian paths and cycling networks	4.16	4.16	8.32	8.32
	Taking into account Private vehicles	1.26	1.26	2.52	1.26
Compensating For Environmental Damage From Construction	Considering Energy Efficiency at the Building scale	2.5	2.5	2.5	2.5
	Considering Energy Efficiency at the Urban scale	1.31	2.62	2.62	2.62
Protecting & Enhancing The Local Environmental Capital	Devising a Water Management concept	4.8	4.8	4.8	4.8
	Devising a Waste management concept	4.3	4.3	4.3	4.3
	Devising a Soil management concept	0	2.18	0	2.18
	Assessing and enhancing the micro-climate of the neighbourhood	1.37	2.74	2.74	2.74
	Producing Low Carbon Food	0	0	0.43	0.86
Equity Safety Empowerment Education	Enhancing Social Diversity and Balance	7.56	3.78	3.78	7.56
	Increasing crime safety	4.02	4.02	4.02	4.02
	Increasing social interaction, participation, and neighbourliness	2.32	4.64	4.64	2.32
	Providing availability of information for community and stakeholder groups to enhance consultation and encourage change of lifestyle	0	1.89	3.78	3.78
Income Prosperity Profitability Of Investment Development Of Green Businesses	Creating opportunities for employment	7.01	7.01	14.02	7.01
	Carefully investigating the economic viability of the project	2.02	4.04	4.04	2.02
	Encouraging green practices for all sectors of economy	0.97	0	1.94	1.94
Total Score/120		76.86/120	92.06/120	108.54/120	104.76/120
Total Score%		64.05%	76.71%	90.45%	87.3%

Table 103: Cross-comparative assessment of the four projects

Design Quality

Evidence from the analysis of the projects conducted in Chapters 6, 7, 8 and 9 suggests the contrasting philosophies that underpin the strategy for the achievement of design quality. In each setting, the issue of design quality was assigned a different priority. In fact, four different patterns emerged.

Firstly, in the case of Upton, design quality was the key concern and it was at the heart of the development plan, rationalised to the greatest extent in the form of a detailed design code. Developers and architects were limited design-wise by the requirement to mimic the local architectural style, but on the other hand, they were given the freedom to experiment with Modern Methods of Construction.

Secondly, in the case of New Islington, design quality was primarily a vehicle for the marketing of the project located in a problematic setting. The involvement of renowned architects and developers posed an emphasis on the aesthetics, and influenced architecture down a very contemporary route, facilitating in that way the selling of the properties. In spite of the financial motives, this strategy also had a symbolic meaning. The estate was a perfect example of the social housing residential conurbations built in the 1970s, and comprised of uniformly built terraced houses and cul-de-sacs. The introduction of contemporary architecture was, therefore, in sharp contrast to the out-dated housing environment that had become associated with high crime rates and urban ghettoization. Furthermore, social diversity was infused to the old single-class community with the construction of the eccentric “chips” building, which was meant to attract young individuals and families that enjoy city-living in its 142 flexible, contemporary apartments.

Thirdly, in Vauban, design quality had different dimensions. It stemmed from the ideals of communal living and building that underpinned the whole ethos of the project. Design quality, in that case, became synonymous with individuality and distinctiveness, as instead of involving developers, the building process was initiated by the future residents themselves, who formed housing co-operatives. This challenging, unconventional method had a significant impact on the urban environment by inspiring diversity of architecture.

Finally, in Kronsberg design quality was mostly oriented towards green building practices and bioclimatic design. The strictness of the environmental specifications motivated a group of developers and architects to experiment with sustainability and to combine sustainable practices with exceptional design solutions. This transition from conventional practices to experimental design and innovative construction methods was primarily encouraged by the fact that the project was part of the EXPO.

Although originating from different philosophies and priorities, design quality has in all cases been a common denominator. To rephrase the argument, the relevance of design quality depends upon the local context, and the ideas and aspirations of the group of stakeholders that were responsible for decision-making.

Mobility

The issue of mobility in the cases we have investigated in this research primarily reflects the residents' regular commuting to the city centre. This particular distance, as in all cases included in this study, drives the analysis of the mobility domain; where residents depend on the adjacent town centres for employment, leisure and recreational amenities. The examining of the mobility domain is also focused on the level of accessibility from the residential unit to the local facilities (playgrounds, schools, clinic, park, square, retail) situated within the neighbourhood.

The projects under investigation achieved outstanding results in terms of mobility, with the only exception being the Upton project. In contrast to the other three case studies in-depth consideration of public transport accessibility was not pursued and the mobility issue was not fully addressed in a comprehensive transport plan. As the evidence from the questionnaire survey suggested in Chapter 7, although the neighbourhood has been developed at the outskirts of the city of Northampton, public transport connections are disappointingly inconsistent and irregular. In addition to the aforementioned limitation, the neighbourhood lacks amenity provision in terms of retail and leisure, a fact that further reinforces the need for regular travelling to town. Although the reduction of private car use was a concern in the development plan, the only measure taken to achieve it was the reduction of the parking allowance per property. This measure, however, was perceived as unsuccessful by the interviewees,

since each of the 4-5-bedroomed properties, comprising the largest percentage within the neighbourhood, supported more than one private vehicle, especially since the neighbourhood was lacking efficient public transport connections. Further to the observed drawbacks, the questionnaire survey proved that every-day commuting by car creates the dominant picture.

Whereas Upton presents a picture of disappointment with regards to the mobility domain, the other three case studies have been successful in terms of offering mobility alternatives for diverse individuals. In New Islington, Vauban, and Kronsberg, spatial accessibility to the city centre was ensured via regular tram and bus services, whereas the well-designed neighbourhood setting offers satisfying local amenity provision, accessible on foot. The viability of the public transport alternatives was ensured as the concentration of the critical mass of everyday-users was secured. Furthermore, pedestrian and cycling accessibility to the several points of destination within the neighbourhood territory (local amenities, transit stops, etc.) was facilitated with the development of cycling and pedestrian networks and mixed-use boulevards. Therefore, comprehensive alternatives to car were provided and, as a result, automobile usage was reduced (see Sections 7.4, 8.4, 9.4).

Numerous examples of well-designed boulevards were indeed identified in the research. For instance, the Old Mill Street in New Islington, offers a unique environment for the pedestrian and the cyclist and functions as a link to the city centre.



Figure 17: Old Mill Street, New Islington

Similarly, the main street in Vauban, where the local retail and other amenities are concentrated, is a very good example of the successful configuration of a vibrant street environment.



Figure 18: Vaubanalle, Vauban

Running along the centre of the neighbourhood, it is a magnetic pole for the community, the gathering of which throughout the day creates a lively atmosphere and strengthens community bonds.

However, we cannot disregard the fact the relative differences in the level of accessibility are dictated by variances in the provision for public transport infrastructure. All other cities, with the exception of Northampton, had the competitive advantage of an already developed tram system, which could be extended to reach the new residential districts. Additionally in some of those cases, there was a strong support of the local government in terms of financial and administrative resources.

Furthermore, a substantial impediment in the case of Upton was the economic recession that coincided with the development of the project. Although resident demand for local facilities is high, as evidence from the questionnaires highlighted, the economic profit for the commercial partners was not guaranteed due to the unstable

economic climate. Therefore, as the interviewees stated, the high risk prevented them from investing, and the commercial facilities remained vacant.

Environmental Performance Optimisation

With regards to environmental performance optimisation all projects achieved satisfying performance levels, especially in the areas of energy efficiency at the building scale, and waste, and water management at the urban scale.

Energy performance of the buildings in Kronsberg and Vauban greatly exceeded the national norm whereas the two other projects achieved results of a level similar to conventional practice. These variations in the level of performance, to some extent, stem from the availability or absence of a number of support mechanisms.

The most striking example that justifies the latter statement is the case of Kronsberg, where in addition to the strict environmental specifications, the project was significantly subsidised by the state. As the conditions for the awarding of these funds to the private developers were related to sustainability objectives, the developers pursued solutions that would optimise the environmental performance.

In Vauban on the other hand, subsidies were lacking. However ecological optimisation was promoted by the use of other means. Firstly, specific benchmarks for energy performance were set in the development plans, making the 65 Kwh/m² energy standard compulsory for all buildings in the district.

Secondly, preference was shown to building groups who were willing to reach the passive house standard (15Kwh/sq m). This second criterion encouraged the experimentation with bioclimatic building techniques and resulted in the development of a large number of passive houses in the first and second construction phases.

Thirdly there were a number of unique administrative and organisational advantages that facilitated the exceptional outcomes. More specifically, the Vauban project was, to a large extent, community-led. Therefore, instead of having the planning professionals acting as key promoters of sustainability, it was the local community that contributed to the setting of benchmarks. Their initiative and participation in the planning process and realisation of the project were unquestionably critical

contributing factors to Vauban's impressive achievements in terms of environmental optimisation.

Community

As was discussed in previous chapters, the community theme in this research incorporates the domains of equity, safety, empowerment and education in decision-making. Significant variations were observed in the methods and practices employed in each case to satisfy the aforementioned criteria, and different levels of performance were consequently achieved.

Both the Vauban and New Islington projects followed a bottom-up approach in planning and embedded public consultation in the heart of the conceptualisation and planning process. This type of public consultation was truly meaningful in the sense that, instead of the local council or the team of partners imposing pre-decided strategies, the concepts were the outcome of the sharing of information and ideas between the future residents and the experts. As the evidence has suggested in Chapters 6 and 8, the numerous consultation meetings and workshops in both settings were inclusive to the greatest extent, and resulted in the highest level of consensus with regards to the development strategy.

In New Islington, for instance, the developers demonstrated a deep concern about the issue of public participation, which resulted in a people-centred approach in decision-making for the regeneration of the area. This endeavour to make the exercise of decision-making as inclusive as possible stemmed from the axiomatic belief that the local community was more aware of the problems related to their neighbourhood and, therefore, had a strategic advantage in its ability to conceptualise an agenda for the resolution of those problems. In the pursuit for the identification of the reasons why the area had failed, developers persistently sought for the public opinion, especially in cases where resident attendance in the consultation meetings was low, by the means of resident questionnaires and interviews. Although this process might seem resource intensive and highly time consuming, it is in fact more efficient, as it leads to the highest level of consensus, and it is more likely to lead to successful urban development since it takes into account the community's perspectives and desires.

In Vauban, the spectrum of participation was even more extended. With the assistance of Forum Vauban, participation became synonymous to partnership, as the Forum helped the resident association to grow into an official member in the team of partners. Consequently, Forum Vauban was given an equal share in the decision-making panel and its ability to influence outcomes was considerably strengthened. Although the interviewees noted that, from an operational perspective, this pluralistic approach often resulted in tension between the residents and the Local Council; people were allocated power to dominate in the quest for the most suitable development alternatives that reflected the community's interests.

On the other hand, in Upton and Kronsberg, public consultation was less open and more superficial, preoccupied with the meeting of the legislative requirement and seeking to legitimise the development intervention. In those two cases the conceptualisation of the development strategy followed a top-down trajectory. The obligatory planning requirement of holding meetings and workshops, open to the public, was indeed met in both settings. However, these official gatherings had the function of informing the future residents and the public of decisions already taken and development plans already completed by the team of partners, and did not encourage an extensive exchanging of ideas and suggestions.

For instance, judging from the project documentation, in the case of Kronsberg, although originally the Local Council appeared willing to attain the Agenda 21 criteria for public participation, the interviews conducted in this study revealed that resident input was limited. The interviewees reported that the limited number of gatherings at the initial stages of decision-making did not leave much room for in-depth consultation or deviation from the partners' verdicts. To some extent it could be also argued that the association of the project with the EXPO was one of the reasons behind the oversimplification of the Agenda 21 guidelines, as the time schedule for the opening of the exhibition was particularly tight, posing an immense pressure on the developers and the local council alike.

However, it is worth noting the remarkable cultural transition that took place over time in the case of Kronsberg. As discussed earlier, although public input was limited

during the planning process, as more residents moved into the neighbourhood, and as the community spirit strengthened, resident involvement increased accordingly. With the invaluable contributions of KUKA and KroKus community centres which provided information on sustainability and supported the community in every way, participation in decisions increased and became part of the local culture. As one of the interviewees reported, the design failure of some of the public spaces in the neighbourhood became an issue of on-going debate and was the catalyst that stimulated more active community involvement.

Long-Term Economic Viability

The literature review conducted in previous chapters suggested that long term economic viability at the local scale has several different aspects that stem from diverse disciplines. The theme, on the one hand, incorporates environmental considerations, for the reduction of dependency on finite resources and for the improvement of energy performance. On the other hand, it integrates social and purely economic aspects, such as income prosperity, profitability of investment and development of green businesses. All initiatives investigated in this research developed strategies to enhance the long-term viability of the scheme and the local community. However, as the local economic environment is unavoidably affected by external activities and conditions, different levels of performance were observed.

In all cases, resource efficiency was enhanced through regulatory control, by the means of the establishment of minimum standards for energy performance. In the cases of Vauban and Kronsberg, however, the goals that were set were more ambitious in comparison to the other projects. The energy specification in Kronsberg was 50KWh/sq m/year, whereas in Vauban it was 65 Kwh/sq m/year. In both cases the targets were significantly increased in comparison to the national norm³⁰. The measures taken to achieve this exceptional performance were aiming at both the building scale, with improvements in the building envelope and at the neighbourhood scale, along with the establishment of CHP units and the exploitation of wind and solar energy. In Kronsberg, although the post-occupancy monitoring survey indicated

³⁰ It is worth noting the fact that the national energy standard was updated in 2006, in line with the WU Directive, to 60kwh/m²a (Federal Ministry of Economic Affairs and Technology, 2007).

problems with the use of mechanical retrofits for increased energy performance, the project overall achieved a reduction in the CO₂ emissions by 75,000t (60%), and a very high percentage of the overall electricity production stemming from renewable resources. Similarly Vauban, achieved 28GJ energy savings per year.

Further resource efficiency was achieved by developing strategies for water and waste management. The instalment of sustainable retrofits for rainwater collection and reuse, grey water recycling, SUDS and the overall increase in the amount of permeable surfaces decreased the risk of natural disasters, and reduced the demand for remote sourcing of water.

All these measures increased the local self-sufficiency of the neighbourhoods by ensuring the natural material flow of natural systems and minimal dependency on finite resources.

In addition, the prosperity of the local economy was secured, to some extent, through planning interventions. Mixed uses were introduced in all cases to ensure a diversity of *living and working opportunities for the locality within walking distance*. However, this research has indicated different levels of progress amongst the projects investigated. In Vauban and New Islington, higher levels of performance in terms of mixed land use were observed. In the case of New Islington, this was primarily due to the developers' will to investigate the local community's needs, in order to provide the diversity of services the neighbourhood was missing. Thus, through the consultation meetings the locality's needs were identified, and were eventually translated into a coherent development plan. Similarly, in the case of Vauban, the local community's involvement in decision-making influenced a particularly strong planning policy in terms of land use.

In contrast, the lower levels of progress in the cases of Kronsberg and Upton were the result of managerial complications and setbacks caused by the recession. For instance, one of the interviewees admitted that the failure of some of the leisure facilities located at the habitat project was mainly due to managerial ineffectiveness. On the other hand, the research illustrated that the EXPO site was utilised for the development of the business sector; however, the impact on employment on a geographical scale was insignificant. Similarly, in the case of Upton, although the

partners' intentions were positive, the recession prevented the commercial partners from investing in the area. Therefore, an appropriate balance between living and working was not achieved.

The comparative analysis of the projects' performance along the key criteria for sustainability discussed in this chapter has revealed a number of key factors that have influenced variations in progress towards sustainability. The next section features an enumeration of the key influencing factors as well as an in-depth discussion on how these have contributed towards the varied outcomes.

11.5 Driving forces for variations in projects' performance towards sustainability

As per the discussion in the previous sub-chapter, different levels of progress in terms of sustainability were revealed for the different projects, and different factors that caused the variations in progress emerged. The Kronsberg and Vauban projects for instance, were both completed at the time of investigation, whereas in New Islington and Upton, construction was still on-going. In line with the aforementioned issue, it is important to note that, although each project was studied in depth, the resources and project documentation referring to New Islington's and Upton's overall performance and final outcomes was not available. The evaluation of the UK projects is, therefore, to some extent, premature, meaning that further investigation will have to be undertaken before a conclusive overview can be developed.

Despite the difficulties explained above, the research has detected the emergence of certain patterns in terms of factors that have affected the projects' performance towards sustainability. These are the following:

- Local conditions (location, climate, social composition, soil conditions, environment, flora/fauna)
- Planning regulations and design standards (local, regional, national, international)
- Key stakeholders' priorities for development/regeneration

- The extent of public/resident involvement
- Availability of instruments for educational support on sustainability
- Financial Resources
- Economic climate and real estate market conditions

Not only do these influence the progress of the scheme, as per the illustration below, but they also affect each other as summarised in the paragraphs that follow.



Figure 19 Driving forces affecting a project's progress towards sustainability

Local conditions (location, soil conditions, environment, flora/fauna climate, social composition, culture,)

The local conditions were contextual factors of high importance that varied in each country and setting, and influenced the development strategy of each project to a large extent. It has been evident from the projects studied, that local conditions such as topography, culture and demographics can form a suitable environment for the cultivation of creative ideas and unique sustainable solutions.

For instance, in New Islington, the high levels of progress in terms of soil management were related to the high degree of soil contamination, whereas, in Upton, soil

decontamination was not required. Similarly, the high risk of floods in the area of Upton influenced a robust water management strategy, whereas in Kronsberg, the fragile flora and fauna required the adoption of strategies for the maximisation of green spaces and creation of new habitats. Also, with regards to energy policy, climatic conditions were major factors of influence. Freiburg, as an example, is one of Germany's sunniest regions, and therefore, the installation of solar retrofits on buildings was maximised.

Demographic issues were also important factors that influenced different strategies and varied performance. For example, in New Islington, the monolithic structure of the population, and the general social decline, were matters that required immediate and radical attention, and therefore, resident consultation and involvement in decision-making became a priority.

The examples enumerated above highlight that local conditions influence a project's development objectives and are, therefore, associated with different levels of progress towards sustainability.

Local conditions also affect a number of other driving forces as seen in the diagram below.



Figure 20 Drivers affected by local conditions

To summarise, Local Conditions dictate a project's development objectives and can potentially offer a competitive advantage in terms of maximising the use of sustainable technologies and systems, should the rest of the influencing factors permit.

Planning regulations and design standards (local, regional, national, international)

As discussed in previous chapters, the planning regulations of all spatial levels are fundamental for the encouragement or discouragement of sustainable development solutions. Therefore, depending on the year of the project's commencement and the country's state of progress in regards to sustainability, different levels of success were observed.

In Germany, at the time when the planning process for both Vauban and Kronsberg was initiated, an official national strategy for sustainable development did not exist. However, climate policy at the national level had been coherently developed from as early as the 90's (Jänicke, Jörgens, Jörgensen, & Nordbeck, 2001). Therefore, rather than giving equal weight to social, economic, and environmental aspects, the ecological dimension had been the primary focus at the national level. The reason for that was the strong appeal the environmental movement and the Green Party had to the public. The National Climate Protection Programme, presented in 2000, as well as the Renewable Energy Act that was adopted in 1999, incorporated explicit goals and targets and were the driving forces behind a remarkable reduction of CO2 emissions (Jänicke, Jörgens, Jörgensen, & Nordbeck, 2001).

In 1993, the year when the Vauban project was initiated, federal and municipal support for Agenda 21 initiatives was non-existent. Therefore, the coordination of the process originated from resident groups that later on became members in the key stakeholder panel. This example highlights how each country's planning system dictates the jurisdictional power and responsibilities of the different planning authorities participating in the development of the built environment³¹. Depending on

³¹ As we have seen in the case of Vauban, the regulations developed by the municipal planning authorities had an influence on which body (private/municipal) acts as the initiator of the project. In Vauban the residents were an official member in the panel of stakeholders and resident housing associations took the place of private developers in the scheme.

the level of freedom the jurisdictional bodies allow to the initiator and key stakeholders of the project, different levels of progress are subsequently achieved.

On the other hand, the Kronsberg project was initiated at a time when the state mechanism had started supporting Agenda 21 initiatives, as a result of the Rio-plus-five-Summit in 1997. More specifically, the State of Saxony was one of the first that provided support for Agenda 21 activities. The Kronsberg project greatly benefited from that advantage and received increased subsidies and support from the state.

The example described above illustrates how the extent to which sustainability has been embedded in the planning system at all levels affects the extent of support (subsidies, sustainability guidelines/know-how/educational resources) for new projects.

In the UK, the planning process for New Islington and Upton was initiated around the same time, in the beginning of 2000. A national strategy for sustainable development had already taken effect from as early as 1994, and was revised in 1999, with the concurrent introduction of a set of 140 indicators. Consequently Local Councils in the UK had become more active in regards to Agenda 21 initiatives. However, although numerous sustainable development strategies had been created by a plethora of governmental and non-governmental bodies, the absence of links between them were reducing the scope for effective mainstream action, particularly at the local level (House of Commons. Environmental Audit Committee, 2004). Therefore, deviation from the mainstream planning and development process was sporadic. The two projects that have been included in this research are examples of this sporadic phenomenon. Both the New Islington and Upton projects were experiments led by the English Partnerships, the national regeneration agency for England. EP as the initiator provided significant funding and set high standards for energy efficiency, water consumption, domestic and construction waste, etc. Similarly, the Prince's Foundation involved in Upton provided educational support for matters relating to sustainability and set specific design standards through a coherent Design Code.

In 2000, under the Local Government Act, Local Authorities were required to prepare community strategies to promote the social, economic and environmental well-being of their areas. The new policy bore resemblance to the Agenda 21 programme for sustainable development at the local level; however, it did not specifically relate to the 10 year experience of the latter, and the local authorities were given the freedom to decide whether and to what extent they wished to respond to LA21 (Lucas, Ross, & Fuller, 2003). Although over 90% of local authorities in the UK were estimated to have produced LA21 programmes by 2000, readily available information on the content of these programmes was mostly anecdotal and not readily available (Lucas, Ross, & Fuller, 2003).

The above paragraphs indicate that the progress of a project towards sustainability can be greatly enhanced or hindered by planning regulations stemming from jurisdictional bodies of all spatial scales. In other words, the Planning System and corresponding regulations greatly influence whether sustainability is an option or a mandatory requirement in urban development.

The complex interplay between the Planning system and other driving forces also identified in this chapter is shown in the diagram below.



Figure 21 Driving forces affected by Planning Regulations

Key stakeholders' priorities for development/regeneration

Alongside the planning regulations and design standards formatted by the public administrative bodies of all spatial levels, guidelines for development are also dependent upon the priorities and input of other key stakeholders involved in the scheme.

The analysis of the four projects conducted in previous chapters has shown that the stakeholder group commonly comprises of state bodies³²; developers or housing associations; and non-Governmental Agencies³³.

Evidence suggests that there are sharp differences between the factors motivating each of those bodies to embrace sustainability.

Developers are usually driven by financial motives but, in their endeavour to succeed in the highly competitive construction industry, they often invest in sustainable technologies, to maximise efficiency, to enhance design quality and to gain a good reputation.

In contrast, Non-Governmental Agencies as well as municipal authorities involved in a neighbourhood scheme are generally driven by social and environmental considerations. Therefore, their aim is to promote social responsibility, meaning that they are often the financial sponsors or the providers of benevolent support in projects that promote the well-being of the community.

In Upton, for instance, the development of the Design Code was the outcome of the Prince's Foundation input, while the focus on the conservation of the local habitat was, to a large extent influenced by the University of Northampton that was monitoring environmental aspects since 2003. In Kronsberg, the driving force behind the effective incorporation of the advanced ecological optimisation standards was KUKA, Kronsberg's environmental liaison agency. Not only did the agency provide the

32 Usually the Municipal Authority

33 Universities/Sustainable Development Foundations/Environmental Agencies e.t.c.

developers and craftsmen with the necessary know-how, but it also educated the residents in matters regarding sustainability and was, therefore, a promoter of an effective public participation process. Similarly, the New Islington project was influenced by the lead developer's focus on design innovation, and by the Millennium Community's goals for sustainability. Lastly, the Vauban project took numerous sustainability issues on board due to the significant input of local resident groups.

The cases investigated in this research, therefore, have indicated the importance of the group of stakeholders' priorities in the achievement of ambitious sustainability targets.

Finally, as the diagram below highlights, there is an amphotropic relationship between the stakeholder group's priorities and other driving forces that affect the progress of a sustainable neighbourhood project.

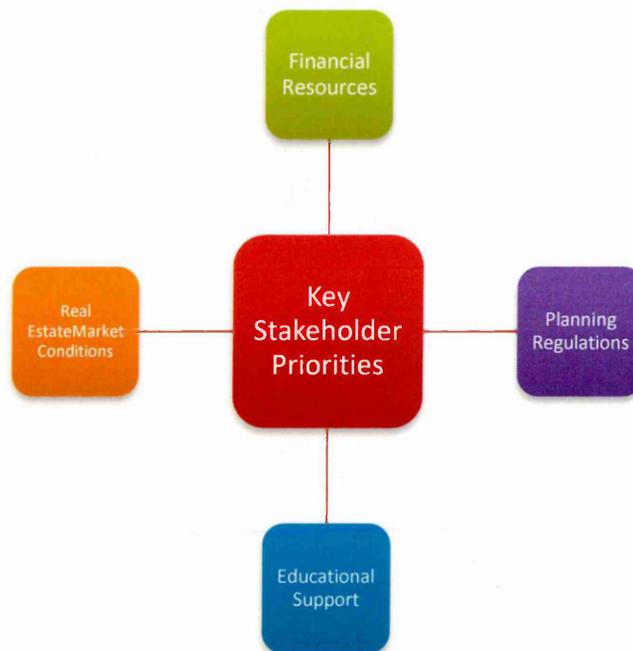


Figure 22 Driving forces affected by Key Stakeholder Priorities

The extent of public/resident involvement

The importance of public participation in decision making has been exhaustively discussed in previous chapters and the case study experience has proved how drastically public input can influence exceptional results.

The community is characterised by a natural inclination to drive sustainable solutions that promote a viable future for the community and the future generations to come. In terms of priorities, the community is concerned about the well-being of the residents. According to the findings presented so far, at any given point, the community will be seeking affordable solutions in terms of housing; quality neighbourhood infrastructure; environmental optimisation; and varied transportation options.

In an effort to achieve those goals, the public becomes active in consultation meetings and people are often willing to voluntarily offer services/ financial resources.

The most characteristic examples were the cases of Vauban and New Islington, where residents earned or were given the right to participate in decision-making as an official partner in the executive panel. This collaborative, bottom-up approach yielded astonishing levels of consensus between the stakeholders, created a culture of public involvement and laid a strong focus on public welfare aspects.

On the other hand, as the Kronsberg experience has indicated, an inactive local community may adversely affect the success of a sustainable neighbourhood development project.

The consultation process followed in Kronsberg and in Upton was superficial and less inclusive. Although a number of meetings were held, these were mainly focused on informing the public of conclusive decisions taken by the team of partners. As a result, negative consequences were observed that involved disputes over the usability of public spaces, inadequate accessibility provision, and lack of basic neighbourhood infrastructure.

The observations so far have led to the conclusion that public participation is a fundamental aspect of sustainability, when conducted in a non-superficial way. Despite its time and resource consuming aspects, in most cases, it has proved

beneficial for the progress towards sustainability, but, whether the public becomes active in the pursuit for sustainability or not, is directly associated with a number of other driving forces as shown in the diagram below.

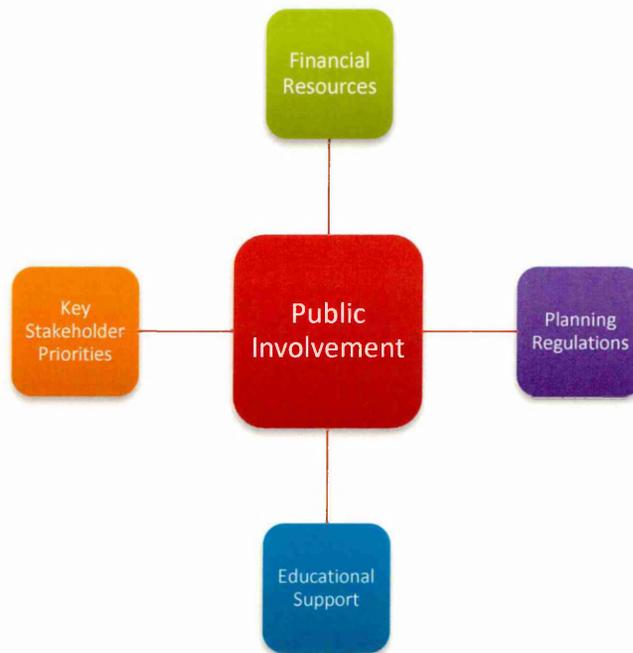


Figure 23 Driving forces affecting the extent of Public Involvement

Availability of instruments for educational support on sustainability

Researchers believe that a dominant issue for the promotion of sustainability at the local level is the availability of a local network of skills and educational resources (Hawkins & Wang, 2011). This research has highlighted how a support network can assist cities and local communities in the pursuit of a comprehensive sustainable development strategy, and how the absence of such a network can complicate and delay the process.

So far we have seen that educational support for sustainability usually stems from two different types of facilitators. Firstly, local institutional establishments often offer educational support (seminars/workshops) on sustainable development.

Secondly, National and International sustainability support networks (eg Forum Vauban, IISD etc) are capable of disseminating knowledge on several different aspects of sustainable development through sharing case study experiences.

As illustrated in the Kronsberg project with KUKA and KROKUS centres and similarly in Vauban with the Forum, SUSI and Buergerbau AG, local support institutions have provided sufficient and credible educational resources for developers, builders and residents alike and, as a result, the projects' performance with regards to environmental targets has been highly satisfying. On the other hand, the lack of a local support mechanism in the Upton project resulted in problems with the retrofitting of the innovative sustainable technology on the buildings (wind turbines, ground source heat pumps, interlocking of roof tiles with the photovoltaics) and in the deterioration in the quality of the architecture and detailing in the later phases of construction due to the oversimplification of the design code (Chapter 7.3).

Not only can educational support motivate the local community but it is also of crucial importance when a network of skills is not available in the local area. If the local work force does not get educated on the instalment and maintenance of sustainable technologies, defects will be unavoidable.

In New Islington, although there was a lack of an institutional establishment similar to KUKA or Buergerbau AG, the lead developer took a leadership role in guiding decision-making, and in providing expert technical support for matters relating to energy planning and sustainable development. In the planning process, a team of experts was employed to support decision-making and to provide technical information for the establishment of the ambitious sustainability targets. Furthermore, it is worth noting the partners' collaboration with the Housing Forum and Construction Skills (former CITB) for the provision of construction training to fill skills gaps and invest in the work potential of the local community. Principal contractors were selected on the basis of their willingness to recruit local people and provide demand-led training (de Souza, 2008).

To summarise, bearing in mind the complexity of the field of sustainable development and considering the challenges posed by the constant innovations in the sustainable

technology arena, knowledge dissemination and educational support for the local communities through local support networks is of the utmost importance.

Finally, evidence presented in Chapters 6,7,8 and 9 and the discussion in this chapter, have suggested that the availability of educational support and the extent to which educational resources are utilised, depend on a number of factors as the diagram below summarises.

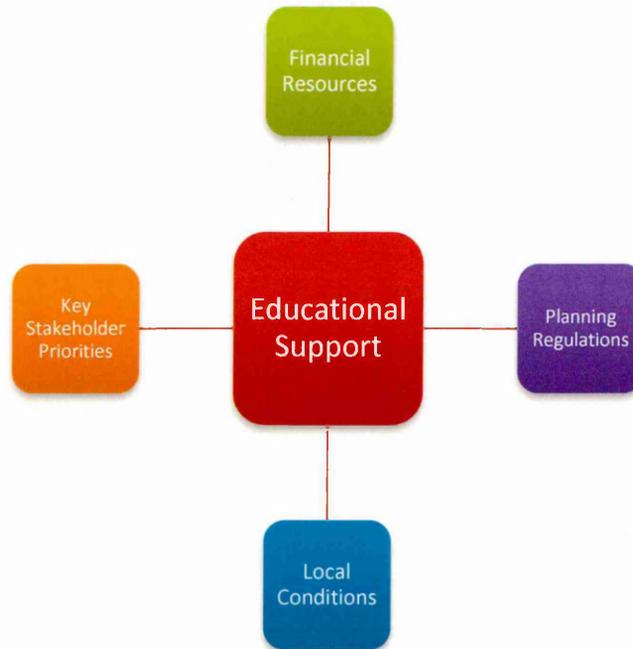


Figure 24 Driving forces affecting the availability of educational support

Financial Resources

The investigation of the four case studies has highlighted the fact that the availability of sufficient financial resources is a key element for the success of a sustainable development initiative. The availability or lack of sufficient financial resources greatly influences the pace and success of any sustainable development initiative.

We have seen two different types of fund raising/cost-saving strategies in the cases we have investigated so far: The typical ones, and the non-typical ones.

Amongst the typical ones were: the selling of the land to developers to fund public infrastructure; funding stemming from Local/Borough/National or International bodies; and finally private body contributions.

The Vauban project, for instance, received a substantial amount of funding from the European Union, the state and the German Environment Foundation (Deutsche Bundesstiftung Umwelt, DBU). Additionally, the development of the public transport infrastructure was funded by revenue from the selling of the land to developers and owner-occupier co-operatives (*Baugruppens*).

On top of the aforementioned typical fund raising strategies, several innovative approaches were employed for the financing of the projects. These often included tax or levy imposition for not complying with planning regulations or, cost-saving measures that facilitated the development process.

In Vauban for instance, by obliging the car owners to buy a parking space in the municipal car parks, the municipality covered the cost of parking infrastructure. Another example was the formation of *Baugruppens*. Firstly, this model facilitated the achievement of the energy optimisation ambitious targets with little or no state or other organisations' funding as the city council was giving preference to the *Baugruppens* with the most ambitious plans for energy optimisation. Secondly, the formation of building groups lowered the construction and design costs by at least 20% when compared to the conventional model.

Kronsberg similarly benefitted from the availability of subsidies, but was less radical in the pursuing of innovative investment opportunities. Sources of funding were the EU (Thermie-Project), the city council, and the State of Lower Saxony, for the funding of the ecological optimisation projects and their monitoring. The funding of the public infrastructure stemmed from the selling of the land to a plethora of private developers that became involved in the scheme. Furthermore, to assist in the availability of affordable housing, the city council and the Federal State created a housing fund for the low-income individuals and state beneficiaries.

In Upton funding stemmed from the Homes and Communities Agency and Northamptonshire County Council. Funds (24.6 million pounds) were allocated upfront for improvements to the existing transport network with three new roads in the area, and for other public infrastructure (school, SUDS, affordable housing, e.t.c.) with the prospect of cost recovery through land sales and public subsidy. The availability of

funds upfront meant that infrastructure provision would be preceding the residential development, so that the first residents could benefit from the availability necessary public amenities.

In New Islington, a vast percentage of the funding was provided by the Homes and Communities Agency (22.7 million pounds) and the Northwest Regional Development Agency (4.4 million pounds) (HCA, 2008) while the central Government provided the funding for the New Islington Free School (MGS, 2011). That covered the higher cost for the building's compliance with HCA's Housing Quality Indicators, the cost of masterplanning, land acquisition, site remediation, public realm and canal infrastructure expenditures. Funding was also provided by the National Affordable Housing Programme (3.3 million pounds) for the construction of social housing. The funding provision accelerated the development of public realm works and maintained a high quality design in accordance to sustainability criteria (EIUA (European Institute for Urban Affairs), 2006).

This chapter has highlighted how the availability or abundance of financial resources can subsequently hinder or greatly support the progress of a sustainable development initiative.

The diagram below illustrates the complex relationships observed so far between different types of fund raising/cost-saving techniques and other driving forces identified in this chapter.

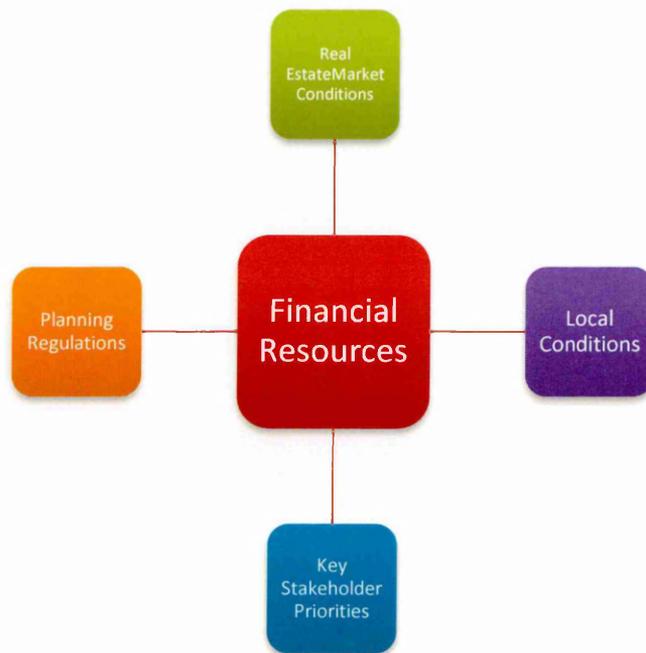


Figure 25 Driving forces affecting the availability of financial resources

Economic climate and Real Estate market conditions

This research so far has highlighted the fact that the pace and quality of the development of an urban project is greatly influenced by unstable market conditions. An unpredictable economic climate places pressures on the funding agencies and commercial partners and hinders the marketing of the properties, whereas in prosperous economic conditions, properties are sold more easily and sufficient funding is available upfront for public infrastructure.

As was discussed in previous chapters, in Upton, the recession adversely affected the viability of investment for the residential and commercial partners alike. The difficult economic climate caused the withdrawal of the commercial partners, and as a result, the development of the commercial facilities stalled.

Similarly, in New Islington, although the scheme has influenced the establishment of commercial and office accommodation at the neighbourhood fringe (*fabrica* office accommodation), the obscure financial climate and the challenging market conditions proved to be problematic for the attraction of commercial development within the scheme (Manchester City Council, 2009). Also, the real estate market in the area of

Ancoats had failed due to the numerous social issues, the decline of the industries and the lack of public support.

The marketing of the properties was further hindered by the difficult real estate market conditions, as at the time of completion of the “chips” building, there were a large number of empty properties in the Greater Manchester area (Audit Commission, 2011). The difficult conditions of the fragile market though and the individuals’ difficulty in accessing mortgage finance motivated the incorporation of special programmes backed by the government. For example, the First Buy equity loan scheme, or the Shared Ownership scheme.

The development partners also responded to the crisis by reviewing the masterplan and by remodelling the tenure mix, property type and density. More specifically, the originally intended 1,400 homes never materialised and, due to the crisis, only 180 houses have been built so far, 50 of which are social houses for the former residents. For instance, in the case of the *Guts* project, the original masterplan featured high-rise developments but the project turned out into a residential cluster of two storey houses for social rent and shared ownership.

On the other hand, the real estate market and the economic circumstances were rather favourable in the cases of Kronsberg and Vauban.

In Kronsberg at the time when the project was initiated the economy of Hannover was rapidly expanding. As a result, there was a high demand for properties in the area, which, combined with the innovative ideas the EXPO was promoting, greatly enhanced the marketing of the properties. The properties were rapidly occupied, especially the low-cost dwellings.

In the case of Vauban, the unpredictability of the real estate market conditions was bypassed with the formation of the building co-operatives. In that way, the profit-orientated developer firms were excluded in whichever phases of development was possible, and the members of the group shared the financial risks, as well as the benefits.

In addition to the pressure posed by the general economic conditions, the marketing of properties can also be significantly affected by the specific building aesthetics dictated by sustainable design. For instance, the passive houses of the solar settlement were proven more difficult to sell due to the inflexible design (narrow layout) and the high market value due to increased upfront costs. For that reason the initial plans for a much larger area to be allocated for the solar settlement were revised after the failure of the first phase, and the city council decided to sell the rest of the land to commercial developers, as was pointed out by the interviewees.

The experiences from the four case studies suggest that market factors are constantly changing and can hinder the progress of an urban project to a great extent. Not accounting for these factors can have unpredictable consequences, and can generate economic and social complications.

Finally, the diagram below summarises this paragraph's discussion on how other factors identified in this chapter can have a major effect on Real Estate Market conditions. If the illustrated relationships are taken into account, future trends can be forecasted and financial risks can be minimised.



Figure 26 Driving forces affecting the Real Estate Market Conditions

11.6 Summary

In this chapter, the cross-comparative case study analysis of the four projects conducted was aiming at the following:

1. To test the usability of the checklist to validate its functionality as an assessment tool for sustainable development initiatives.
2. To identify and analyse the factors that have influenced varying levels of performance.

The use of the Analytic Hierarchy Process (AHP) enabled the evaluation of the criteria for success in developing sustainable neighbourhoods identified in Chapter 10. The assignment of a universal priority for each criterion facilitated their hierarchical grouping which in turn enabled the rating of the four projects.

The rating of the projects was in turn conducted by the author, based on the analysis performed in Chapters 6, 7, 8, and 9 and each project's overall score was discussed in more detail.

The comparison of the four projects' success in Section 11.4 then demonstrated how the different levels of progress in key sustainability themes (Design Quality, Mobility, Ecological Optimisation, Community, and Long-Term Economic Viability) are affected by a number of factors or driving forces.

These are: Local Conditions; Planning Regulations, Key Stakeholders' priorities; the extent of Public/Resident Involvement; the availability of educational support/networking; Financial Resources; and the Real Estate Market conditions.

The overview of those factors presented in Section 11.5 showed that not only were they perceived to have had significant effects to the progress towards sustainability, but they were also strongly related to each other in an amphidromic way.

It is, therefore, necessary for those driving factors to be taken into account when using the checklist of criteria suggested, and before making any final judgements regarding the assessment of a neighbourhood project.

The last chapter of this thesis following in continuation will present the final conclusions of the research. The focus will be on the contribution of this research to existing knowledge, as well as on limitations and recommendations for further research directions, based on the study results.

Chapter 12. Conclusions

In this final section of the thesis the overall evaluation of the research will be conducted. The evaluation will be based on a review of the research objectives presented in Chapter 1 and the findings and subsequent conclusions reached will be summarised. Finally this chapter will emphasize on the research limitations identified and building on the study results, it will make recommendations for further research.

12.1 Evaluation of results/ Research hypothesis, aims and findings

The study of the four projects has confirmed the initial hypothesis that the use of checklists and indicators facilitates sustainable development. The use of checklists for environmental specifications in Kronsberg; the Millennium Communities checklist used for New Islington; or the design code that was utilised in the development of Upton, all led to successful results as was discussed in Sections 6.5, 7.5, 8.5, and 9.5. Furthermore, the need for checklists that holistically address sustainable development at the neighbourhood scale was confirmed in the interviews conducted with the experts in Sections 6.3, 7.3, 8.3 and 9.3.

In relation to the research hypothesis, throughout the course of this research the main aim has been to explore the opportunities that exist in the development of a checklist of criteria in promoting sustainability at the neighbourhood scale.

A number of objectives, presented in Chapter 1, were generated to facilitate the achievement of the overall aim. This section will focus on the review of the research objectives and will reflect on the subsequent findings that emerged.

The first objective of this research was:

- 1. To undertake a theoretical exploration of key sustainable development concepts emerging from literature.**

An in-depth analysis of the theoretical notion of sustainable development that was undertaken in Chapter 2 showed that there is a plethora of definitions

aiming to provide the philosophical background of the sustainability concept. In line with the most popular definition for sustainable development, formulated by the Brundtland Commission, (*"A development that meets the needs of the present without jeopardizing the ability of future generations to meet their own needs"*), and following the three-pillar structure of the sustainability model, the social, environmental, and economic dimensions were further examined. The same chapter also embarked on a further investigation of existing frameworks and tools, aiming to outline the practical processes involved in the pursuit for sustainable development.

An extensive literature review was also focused on existing definitions of the neighbourhood unit and on the deriving neighbourhood design movements. This investigation showed how the concept has evolved over time, and indicated how the theoretical background the design movements provided influenced variations in the materialisation of the concept.

The aforementioned investigation resulted in the concentrative enumeration of a number of criteria that pertain to each of the three pillars. As the neighbourhood unit features the scale of concern for this research, the exploration for the contributing criteria was focused on the spatial context of the neighbourhood unit.

The list of criteria based on the literature review was used for the fulfilment of the second objective of the research which was:

- 2. To use the list of concepts as criteria to identify exemplary sustainable neighbourhood initiatives to be used as case studies.**

As mentioned previously, the appropriateness of the case studies to be included in the research was based on the following basic criteria:

- A. Scale (5,000 - 20,000 inhabitants)
- B. Location (Europe)
- C. Stage of development (completed or near completion)
- D. Criteria defined in the literature review had to be met

In order to facilitate the process of assessment a scoring matrix was devised, where the projects' suitability could be assessed according to whether the criteria had been met or not met. Eventually four projects were selected as suitable for the purpose of this research and these were New Islington in Manchester, UK, Upton in Northampton, UK, Kronsberg in Hannover, Germany and Vauban in Freiburg, Germany.

The third objective of the research was:

- 3. To investigate the case studies selected to determine the key goals and objectives that were used to achieve a significant level of progress towards sustainability at the neighbourhood scale.**

The four exemplary projects were outlined and analysed in-depth in Chapters 6, 7, 8 and 9. The description of the projects involved the investigation of the site location and context; the enumeration of key stakeholders involved in decision-making and in the development process; the description of the planning construction stages; and the schemes' aims, criteria and guidelines that were established by the group of stakeholders. In Sections 7.2.5, 8.2.5, 9.2.5 and 10.2.5 the initial aims and the performance each scheme achieved were summarised and tabled by the author. This process constituted the first level of assessment that was based on project documentation and, wherever possible, on monitoring reports.

The second stage of the analysis of the projects was concentrated on a qualitative and quantitative assessment of the projects' performance according to the critical reflections of key stakeholders and according to the residents' satisfaction with their neighbourhood.

A synopsis of the key outcomes of the analysis for each individual project follows below.

New Islington

- The project was successful in respect to regenerating an old, neglected and stigmatised residential estate because community engagement was empowered. Active dialogue was embraced by the partners and in that way the reasons why the area had failed came to the surface and the locality communicated their aspirations for the future of their neighbourhood. As a result the public realm aspect of the scheme meets the needs of the residents in terms of services and other public infrastructure, and the landscape developments have attracted city-wide and nation-wide attention and visitors, as well as inward investment.
- A strong branding was created for the scheme through an approach of incorporating iconic buildings and popular architects. The neighbourhood therefore gained international attention and demand for properties in the area was increased.
- A clear concept was established in regards to the strategy for sustainability (Millennium Communities targets). This included comprehensive guidelines for the ecological optimisation at the building (Eco Homes Excellence) and at the urban scale (soil remediation, reduction of construction waste, protection and enhancement of natural landscape etc.). The buildings therefore achieved Eco-Homes excellence and their ecological performance was to a large extent improved in comparison to the national norm.
- A strong focus was posed on the mixed aspect of the scheme as the area before was characterised by a monolithic social structure and had a residential profile. Mixed uses were therefore allocated to the ground level spaces of the chips building to allow for the establishment of commercial facilities, and housing was allocated for sale or part-ownership to encourage the establishment of a balanced social profile.
- Although it was proven difficult to resolve the problem of high unemployment rates in the area, the partners chose to select the principal contractors on the

basis of their willingness to recruit local people and provide demand-led training on sustainability and construction (de Souza, 2008).

Upton

- The establishment of the Design Code provided specific design targets and criteria both for the buildings and for the masterplan for successful implementation of the sustainability agenda.
- The water management strategy (SUDS, rainwater harvesting, green roofs, water butts) provided solution to the long-standing problem of floods in the area, encouraged biodiversity and created exceptional landscape features that provided opportunities for recreational activities.
- Energy efficiency and reduction of carbon emissions was emphasised through the incorporation of the BREEAM guidelines and the use of MMC (Modern Methods of Construction). As a result, the performance of the building envelope was increased by 15% over building regulations and CO₂ emissions were reduced to less than 20kg/sq m/year.
- The balanced population profile was assigned a high priority. The measures employed to achieve a diversity of population were meant to satisfy the 22% benchmark set by the 1998 guidance for affordable housing. However, the task was not undertaken in the commonly applied superficial manner of clustering social housing developments. On the contrary, affordable units were indistinguishable from the market rate housing and were pepper-potted across the neighbourhood, to avoid stigmatisation and the formation of housing ghettos.
- A mixture of uses was promoted with flexible buildings on the main street that allow for conversion from residential to retail, office, or community services. However, the task was to a great extent undermined by the recession that caused the withdrawal of commercial partners. As a result the neighbourhood is devoid of a vibrant mixed-use core that has left the residents unsatisfied.

Vauban

- The community-led planning process in this project has clearly demonstrated that community empowerment is necessary to accomplish a significant progress towards sustainability. Collaborative decision-making was celebrated in Vauban and proved to be one of the project's key assets.
- Secondly, the experience shows that the involvement of the land owner (in that case the municipal authority) in setting advanced sustainability targets within the contracts for the acquisition of the land can encourage developers and housing co-operatives to make significant progress towards bioclimatic building design and sustainable construction.
- Thirdly the experience indicates the importance of the appointment of supporting establishments that provide the necessary know-how for matters relating to sustainability and the importance of the involvement of a body that co-ordinates the decision-making process. Forum Vauban was, in that respect, an important champion that encouraged significant achievements with regards to sustainable neighbourhood development by co-ordinating decision-making, by providing relevant information through on-line resources and publications, and by organising seminars and training programmes for practitioners and residents alike.
- The project also demonstrated that a Car-free neighbourhood is possible to materialise. However, the involvement of dedicated citizens, as well as the introduction of strict measures that discourage car-ownership, are both prerequisites in order to achieve a significant reduction in car usage.
- Finally, the Vauban project was revolutionary with the encouragement of building co-operatives that assisted people in building inexpensively and strengthened community spirit even before the first residents moved in to the neighbourhood.

Kronsberg

- The experience of the Kronsberg project has illustrated how it is possible to encourage private sector innovation and how to promote deviation from standard practice. Sustainability-led planning and design was reinforced through

improved building regulations and through clauses in the land sale contracts that encouraged private developers to experiment with innovative solutions in building design and construction.

- Another important lesson learned from the Kronsberg project was the allocation of subsidies and incentives for sustainable building design and construction, for the use of green energy resources and for experimentation with social sustainability issues. The Federal Government as well as the State of Lower Saxony utilised these funding schemes to promote sustainable solutions pertaining both to the environmental and social domains.
- The success of the public transport concept was another important lesson for future sustainable neighbourhood design. The municipality sought for the most sustainable and viable solution – the extension of the tram line to reach the new district. The viability of the scheme was secured as the densities in the compact development were high. Ease of access was ensured with two tram-stops that ensured easy access to all properties in the neighbourhood. In addition the tram stops were located at the bottom part of the settlement where the high-rise building blocks were constructed.
- A balanced residential profile was promoted through four distinct measures. Firstly, a number of incentives (subsidies or other financial motives) were given to developers to account for diverse social and cultural needs of a diverse population. Therefore the properties allowed for flexibility in the layout so that spaces could be adaptable to suit the needs of people from different cultural backgrounds and to easily adapt to changing housing needs (e.g. FOCUS, HABITAT). Secondly the masterplan configuration reinforced the peripheral configuration of buildings within the building block, so that an inner court space would be created to enhance the feeling of neighbourliness. Thirdly, incentives were given for families with young children and for low-income households. Finally diversity of building types, sizes and tenures stimulated increased demographic diversity.
- Another success of the scheme was the co-operative project development that involved all key stakeholders: the City Council, Kronsberg Advisory Council, the private developers, KUKA (Kronsberg Environmental Liaison Agency) and the

community. Project management was facilitated as each of the co-operating bodies was allocated specific responsibilities and therefore, the pace of development was increased.

- Finally the regular monitoring of the scheme ensured the matching of the delivered result with the initial framework for sustainability. Regular monitoring, during construction as well as post-occupancy, identified problems and indicated areas where there was room for further progress.

The identification of the successful and unsuccessful aspects of the four projects, outlined previously and extensively documented in Chapters 6, 7, 8 and 9, allowed for the fourth objective of this research to be accomplished:

- 4. To revise the initial checklist of criteria identified in the literature review to include new themes and criteria deriving from the analysis of the case studies.**

Based on the analysis of the four projects' sustainability progress, the sustainability matrix was amended and completed. The matrix allows for a holistic appreciation of sustainable development at the neighbourhood scale and comprises of the general themes, sub-themes, criteria, methods and indicators.

The different sections of the matrix have been developed in accordance with facts identified in the literature review and in line with evidence extracted from the analysis of the case studies. Each column equals a different level of understanding about sustainable development that progresses from the most generic (themes) to the more specific (indicators).

The fifth objective was related to the assessment of the checklist, as outlined in the following statement:

5. **To identify whether the revised checklist of criteria can be applied on similar initiatives in different settings and to explore potential key application problems.**

The finalised sustainability matrix presented in Section 10.2 has been based both on scientific knowledge (literature) and on empirical evidence deriving from the projects studied. It rationalises the complex field of sustainable development and it focuses on a specific spatial scale. It is therefore a valuable tool that can be used by decision-makers for the planning of similar initiatives that pertain to the neighbourhood scale.

However in Chapter 10 a number of key issues regarding the adoption of the matrix were identified. Firstly, the use of checklists and frameworks for sustainable development runs the risk of being seen as tick-box exercises. On the contrary, they should be primarily utilised in the initiation of discussion between all key stakeholders. Additionally, as the literature suggests and as was advised by the participants in this research, checklists should be used alongside common sense and instead of being exhaustive, they should allow for some flexibility in order for the decision makers to be able to make additions or modifications according to the local conditions, and the community's needs.

Another issue of concern identified in Chapter 10, is the suitability of the indicators included in the matrix. Although a number of indicators have been suggested, for some themes, the lack of relevant scientific knowledge means that there were no indicators available. The establishment of appropriate indicators is therefore crucial to ensure a scientifically valid result. However, this process invites broad scientific engagement and requires international debate and institutional assessment (see Chapter 10.3).

Finally, although the initial intention of the researcher was to develop a matrix that could be used internationally, it has been proven that this step is not

feasible yet. The development of a universal checklist and the creation of a universal set of associated indicators is a matter that can only be resolved through international debate and through further experimentation.

The development of the checklist was followed by another key objective of this research which was:

- 6. To cross compare the case studies selected in a qualitative and quantitative manner to gain an insight on the contributing factors to their success and to investigate themes in which there is room for progress.**

The task of cross-comparison had three different dimensions. Firstly it was aiming at measuring quantitatively the extent to which each case study responded to each particular theme. Secondly, the scope was to gain a rich insight on the commonalities across the different settings. Finally, by focusing on variations across different locations the process was aiming at the rich harvesting of factors that have contributed to failures and successes.

In Section 11.2, the method and process of assessment was explicitly discussed. By applying the Analytic Hierarchy Process, the quantitative assessment of the four projects was possible and the areas where further progress was desirable were, in that way, more easily identified. More specifically, the four case studies were individually assessed according to the six principal themes this research has concluded to: Architectural quality, urban design quality, mobility, ecological optimisation, community and long-term economic viability.

Having each theme as a common denominator, Section 11.4 elaborated on differences in the development strategy followed that caused differences in performance. A number of key approaches that influenced good performance in each theme were then identified.

These were:

- Design Quality
 - Improved Design quality can be achieved with the establishment of a design code. However, the design code should be characterised by some degree of flexibility to avoid limiting architectural creativity. Nonetheless design codes rationalise the multiple dimensions of urban design and provide invaluable guidance for developers, architects, planners, and housing co-operatives.
 - Design quality can be used as a marketing tool for a project located in a problematic setting. As the experience of New Islington indicates contemporary architectural design and the involvement of renowned architects and developers in an urban scheme, creates publicity and facilitates the selling of properties, even when unstable real estate market conditions are experienced.
 - In cases of neighbourhood regeneration, it is important to preserve part of the building stock that is associated with the locality's history. The experiences of New Islington and Vauban have shown that in addition to the numerous cost-effective and time-saving advantages this strategy has, it positively contributes to the preservation of community's distinct identity.
 - Design quality can be improved by encouraging practices that promote architectural diversity. In regards to the aforementioned, the model of building co-operatives followed in Vauban created tailored-made designs that suited the needs of the future residents and generated a particularly diverse architectural result. In addition, it was associated with numerous other advantages such as low-cost construction and the formation of social bonds amongst the members of the Baugruppens, prior to the construction of their properties.

- Finally, it is evident from the experience of Kronsberg that the encouragement of green building practices is not necessarily associated with deterioration in the quality of architecture. On the contrary, by encouraging experimentation with bioclimatic solutions and sustainable technologies at the building scale impressive design innovations can be achieved.
- Mobility
 - Differences in the projects' performance in the mobility domain are to some extent dependent upon varied distances from the existing town or city. The greater the distance from the city core, the more effort had to be put in creating a comprehensive mobility concept. These observations drawn from the case studies in this research indicate that the incorporation of new urban developments within the urban structure of the city generates significant benefits in comparison to the sub-urbanisation approach.
 - Within the mobility domain, varied performance is also related to differences in the level of public infrastructure provision. The higher the percentage of public amenities in a neighbourhood area, the less frequent is the residents' need to use their cars. Of the projects we have investigated in this research, the two extremes in that respect were Vauban and Upton. The experience of Vauban demonstrated that the existence of a local centre, equipped with the necessary facilities that meet the population's everyday educational, shopping, leisure and recreational needs, reduces the need for every-day commuting to the city centre. On the contrary, in Upton, it was observed that the lack of basic amenities reinforces the need for daily trips to the town centre.
 - Differences in the mobility domain also depend on the transport infrastructure already available in a city. In Vauban, New Islington and Kronsberg the tram system had already been developed and therefore it was a matter of extending the tram lines to reach the new neighbourhoods. In

Upton on the other hand, advanced transport infrastructure was not in place and therefore increased car dependency was observed.

- Behavioural trends were further identified as factors that impact on a project's performance in the mobility domain. In Vauban for instance, the community's decision to give up their cars was conscious to a large extent. The numerous community groups that promoted sustainability as well as the city's long-term tradition of pursuing environmentally friendly solutions were the contributing factors for the local population's willingness to reduce car dependency.
- Finally, differences in performance were observed in the neighbourhoods in which reduced car-dependency was reinforced through planning interventions or other measures taken by the municipal authorities. For instance in Kronsberg, the low speed limit as well as the forbidding parking provision per household in combination with the advanced public transport network had an effect in the level of car dependency, although, as interviewees stated, the district was never meant to become entirely car-free.
- Ecological optimisation
 - With regards to ecological optimisation, this research has indicated that in order to achieve improved performance compared to common practice, explicit guidelines and comprehensive frameworks have to be devised. This strategy was adopted in all cases investigated in this research and produced exceptional outcomes on the subject of ecological optimisation. Clear guidelines were established from the very initial stages of decision making for the protection of the natural flows of systems (water, waste, soil) at the urban scale, and improved specifications pertaining to the building scale were included in the development contracts for the construction of an ecologically optimal building stock.

- Further methods for the reinforcement of ecological optimisation included innovative ways for the selection of building co-operatives through point systems for the acquiring of plots (Vauban) or the organising of architectural competitions for developers and the subsequent selection of the most appropriate solution on the basis of the incorporation of optimal standards for energy and ecological efficiency (Upton).
- This research has also highlighted the importance of the establishment of supporting institutions that provide guidance and the necessary know-how to developers, architects, engineers or craftsmen. The establishment of such institutions in Kronsberg and Vauban facilitated the construction process through the provision of cutting-edge knowledge for new technologies and encouraged the residents to make significant progress towards sustainability by providing consultation on ways to improve unsustainable behaviours (wasting water and energy, not embracing a recycling pattern). The lack of a similar support-mechanism in Upton, on the other hand, contributed to several problems of technical nature such as the problematic instalment of sustainable technologies on the buildings.
- Finally, the experience of the four projects with regards to ecological optimisation has illustrated that community awareness is a crucial factor for progress towards sustainability. More specifically, this research has found that behavioural changes are necessary alongside planning interventions to ensure wise energy and water consumption and the reduction of domestic waste output.
- Community
 - Within the community theme, the issue of public participation is critical. The four cases investigated in this research have followed different community involvement approaches that resulted in different operational models for community participation in decision-making. Although in all cases public

participation or consultation was a mandatory component of the planning regulations, inadequacies were identified, as there was a lack of specific operational directions for the public consultation activities. The assessment of the four projects however, indicated that meaningful public consultation is only possible when the community becomes an official member in the decision-making panel. In the cases where this model was not adopted, the few of meetings that took place were superficial, in the sense that they were only seeking to obtain public consent on decisions already taken by the team of partners.

- Community involvement in a regeneration project is the foremost prerequisite for the appropriate identification of the problems the neighbourhood faces. Observations drawn from the New Islington project have provided useful insight on the competency of the local community to successfully identify the causes of neighbourhood decline. The New Islington experience has further emphasised that community input is necessary for the successful resolution of the problems of deprivation. As regeneration aims at improving community welfare, the local people are most capable of developing visions and priorities for their own areas.

- From the analysis of the case studies, it has also emerged that community involvement is sometimes undermined by natural inertia. However, public can be stimulated with educational seminars on urban planning and development procedures as well as with training on the specifics of sustainability. Furthermore, municipality-led events (e.g. street parties in New Islington, exhibitions in Vauban) have proven to be particularly effective in stimulating public interest and in raising awareness around environmental issues. Finally public opinion can also be sourced through one-to-one interviews or questionnaires in cases where residents are reluctant to attend the meetings. The cultural transition from the attitude of indifference towards the local problems to the attitude of active involvement in decision-making is challenging and particularly time-consuming. However, the examples

investigated in this research have shown that if the necessary support mechanisms are employed, an increasing trend in community involvement is observed (e.g. Kronsberg).

- Institutional support is finally a key aspect for the encouragement of community involvement. In neighbourhood development schemes, local residents have to work with professionals and local council representatives. This form of collaboration is rather challenging as the members of the decision-making panel represent differing interests and are eager to push differing agendas. For that reason, the establishment of local support mechanisms (e.g. KUKA, Forum Vauban) to promote community empowerment and to co-ordinate decision-making is a definite requirement. Such liaison institutions can acquire the necessary administrative resources through co-operation with the local council, and are more likely to succeed in securing funding.
- Long-term economic viability
 - This research has concluded that mixed land uses are positively associated with the prosperity of the local economy. The establishment of a mixed use neighbourhood core creates employment opportunities for the residents and citizens (e.g. main boulevard in Vauban), attracts new businesses (e.g. fabrica in New Islington), and has a positive economic effect on the wider city area (establishment of major office developments nearby the Kronsberg scheme).
 - Another conclusion that derived from the cross-comparative analysis of the four projects was the need to respond to changing market conditions that can have adverse effects on the economic viability of a neighbourhood scheme. Urban development projects are time and financial-resource intense. As the market conditions change over time, the partners need to respond accordingly. For instance, in New Islington the partners responded to a real estate market crisis by changing the tenure mix, property type and density to

- ensure properties would not remain vacant. Vacant properties would not only have been catastrophic for the developer companies involved, but they would have also hindered community development as the neighbourhood would lack vibrancy.
- This research has also concluded that the utilisation of funding opportunities and subsidies to maximise the resource efficiency of a neighbourhood has proven to be an effective strategy for long-term economic viability. For instance, financial incentives for green building design motivated developers and house-building co-operatives in Upton, Vauban and New Islington, to experiment with sustainable solutions.
 - Measures for enhanced resource efficiency at the urban scale were also found to be cost-effective in comparison to the utilisation of conventional systems. For instance, as a comparative report for Kronsberg revealed, sustainable water management is associated with substantial expenditure-savings both in the short and in the long term.
 - Finally, an important lesson that has emerged from the analysis of the New Islington project was the positive association between public realm interventions and long-term economic viability. Observations drawn from the New Islington scheme, have demonstrated that welfare orientated urban infrastructure interventions can increase the value of land in the long-term, while in the short term can facilitate the marketing of properties.

Having reached to the aforementioned conclusions, the sustainability matrix was modified accordingly to include further criteria and methods for sustainable neighbourhood development.

The next objective sought to explore key factors that have emerged and have influenced variations in the projects' performance. The conclusions follow below.

7. To identify key factors that influence variations in performance.

From the cross-comparative analysis of the four projects a number of conditions were found likely to potentially compromise the effectiveness of a sustainable development initiative. These factors were:

- Local conditions
- Planning regulations and design standards (local, regional, national, international)
- Key stakeholders' priorities for development/regeneration
- The extent of public/resident involvement
- Availability of instruments for educational support on sustainability
- Subsidies and funding
- Economic climate and real estate market conditions

This research also conceived the following strategies as important in overcoming the aforementioned barriers and in enhancing progress towards sustainable development:

- The public-private form of co-operation is highly effective as it combines the private sector's effective adaptation to changing market conditions and the public sector's welfare orientated character.
- Although sustainability has been embedded in planning regulations both in Germany and in the UK there is still room for progress until zero carbon and resource optimal urban patterns become a reality. Therefore it is essential for new developments to aim for higher standards than the ones imposed by the planning regulations. Only through design innovation and experimentation can progress towards sustainability be realised. As this research has indicated that the success of experiments such as Kronsberg and Vauban influenced the modification of national housing standards.

- Support institutions for sustainability are essential instruments in disseminating sustainability concepts to the public, in providing the necessary know-how to architects, developers, contractors and craftsmen, and in facilitating public involvement in decision-making.
- Although indicators and checklists, as well as the sustainability matrix proposed in this research, are effective tools for the assessment of a project in terms of sustainability, resident satisfaction surveys are equally important to gain an overall understanding of the progress the neighbourhood has achieved. The experience of this research has highlighted the significance of that point, as the resident survey clearly indicated the areas in which there was room for further progress.

12.2 Key contributions of the research and practical applications

This study has primarily emphasised on developing a matrix comprised of social, environmental and economic criteria to facilitate sustainable development at the spatial level of the neighbourhood.

The research has also enhanced the efficiency of the matrix proposed with the employment of a criteria-weighting method to facilitate the assignment of priorities.

The combined potential shows a significant contribution to holistically envisaging sustainability and to enabling the practical application of the matrix in the following ways:

Firstly, the matrix can be used as a tool for the initiation of collaborative decision-making between key stakeholders. As was discussed in Chapter 10, modifications and further additions according to the specific context in which the scheme is taking place are not only possible but essential. The matrix is an initial suggestion of priorities. The stakeholders involved in decision-making, for whom it is purported to serve, can discuss its effectiveness, expand on the context, and suggest further measures and guidance that better fulfil the needs of the locality.

Secondly, the proposed matrix, modified through decision-making, in the way explained in the previous paragraph, can be used as a guidance tool for all parties involved in the development process. The contribution of a tool that provides detailed guidance has unquestionable advantages for the development process as it ensures compliance of planning and design interventions with the essential criteria for sustainability.

Thirdly, the matrix can be used as a tool for the evaluation of different scenarios for development and in the selection of the most appropriate one. For instance, the matrix can be used in masterplanning competitions to assess the effectiveness of each design proposal and to select the most appropriate one that fulfils the criteria included in the matrix.

Fourthly, the matrix can be used throughout the development process for monitoring purposes. Compliance with the guidelines should be ensured through regular monitoring and modifications should take place according to changing circumstances as per decisions taken by the group of stakeholders.

In addition to the establishment of the matrix, this research has further expanded upon differences in the way sustainability has been embedded in the German and the UK planning systems. It is the first time an extensive cross-comparative study of sustainable initiatives in the two countries has been undertaken and the effectiveness of policies, development processes and support mechanisms has been assessed.

Finally, this research has investigated factors that have influenced different levels of performance between the projects (Chapter 10.4). The identification of those factors is a practical contribution to sustainable neighbourhood development as precautionary measures can be taken to avoid negative consequences, and therefore the risk of failure can be minimised. Therefore, by addressing those factors early in the decision-making and planning stages, spontaneous reactions to unpredictable events can be replaced by comprehensive strategies for the avoidance of negative consequences.

12.3 Limitations

Although this research was carefully designed and implemented, a number of limitations have emerged through the course of investigation. These have been enumerated below.

The most important weakness acknowledged by the author is the inadequate validation of the matrix proposed. Although an effort was made to seek for the participants' feedback, the responses were not satisfactory, as only one out of 9 interviewees agreed to contribute.

However, the usability of the matrix was tested through the cross-comparative assessment of the four projects in Chapter 11. The cross-comparative exercise conducted, has shown that the matrix can function as a tool for the holistic assessment of a sustainable neighbourhood development initiative.

Despite the several modifications that took place in accordance with the conclusions drawn from the aforementioned analysis of the four projects, throughout the course of the investigation, it is the author's belief that further validation through experts' opinion is a necessary step to ensure the adequacy of the suggested matrix. Additional evaluation and validation of the matrix can be achieved by its implementation on a real project. This could be an important opportunity for further modifications based on actual experiences. Although, time and financial constraints excluded this activity from the scope of this research, it is a step that should take place in the future.

A second limitation is related to the Analytic Hierarchy Process and more specifically to the process of assigning values for the relative importance of the sustainability criteria included in the matrix. The pairwise comparison of the criteria would have been more accurate if it had been conducted by experts involved in the projects investigated. However, this would have been a challenging process which was not possible in this time-intense and finance-constrained research. This limitation should therefore be addressed and, ideally, the process of assigning values of the relative importance of criteria should, in every project, be preceding the utilisation of the matrix, as priorities

and perspectives on sustainable development vary across different contexts and locations.

A third limitation is associated with the selection of the case studies. The fact that the projects were at different stages of development made impossible the acquiring of post-occupancy reports that would allow for a holistic evaluation of the projects. Although the projects were analysed and assessed through project documentation, thorough interviews with key stakeholders and resident satisfaction surveys, post occupancy quantitative reports were not available for New Islington and Upton, as both of the projects were under construction at the time of investigation. Hence, further data is necessary to achieve a holistic evaluation of their progress towards sustainability.

A fourth potential weakness of this research stems from the selection of participants for the interview-based analysis of the performance of the four projects. All interviewees selected were directly involved in the process of decision-making and development of the neighbourhoods investigated. On the one hand, this allowed for an in-depth analysis based on stakeholder experience. On the other hand, the direct involvement of participants and their roles as practitioners in the developer companies increases the possibility of biased views. Although this limitation was to some extent balanced with the resident satisfaction survey, the involvement of a larger number of practitioners and politicians in the research could have yielded different results, as more perspectives would have been incorporated.

Finally, it is important to recognise the concern about potential limitations due to linguistic barriers. To overcome those challenges, a translator was present during the field visits in Germany and a number of project documentation was translated into English by a native speaker. Furthermore, it was possible for all interviews to be conducted in English, as all interviewees were fluent speakers. However, the level of engagement of the researcher with the participants in the questionnaire survey in the UK was higher compared to the level of engagement experienced in Germany. It was therefore possible to more easily build a rapport with the residents of neighbourhoods in the UK, and thus to extract further information and feedback while the participants

were completing the questionnaire. To summarise, there is a possibility that more information could have been obtained if the challenges of language had not been experienced.

12.4 Recommendations for further research

This research has led to a number of useful results and has contributed to the theoretical and practical discourse of sustainable neighbourhood development. However, a number of aspects that require further research have also been uncovered. A brief discussion on those aspects and the researcher's recommendations on the areas in which additional study is necessary follow below.

Firstly, to overcome the number of weaknesses identified in 13.4 in relation to the sustainability matrix, it is necessary to further test the proposed set of criteria. The testing procedure can be conducted on the basis of applying the matrix on a neighbourhood development scheme. The matrix can then be utilised across the life-cycle of the development process. Firstly it can be used in decision-making to initiate discussion between the key stakeholders; secondly, during the course of planning and design, where it can be used as the guideline for sustainability; and thirdly it can be used as a monitoring tool to assess the effectiveness of specific physical interventions. Although the development of the matrix was based on academic knowledge and was modified according to empirical evidence, the testing process will unquestionably reveal limitations, the addressing of which will ensure the practicability of the matrix.

Secondly, following the identification of shortcomings regarding the adequacy of indicators for sustainable development at the neighbourhood scale, it is evident that there is a significant need for further research on the potential establishment of different sets of indicators that are appropriate to use on specific local contexts. This research has provided evidence of the way in which local conditions (policy context, climate, cultural aspects, public awareness on sustainability etc.) impact on different priorities for development at the neighbourhood scale. Further research can be

focused on if and how it is possible to establish different groups of indicators that reflect those different spatial and cultural characteristics. The establishment of context-specific matrixes will assist in overcoming the inappropriateness of a universal set of indicators to be applied on diverse settings that require different strategies for development.

Thirdly, international cross-comparative studies of exemplary sustainable neighbourhood initiatives should also be targeted for additional research. This type of research should address the variability of institutional strategies for sustainable development and differences in planning policies in different countries. This study will provide a comparative base to help determine the effectiveness of planning policies and guidelines for sustainable development in practice. Furthermore, socio-cultural and climate variables should be paid greater attention to, in order to determine how the geographical scope influences the delivery of sustainable neighbourhoods. Last, international, cross-comparative future research should emphasise more on the aspect of resident satisfaction. Although sustainable development focuses on the welfare of current and future generations, the resident satisfaction aspect is currently underestimated and often overlooked, as it is not an obligatory step of the current planning system in any of the two countries investigated in this research. It is therefore the author's suggestion that long-term funding should be allocated for the purpose of resident satisfaction surveys as it is the ultimate yardstick sustainability performance of any neighbourhood development or regeneration scheme.

12.5 Conclusion

In spite of the impressive achievements that have taken place in the last decade regarding benchmarks for sustainable neighbourhood development, there is still much room for further progress. This research has emphasised on the difficulties in holistically addressing sustainable development at the neighbourhood scale, but it has also shown that despite the difficulties and conceptual ambiguities, it is an achievable target. Sustainable development is therefore neither a dead-end nor an axiomatic concept, but a fascinating experimental field where progress is only possible through

the constant process of benchmarking and modifying. This research has presented a benchmarking approach that combines qualitative and quantitative criteria to be considered for the development of sustainable neighbourhoods. The matrix proposed is a tool devised to assist architects, planners, developers and residents in choosing the most appropriate scenario for development, assess the effectiveness of specific planning interventions, and conduct an overall evaluation of the delivered outcome. Therefore this research provides valuable insights for the benchmarking of sustainable neighbourhood development. However, further research and experimentation in practice is necessary to reinforce a radical change in the current unsustainable patterns and to therefore mark a significant transition in the quest for a sustainable future.

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Appendix

Appendix 1: Research Protocol

➤ Scope of Case study Method

- To identify the planning and design aims and criteria that were conceived to promote sustainable development
- To identify how the aims and criteria conceived were translated into specific guidelines and actions for sustainable development
- To examine the success of the four projects in terms of sustainability
- To identify limitations and drawbacks or less successful aspects of the projects and their causes
- To draw lessons from the successes and failures to help create a checklist of specific criteria for sustainable neighbourhood development to assist future initiatives

➤ Context of the Case Study Method

- Pilot study to determine the projects to be selected for the research
- Assessment of their performance in regards to sustainability using four sources of evidence: Project Documentation, interviews with key stakeholders, resident questionnaires and field visits
- Quantitative evaluation of the overall sustainability performance using a Multiple Criteria Decision Making (MCDM) method.

TABLE 1. CASE STUDY QUESTIONS

CASE STUDY QUESTION	DATA COLLECTION METHODS				
	LITERATURE REVIEW	PROJECT DOCUMENTATION	INTERVIEWS	QUESTIONNAIRES	FIELD VISITS (observation/photos)
1. Who was the project initiated by?					
2. What circumstances (social, cultural, and economic) led to the initiation of the project?					
3. Who were the key stakeholders and how were they selected?					
4. How was the project funded? Did it receive financial support to fulfill specific requirements?					
5. What is the household and tenure mix in the neighbourhood?					

THEMES	CASE STUDY QUESTION	DATA COLLECTION METHODS				
		LITERATURE REVIEW	PROJECT DOCUMENTATION	INTERVIEWS	QUESTIONNAIRES	FIELD VISITS (observation/ photos)
Project Description	6. Did the project brief undergo a public consultation phase? What was the duration of that phase and how was the public consultation procedure organised and implemented?					
	7. Does the project respect the local vernacular?					
	8. Does the neighbourhood have a distinctive aesthetical identity?					
Project Aims	9. What were the project's aims, how were they decided upon and by whom?					

THEMES	CASE STUDY QUESTION	DATA COLLECTION METHODS				
		LITERATURE REVIEW	PROJECT DOCUMENTATION	INTERVIEWS	QUESTIONNAIRES	FIELD VISITS (observation/photos)
Sustainable Development Aspects	10. What are the project's aspects (design, technological, decision-making) that promote sustainable development?					
	11. How did sustainability become a key factor in the development of the project?					
	12. Were there any checklists/frameworks/indicators used to promote sustainable development? Which scale were these pertaining to? Who selected them?					
	13. What are the project's environmental aims? Is it designed to be energy efficient? Does it minimise the impact from construction? Does it enhance the local landscape and promote biodiversity?					
	14. Were the environmental legislation and planning system encouraging/discouraging?					

THEMES	CASE STUDY QUESTION	DATA COLLECTION METHODS				
		LITERATURE REVIEW	PROJECT DOCUMENTATION	INTERVIEWS	QUESTIONNAIRES	FIELD VISITS)
Achievements	15. Did the project achieve its initial aims?					
	16. What were the unsuccessful aspects of the scheme?					
	17. What are the project's achievements in terms of sustainability?					
	18. What were the compromises made and why?					
	19. Did the use of checklists/indicators for sustainable development prove to be useful?					
	20. How satisfied are the key partners with what the scheme has delivered?					
	21. Are the residents satisfied with their properties?					
	22. Is the community satisfied with the neighbourhood amenities?					

THEMES	CASE STUDY QUESTION	DATA COLLECTION METHODS				
		LITERATURE REVIEW	PROJECT DOCUMENTATION	INTERVIEWS	QUESTIONNAIRES	FIELD VISITS (observation /photos)
Achievements	23. Is the community satisfied with the public transport connections?					
	24. Is the community satisfied with the quality of the local environment?					
	25. Is the community satisfied with the opportunities they have to participate in decision-making?					
Lessons learned	26. Are the properties affordable for a wide range of income groups?					
	27. What lessons have been learned?					
	28. Does living in a sustainable neighbourhood change people's behaviours?					
	29. Does well planned mobility concept that involves suitable connections with public transit routes reduce car usage?					

THEMES	CASE STUDY QUESTION	DATA COLLECTION METHODS				
		LITERATURE REVIEW	PROJECT DOCUMENTATION	INTERVIEWS	QUESTIONNAIRES	FIELD VISITS (observation/photos)
Lessons learned	30. Does living in a sustainable neighbourhood improve quality of life?					
	31. Does living in a sustainable neighbourhood enhance the feeling of civic pride?					
	32. Are sustainable neighbourhoods safer?					
	33. What were the barriers encountered? How can they be overcome in the future?					
	34. What are the successful aspects of the scheme that can be considered transferable for other future similar initiatives?					

Appendix 2: The Weighing of the Criteria

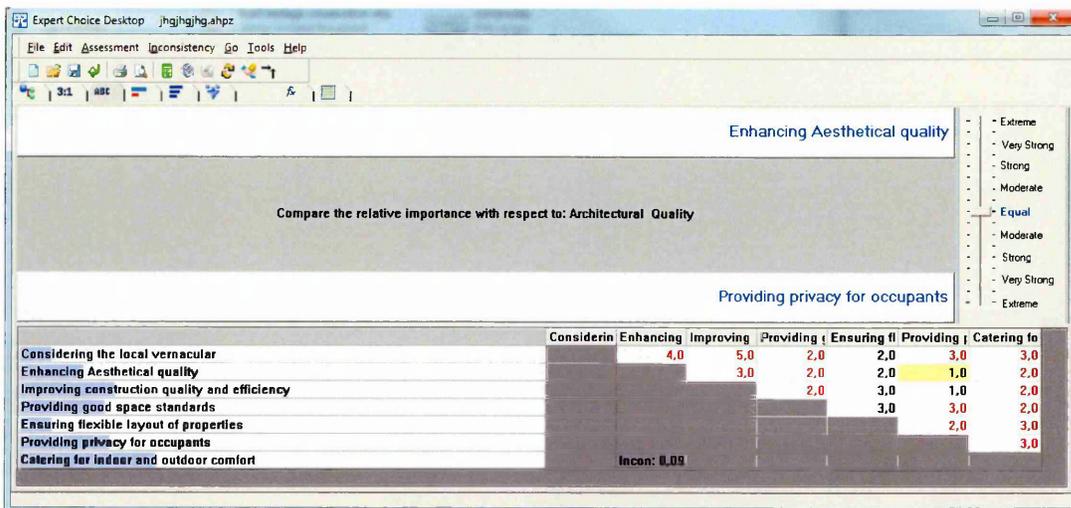
The AHP method used for the weighing of the criteria follows below.

As per the philosophy of the AHP approach followed, in comparing each criterion with the others from the same group, the expert is able to determine the full implication of a particular criterion. In that way, the influence of each criterion on sustainable development is assessed from various perspectives, and the results give us a relative numerical value for each variable.

The tables and images that follow, reflect the process of obtaining the weights. For each topic, the sub-criteria have been coded in the following pattern: C1, C2, C3...Cv and The tables illustrate the comparison matrices deriving from the process. The images show how the weighing is conducted using an AHP specific software: SPSS.

1. Architectural Quality

C1=0.59, C2=0.117, C3=0.178, C4=0.158, C5=0.055, C6=0.170, C7=0.262



	C1	C2	C3	C4	C5	C6	C7
C1	W1/W1	W1/W2	W1/W3	W1/W4	W1/W5	W1/W6	W1/W7
C2	W2/W1	W2/W2	W2/W3	W2/W4	W2/W5	W2/W6	W2/W7
C3	W3/W1	W3/W2	W3/W3	W3/W4	W3/W5	W3/W6	W3/W7
C4	W4/W1	W4/W2	W4/W3	W4/W4	W4/W5	W4/W6	W4/W7
C5	W5/W1	W5/W2	W5/W3	W5/W4	W5/W5	W5/W6	W5/W7
C6	W6/W1	W6/W2	W6/W3	W6/W4	W6/W5	W6/W6	W6/W7
C7	W7/W1	W7/W2	W7/W3	W7/W4	W7/W5	W7/W6	W7/W7

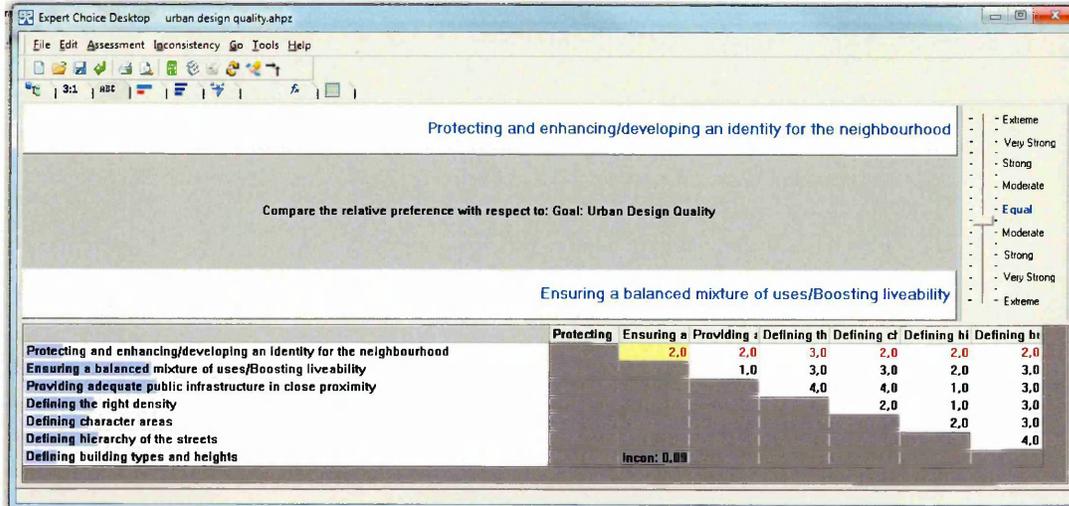
An example of the matrix populated with the outcomes of the weighing process:

	C1	C2	C3	C4	C5	C6	C7
C1	1	4/5=0.8	4/4=1	4/3=1.33	4/3=1.33	4/3=1.33	4/2=2
C2	5/4=1.25	1	4/5=0.8	4/3=1.33	4/3=1.33	4/3=1.33	4/2=2
C3	5/4=1.25	5/3=1.66	1	5/3=1.66	5/3=1.66	5/3=1.66	5/2=2.5
C4	3/5=0.6	5/4=1.25	3/5=0.6	1	4/3=1.33	3/4=0.75	3/4=0.75
C5	4/3=1.33	3/4=0.75	3/5=0.6	3/4=0.75	1	3/4=0.75	3/5=0.6
C6	3/3=1	3/4=0.75	3/5=0.6	3/4=0.75	4/3=1.33	1	3/5=0.6
C7	4/3=1.33	4/4=1	4/5=0.8	4/3=1.33	4/2=2	4/3=1.33	1

In the same way, the weighing of the criteria has been conducted for the rest of the themes: Urban Design Quality, Mobility, Long-term Economic Viability, Ecological Optimisation and Community.

2. Urban Design Quality

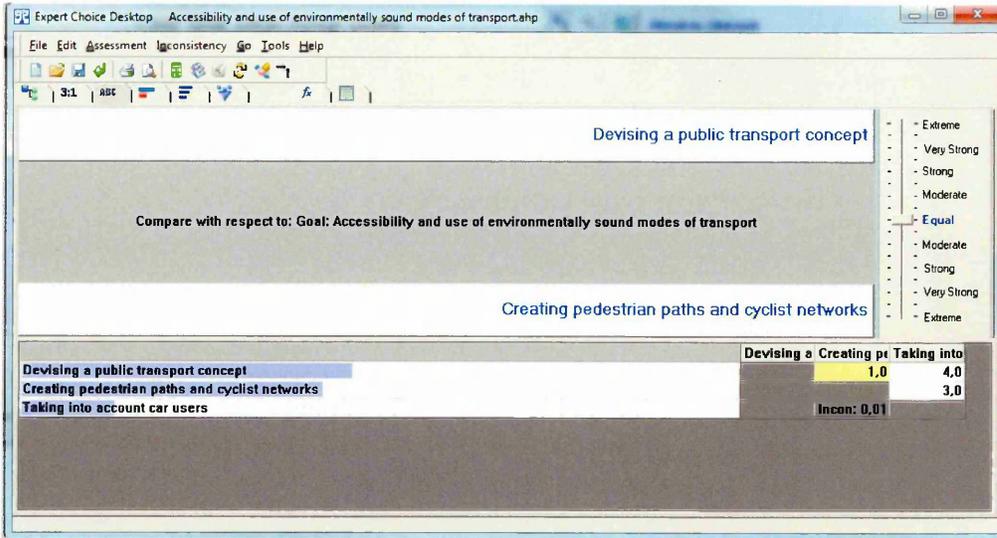
C8= 0.66, C9=0.235, C10=0.250, C11=0.132, C12=0.118, C13=0.138, C14+C15=0.061



	C8	C9	C10	C11	C12	C13	C14	C15
C8	W8/W8	W8/W9	W8/W10	W8/W11	W8/W12	W8/W13	W8/W14	W8/W15
C9	W9/W8	W9/W9	W9/W10	W9/W11	W9/W12	W9/W13	W9/W14	W9/W15
C10	W10/W8	W10/W9	W10/W10	W10/W11	W10/W12	W10/W13	W10/W14	W10/W15
C11	W11/W8	W11/W9	W11/W10	W11/W11	W11/W12	W11/W13	W11/W14	W11/W15
C12	W12/W8	W12/W9	W12/W10	W12/W11	W12/W12	W12/W13	W12/W14	W12/W15
C13	W13/W8	W13/W9	W13/W10	W13/W11	W13/W12	W13/W13	W13/W14	W13/W15
C14	W14/W8	W14/W9	W14/W10	W14/W11	W14/W12	W14/W13	W14/W14	W14/W15
C15	W15/W8	W15/W9	W15/W10	W15/W11	W15/W12	W15/W13	W15/W14	W15/W15

3. Accessibility and use of environmentally sound modes of transport

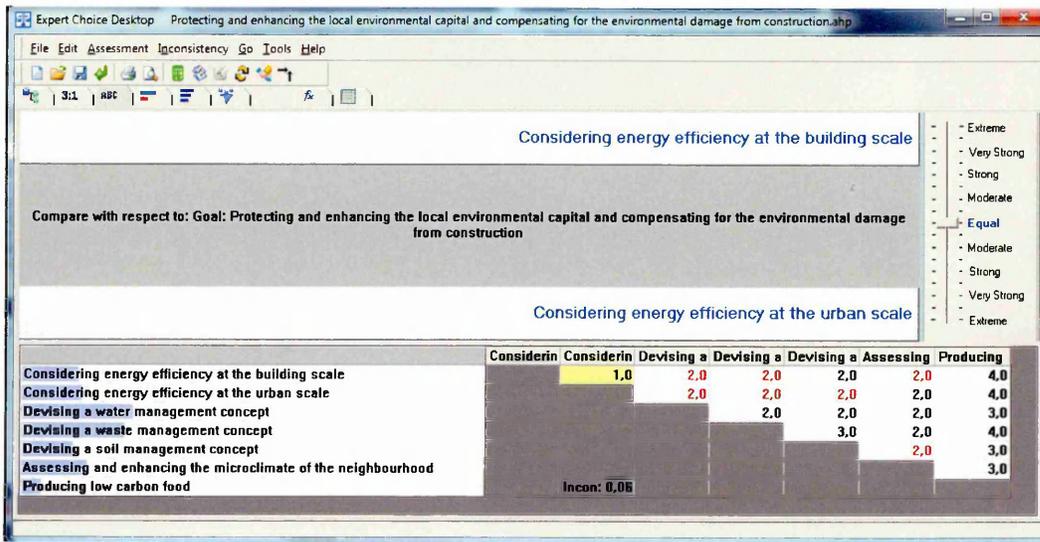
C16=0.458, C17=0.416, C18=0.126



	C16	C17	C18
C16	W16/W16	W16/W17	W16/W18
C17	W17/W16	W17/W17	W17/W18
C18	W18/W16	W18/W17	W18/W18

4. Protecting and enhancing the local environmental capital/Compensating for the environmental damage from construction

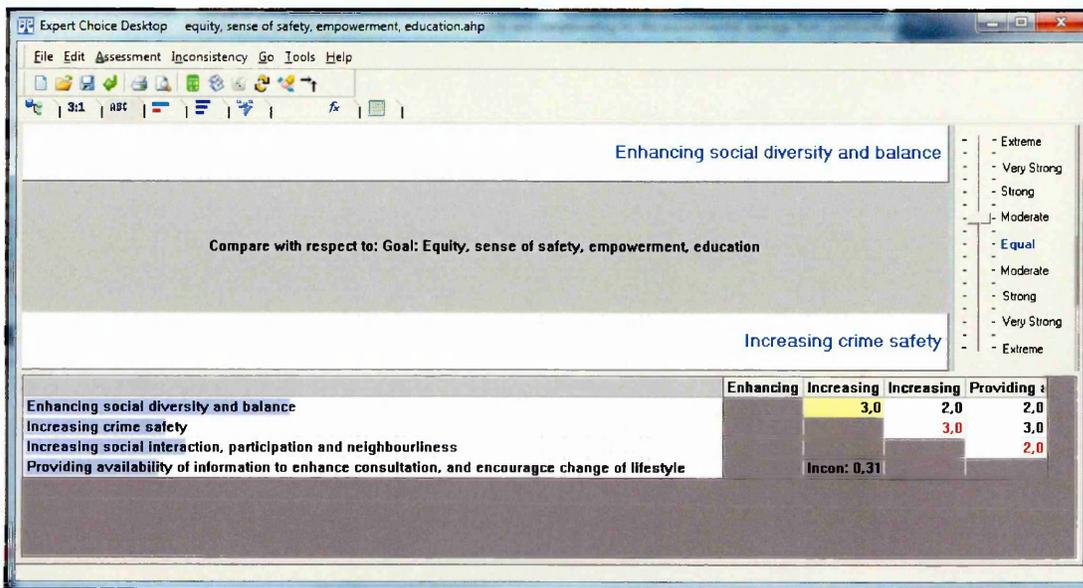
C19=0.125, C20=0.131, C21=0.240, C22=0.215, C23=0.109, C24=0.137, C25=0.43



	C19	C20	C21	C22	C23	C24	C25
C19	W19/W19	W19/W20	W19/W21	W19/W22	W19/W23	W19/W24	W19/W25
C20	W20/W19	W20/W20	W20/W21	W20/W22	W20/W23	W20/W24	W20/W25
C21	W21/W19	W21/W20	W21/W21	W21/W22	W21/W23	W21/W24	W21/W25
C22	W22/W19	W22/W20	W22/W21	W22/W22	W22/W23	W22/W24	W22/W25
C23	W23/W19	W23/W20	W23/W21	W23/W22	W23/W23	W23/W24	W23/W25
C24	W24/W19	W24/W20	W24/W21	W24/W22	W24/W23	W24/W24	W24/W25
C25	W25/W19	W25/W20	W25/W21	W25/W22	W25/W23	W25/W24	W25/W25

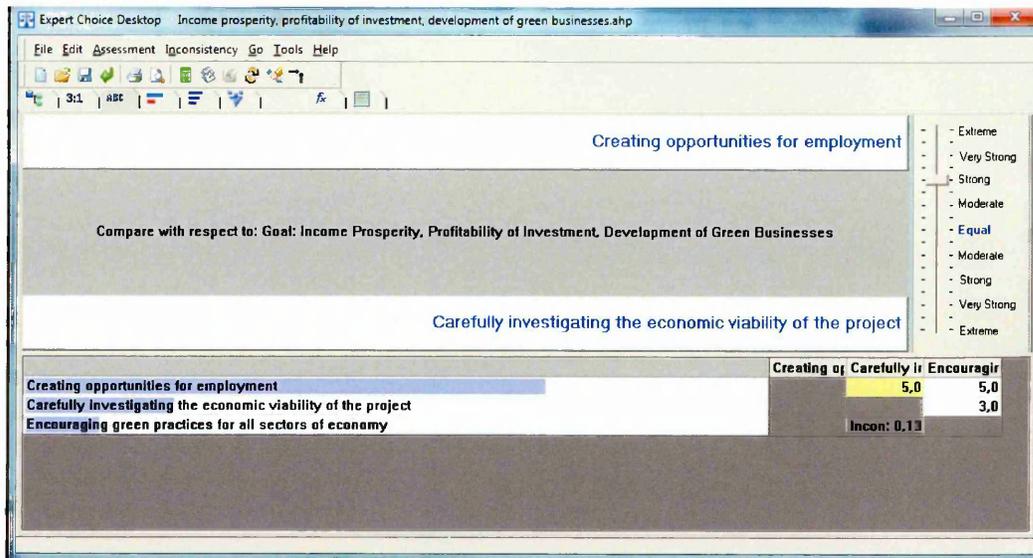
5. Community Equity, Safety, Empowerment, Education

C26=0.378, C27=0.201, C28=0.232, C29=0.189



	C26	C27	C28	C29
C26	W26/W26	W26/W27	W26/W28	W26/W29
C27	W27/W26	W27/W27	W27/W28	W27/W29
C28	W28/W26	W28/W27	W28/W28	W28/W29
C29	W29/W26	W29/W27	W29/W28	W29/W29

6. Income prosperity/Profitability of investment/Development of green businesses
 $C30=0.701$, $C31=0.202$, $C32=0.097$



	C30	C31	C32
C30	W30/W30	W30/W31	W30/W32
C31	W31/W30	W31/W31	W31/W30
C32	W32/W30	W32/W31	W32/W32

Appendix 3: Interview Protocol

Background questions

1. Could you briefly describe how you first got involved in the project and which were your initial expectations from the development?
 2. To what extent was sustainability a factor in your approach to the development?
 3. In what ways do you think that the project departs from the initial commitments that were made during the decision making? To what extent are you satisfied with the outcome?
-

1. In your expert opinion which are the factors, relating to the urban design of the project that have made it exemplary in terms of sustainability?
2. Do these factors account for the relatively high levels of rental values?
3. What do you think are the features of the development that if applied on similar initiatives could guarantee success?
4. How accessible is the development in its connections to the surrounding area?
5. Was the environmental legislation existing, at the time the project was initiated, encouraging or, restrictive?
6. What is the impact of the development on employment on a geographical scale?
7. In what way do you consider this development to be contributing to the identity of, and civic pride attached to, the wider area?
8. What do you think were the advantages/disadvantages in the involvement of private/public sector in the initial steps of the project?

4. What were the unique economic opportunities of the setting that were taken into consideration in order to ensure a stable, resilient and sustainable economy for the residents?
9. In what ways was the local and wider community involved in the early stages of conceptualization of the project?
10. In your opinion, what are the main barriers to community involvement and action?
11. Were indicators of sustainability used on the development of the project? If yes, do you consider this to have been a major contribution to the success of the project?
12. From your point of view what are the strengths and weaknesses of the current sustainable development indicators, and how they are used?

Appendix 4: Resident Satisfaction Questionnaire

Questionnaire: Resident Satisfaction

Instructions

- The questionnaire can be completed by any person aged over 18.
- To indicate your answer either circle/underline/highlight the statement with which you agree most or fill in the boxes provided.
- The questionnaire consists of 33 questions divided into 3 parts, and should not take you more than 10 minutes to complete.
- Once you have completed the questionnaire please make sure you have answered all the questions.
- You can return the questionnaire either by emailing it to Athina.Zisi@student.shu.ac.uk or by posting it to the following address:

Athina Zisi
200 Norfolk park road
Norfolk Park Village, Unit 85, room 2
S22UF, Sheffield, United Kingdom

Part 1: General Information

1. How long have you been living in Kronsberg/Vauban/BedZed/New Islington for?

- Less than 6 months
- Between 1 and 5 years
- More than 5 years

2. What type of property do you live in?

- Rented
- Owned
- Social housing

3. How many adults are living in your household?

4. How many children are living in your household?

Part 2: Your home

1. Do you think that the size and layout of your house allow you enough privacy?
 - Yes
 - To some extent
 - No

2. Do your children have their own private space to play and study in the house?
 - Yes
 - To some extent
 - No

3. Does your house have a garden?
 - Yes
 - No

4. Whenever you have visitors do you think that there is enough space for you to socialize in the lounge/dining area?
 - Yes
 - To some extent
 - No

5. Is the layout of your house flexible? (e.g. Does it allow alterations in the positioning of the furniture/future extensions/converting the use of rooms)
 - Yes
 - To some extent
 - No

6. Do you think that you have saved money on bills since you moved in an eco-house?
 - Yes
 - To some extent
 - No
 - Not sure

Part 3: Your neighbourhood

A. Planning/Design

1. Can your everyday shopping needs be served within the territory of the neighbourhood?
 - Yes
 - To some extent
 - No
 - Not sure

2. Do you think that the existing public space (parks, squares etc.) is adequate?
 - Yes
 - To some extent
 - No
 - Not sure

3. Do buildings and layout make it easy to find your way around the neighbourhood?
 - Yes
 - To some extent
 - No
 - Not sure

4. Are the streets pedestrian, cycle and vehicle friendly?
 - Yes
 - To some extent
 - No
 - Not sure

5. Does the development provide (or is it close to) community facilities, such as a school, park, play areas, pubs or cafes?
 - Yes
 - To some extent
 - No
 - Not sure

6. Do you feel that the buildings' and the neighbourhood design have given to your neighbourhood a distinctive character?
 - Yes
 - To some extent
 - No
 - Not sure

B. Transport

1. Are you satisfied with the public transport?

- Yes
- To some extent
- No
- Not sure

2. Is public transport relatively cheap?

- Yes
- To some extent
- No
- Not sure

3. Is public transport fast?

- Yes
- To some extent
- No
- Not sure

4. How often do you use a car?

- On a daily basis
- A few times per week
- A few times per month
- Never use it

C. Environment

1. How would you describe the quality of air in your neighbourhood?

- Very good
- Acceptable
- Not good
- Not sure

2. Are the recycle bins in your neighbourhood within walking distance from your place?

- Yes
- To some extent
- No
- Not sure

3. Do you recycle?

- Yes
- To some extent
- No
- Not sure

4. Do you think that moving here has drifted your lifestyle to a more sustainable path?

- Yes
- To some extent
- No
- Not sure

5. Do you think your neighbourhood provides better opportunities for employment compared to the one you were living in before?

- Yes
- To some extent
- No
- Not sure

D. Community

1. Do incidents of crime or vandalism often take place in your neighbourhood?

- Very often
- Rarely
- Never
- Not sure

2. Do you feel safe living here?

- Yes
- To some extent
- No
- Not sure

3. Do you feel close to your neighbours?

- Yes
- To some extent
- No
- Not sure

4. How often are you engaged in community events (meetings etc.)?

- Very often

- Rarely
- Never

5. Do you think that your voice is heard by the public authority whenever a problem occurs?

- Yes
- To some extent
- No
- Not Sure

6. Are you satisfied by the opportunities that are given to you to participate in the decision making process whenever a new project is initiated?

- Yes
- To some extent
- No
- Not sure

7. Do you think that it is easy for someone who plans on moving here to find an affordable place?

- Yes
- To some extent
- No
- Not sure

E. Overall Satisfaction

1. Do you think that the quality of your life has in overall been improved since you moved here?

- Yes
- To some extent
- No
- Not sure

Appendix 5: Certification of Translation Accuracy

Certification of Translation Accuracy

I, Christian Feiner, hereby certify that I translated the attached documents for the Questionnaire Survey from English into German and that, to the best of my ability it is a true and accurate translation.

I further certify that I am a native German speaker and proficient in the English language, therefore competent to conduct and officially verify such translation.



Christian Feiner

20/9/2010

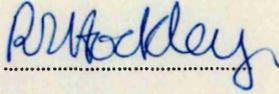
Contact Details:

Christian Feiner
Kolonitzgasse 2/27
1030 Wien
AUSTRIA
Phone: 0043 699 11077484
c.feiner@yahoo.co.uk

Certification of Translation Accuracy

I, Ruth L. Stockley, hereby certify that I accompanied Miss Athina Zisi to the study visits she conducted in Kronsberg and Vauban, Germany, in October 2010. During those visits I declare that I was responsible for advising the non-English speaking research participants about the aim and content of the questionnaire survey and I provided clarifications when queries arose in regards to the questionnaire instructions and questions.

I further certify that I am a native English speaker and that I hold accreditation for my competency in German from St Bernards High School for Girls and I confirm that the oral translations conducted were accurate to the best of my knowledge.



Ruth L. Stockley

24/10/2010

ruth.l.stockley@hotmail.co.uk

+39 340 546 4597

Appendix 6: Resident Satisfaction Questionnaire (German)

Fragebogen: Allgemeine Zufriedenheit der Bewohner

Instructions

- *Man muss mindestens 18 Jahre alt sein, um diesen Fragebogen auszufüllen.*
- *Bitte unterstreichen oder umkreisen Sie ihre Antwort.*
- *Es gibt 33 Fragen in 3 Abschnitten. Das Beantworten aller Fragen sollte ca. 10 Minuten dauern.*
- *Bitte beantworten Sie alle Fragen.*
- *Sie können den Fragebogen entweder per email an Athina.Zisi@student.shu.ac.uk senden,*
 - *Oder mittels Postweg an die folgende Adresse schicken:*

Athina Zisi
200 Norfolk park road
Norfolk Park Village, Unit 85, room 2
S22UF, Sheffield, United Kingdom

Teil 1 – Allgemeine Informationen

1. *Wie lange haben Sie bis jetzt in Vauban gelebt?*
 - weniger als sechs Monate
 - zwischen einem Jahr und fünf Jahren
 - mehr als fünf Jahre
2. *Das Haus oder die Wohnung in dem/der Sie leben ist...*
 - gemietet
 - gehört Ihnen
 - eine Sozialwohnung
3. *Wie viele Erwachsene Personen leben in Ihrem Haushalt?*
4. *Wie viele Kinder leben in Ihrem Haushalt?*

Teil 2 – Ihr Zuhause

1. *Denken sie, dass Ihnen die Größe und Aufteilung Ihres Hauses genug Privatsphäre erlaubt?*
 - Ja
 - Bis zu einem gewissen Grad
 - Nein
 - Nicht sicher

2. *Haben Ihre Kinder einen eigenen privaten Platz zum Spielen und Lernen in Ihrem Haus?*
 - Ja
 - Bis zu einem gewissen Grad
 - Nein
 - Nicht sicher

3. *Hat Ihr Haus auch einen Garten dabei?*
 - Ja
 - Nein

4. *Denken Sie, dass Sie genug Platz im Wohnzimmer oder Esszimmer haben um Gäste zu unterhalten, wenn Sie jemand besuchen kommt?*
 - Ja
 - Bis zu einem gewissen Grad
 - Nein
 - Nicht sicher

5. *Ist die Aufteilung Ihres Hauses flexibel? (z.B.: Ist es Ihnen möglich die Möbel umzustellen bzw. neue Möbel aufzustellen um den Zweck des Raumes zu verändern?)*
 - Ja
 - Bis zu einem gewissen Grad
 - Nein
 - Nicht sicher

6. *Glauben Sie, dass Sie Geld gespart haben, seit Sie in ein Ökohaus gezogen sind?*
 - Ja
 - Bis zu einem gewissen Grad
 - Nein

- Nicht sicher

Teil 3 – Ihre Umgebung

A. Planung/Design

1. *Können Sie Ihre täglichen Bedarfsgegenstände in der Umgebung einkaufen?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

2. *Glauben Sie, dass die öffentlichen Anlagen (Parks, Plätze, usw.) genügend sind?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

3. *Machen es Ihnen die Gebäude und die Anordnung dieser einfach den Weg durch die Nachbarschaft zu finden?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

4. *Sind die Straßen Fußgänger-, Radfahrer- und fahrzeugfreundlich?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

5. *Gibt es in Ihrer Umgebung öffentliche Einrichtungen wie zum Beispiel Schulen, Parks oder Kneipen?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

6. Haben Sie das Gefühl, dass die Gestaltung der Gebäude und deren Umgebung Ihrer Gegend einen unverwechselbaren Charakter verleihen?

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

B. Transport

1. *Sind Sie mit dem öffentlichen Verkehr zufrieden?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

2. *Ist der öffentliche Verkehr relativ günstig?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

3. *Ist der öffentliche Verkehr schnell?*

- Ja
- Bis zu einem gewissen Grad?
- Nein
- Nicht sicher

4. *Wie oft verwenden Sie ein Auto?*

- Jeden Tag
- Ein paar Mal pro Woche
- Ein paar Mal pro Monat
- Niemals

C. Umwelt

1. *Wie würden Sie die Luftqualität in Ihrer Umgebung einstufen?*

- Sehr gut
- Akzeptabel
- Nicht gut
- Nicht sicher

2. *Sind die Recycling- Abfallkörbe in der Nähe von Ihrem Haus?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

3. *Trennen Sie Ihren Müll? (Recyclen Sie?)*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

4. *Glauben Sie, dass sich Ihr Lebensstil in eine mehr umweltfreundliche Richtung verändert hat, seit Sie hierher gezogen sind?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

5. *Glauben Sie, dass Ihnen Ihr momentanes Umfeld bessere Arbeitsmöglichkeiten bietet, als verglichen mit dem Umfeld wo Sie zuvor gewohnt haben?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

D. Gemeinde

1. *Gibt es in Ihrer Umgebung öfters Vorfälle wie Verbrechen oder Vandalismus?*

- Sehr oft
- Selten
- Niemals

2. *Fühlen Sie sich sicher hier zu leben?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

3. *Fühlen Sie sich eng verbunden mit Ihren Nachbarn?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

4. *Wie oft besuchen Sie gesellschaftliche Veranstaltungen (Sitzungen usw.)?*

- Sehr oft
- Selten
- Niemals

5. *Glauben Sie, dass Ihre Meinung von der Behörde wahrgenommen wird, wenn ein Problem auftaucht?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

6. *Sind Sie mit den Möglichkeiten zufrieden, welche Ihnen zur Verfügung stehen, um am Entscheidungsprozess über neue Projekte teilzunehmen?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

7. *Glauben Sie, dass es für jemanden der plant hierher zu ziehen, leicht ist einen finanziell erschwinglichen Platz zu finden?*

- Ja
- Bis zu einem gewissen Grad
- Nein
- Nicht sicher

4. Allgemeine Zufriedenheit

1. *Glauben Sie, dass sich gesamt gesehen Ihre Lebensqualität verbessert hat, seit Sie hierher gezogen sind?*

- Ja
- Bis zu einem gewissen Grad

- Nein
- Nicht sicher

Appendix 7: Interview Protocol

Title of study: Criteria for success in developing sustainable neighbourhoods

Please indicate your consent by responding to the following questions and statements.

Have you read and understood the information sheet about this study? YES NO

Have you received enough information about this study? YES NO

Do you understand that you are free to withdraw from this study?

- At any time? YES NO
- Without giving a reason for your withdrawal? YES NO

Do you understand that you have the right to withhold any information if you think it is necessary? YES NO

Your responses will be anonymised before they are analysed. YES NO

Do you give permission for the research supervisors to have access to your responses? YES NO

Do you agree to take part in this study? YES NO

Your signature will certify that you have voluntarily decided to take part in this research study having read and understood the information in the sheet of participants. It will also certify that you have had adequate opportunity to discuss the study with the investigator and that all questions have been answered to your satisfaction.

Signature of participant:.....Date:.....

Name (Block letters):.....

Signature of investigator:.....Date:.....

Name: Athina Zisi

Address: 200 Norfolk Park Road, Norfolk Park student village, unit 85, S22UF, Sheffield

Contact number: 0044 -7748242846

Appendix 8: Participant information sheet

Summary of the project:

The viability of the cities today is jeopardized by interrelating economic, ecological and social issues (WCED, 1987; UNCED, 1992). International conferences and workshops have emphasized the importance of sustainable development as a way to tackle these issues. The lack of clarity and preciseness behind the definition of the term however make its integration in current planning policy a problematic issue, not so much in the buildings' scale but especially in the scale of neighbourhoods and towns (HQE2R, 2004). Therefore, the development of a common checklist of criteria, accompanied by a set of indicators that will focus on both quantitative (technical), and qualitative (non-technical) aspects within the context of sustainability will facilitate more successful solutions for projects that pertain to the scale of the neighbourhood.

The importance of such research has been highlighted in numerous international publications and declarations, launched by the United Nations as well as by other major international organizations that aim in promoting sustainability (Bristol accord, 2005; HQE2R, 2004; UNEP, 2006).

The aim of the study will be to identify criteria for success and develop associated indicators in promoting sustainability at the spatial scale of the neighbourhood.

This research will inform the local authorities' policy and practice through providing practical guidance on creating a more sustainable urban form. Checklists and indicators should be the main reference for any public or private body that wants to ensure the economic, ecological and social viability of a planning application or a project.

Case studies from Europe will be used as sources of data for the research. The case study research of best practice projects will provide an opportunity for the comparison of checklists and indicators that have been used and have proven to be successful. Weaknesses and strengths of the different strategies followed will be enumerated and consequently the different cases will be evaluated and the positive elements among them will be gathered and reviewed in order to introduce the final checklist of criteria.

Case study research is appropriate for a field as complex as the field environment since it has a close linkage with reality and the theory is likely to be novel, testable and empirically valid (Eisenhardt, 1989, Proverbs and Gameson, 2008). The projects have been chosen on the basis of their success in achieving the sustainability goals that were agreed upon during the decision making processes. The case studies will be New

Islington, Bed Zed, Kronsberg and Vauban. The neighbourhoods chosen are located in different countries because the diversity in organizational frameworks, policy and practice is likely to be largely contributing to a universal set of criteria which is the desirable outcome.

The analysis of the case studies will relate to a wide range of parameters such as geometric qualities of the designs, the way the projects were brought into existence, the stakeholders involved in the decision – making process, the main stages of the development process, how and in which of the stages was sustainability considered, the cost, and models of financing.

The use of triangulation will be adopted. Three sources of evidence will be used (Yin, 2003) in order to maximize the validity and to add breadth and depth to data collection. These will be documents, questionnaires and interviews to key stakeholders.

The research will be grouped into five steps: Literature review and strategy development, case studies investigation, analysis of the data gathered, checklist and indicators development and outcomes documentation. The research will be submitted by no later than 7 June 2012.

You have been asked to take part in this research because you were involved either in the planning or the realisation process of Kronsberg/Vauban/New Islington/BedZed neighbourhood. Your participation is voluntary and you have the right to withdraw at any time or withhold any information if you think this is necessary.

You will be required to share your experiences from the process of planning and give your opinion on the features of the project which you think have led to its success. Interviews will be held for that reason in a place and time of your choice. The recordings and transcripts will be available only to the researcher and the supervisors and not to any other third party.

The findings will then be posted to you and your comments on the accuracy of the information will be requested. The data (recordings, transcripts) will be kept by the researcher until the degree results are announced and they will be disposed afterwards.

The results of this study may be published or presented but the anonymity of the participants will be secured by any means. In the presentation of the data, all individuals will be referred to with general descriptions of their occupation, such as “architect”, “planner”, “resident”, etc. No reference shall be made to their specific responsibilities in the project such as “director of...” or “chief executive” etc.

Appendix 9: Research Poster for the Graduate Junction Competition

The poster below was presented at the Graduate Junction poster competition: 'Communicating to the Public', in November 2010. The event was organised by the University of Leeds and Vitae Yorkshire & North East Hub and was aiming at disseminating academic research findings to the public.

SHEFFIELD HALLAM UNIVERSITY
NAME: ATHINA ZISI, PHD STUDENT: SUSTAINABLE DEVELOPMENT
FACULTY: DEVELOPMENT AND SOCIETY

sustainable neighbourhoods

Criteria for success

1. ACCORDING TO WWF TWO NEW PLANETS THE SAME SIZE AS EARTH WILL BE NEEDED BY 2050 IF NATURAL RESOURCES CONTINUE TO BE EXPLOITED AT THE CURRENT RATE

2. ENERGY USE IN BUILDINGS IS THE LARGEST ENVIRONMENTAL IMPACT OF BUILDINGS

ENERGY

3. POPULATION KEEPS INCREASING

RAPID URBANISATION

SUSTAINABLE DEVELOPMENT BECOMES A PRIMARY TOOL TO TACKLE PROBLEMS OF ENVIRONMENTAL DEGRADATION, SOCIAL EXCLUSION, AND ECONOMIC DECLINE.

***The NEIGHBOURHOOD SCALE BECOMES CRUCIAL** because the implementation of sustainable development is particularly perceptible at that intermediate level.

EFFICIENT PUBLIC TRANSPORT

Integrated, modern transport systems that provide good connections with the core city and the adjacent areas are of crucial importance.

CHANGE OF LIFESTYLE

*Social change is required for the maximisation of public participation.
 *The environmental awareness of people and businesses needs to be increased. They should be more informed on sustainable development in order for them to contribute to decision-making.

PEDESTRIAN PRIORITY

Well designed pedestrian and cyclist networks that encourage people from all sectors of society to reduce car usage.

ENERGY EFFICIENT BUILDINGS

SUSTAINABLE NEIGHBOURHOOD'S "ECO-CYCLE"

PROVISION FOR PUBLIC SPACE

Access to carefully designed, quality public spaces where social interaction is encouraged and children's play can occur safely and unobstructed.

DIVERSITY IN EVERY SENSE

- *Land use diversity
- *Social diversity
- *Aesthetical diversity

EFFICIENT PUBLIC TRANSPORT

Core City, Playground, Efficient public transport, Sustainable transport system, Local shops and community centre, Cafes, Diversity of architecture and social history, Redirection pond, Natural environment, Cat fire streets.

R P R S O B E A I R E C H

S U S C T A I N A B L E N E I G H C B O U R S H O O D S