

UTRECHT UNIVERSITY – MASTER THESIS IN SUSTAINABLE DEVELOPMENT

45 ECTS - TRACK ENERGY AND RESOURCES

How sustainable is sustainable planning?

An analysis from the perspective of holistic
sustainability

Ana Sofia Poças Ribeiro

3609693

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Supervised by :

Robert Harmsen

Jacqueline Cramer

Contact:

a.s.pocasribeiro@students.uu.nl

wellcastsomelight@gmail.com

Javastraat 9Bis 3531 PL Utrecht

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This research represents a downscaling of the focus of my willingness to understand the universe, from the Astronomical questions of my bachelor, passing by the global aspects of Sustainable Development throughout the Master, to the more concrete, but not less complex, domain of pursuing sustainable cities. I would like to express my gratitude to the people who have accompanied me in this ride.

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“[Cities] are a mirror of our societies, a part of our economy, an element of our environments. But above all else they are a measure of our ability to live with each other. When we examine our cities, we examine ourselves.” Short in *The Urban Order*

“[Sustainability], as the challenge of managing the earth's resources may well be the single most decisive factor in shaping this century's destiny, for better or for worse.” Appleton (2006)

“When a place-related issue confronts them, people [...] discover how all kinds of issues interrelate, clash and get tangled up when they come together in particular places” Healey, in *Making Better Places*

TABLE OF CONTENTS

1	Introduction	4
1.1.1	Sustainability or Sustainable Development	4
1.1.2	Sustainable Development and Climate Change	5
1.2	Problem Definition and Research Question	5
1.3	Sub Research Questions	6
1.4	Method	8
1.5	Academic Context and Relevance	9
2	Sustainable Development	10
2.1	The three imperatives	11
2.2	The dimensions of sustainability	15
2.3	How to achieve sustainability –different views	22
2.4	Sustainability challenges	23
2.5	Holistic model of Sustainable Development	24
2.6	Review of SD critiques	27
3	Sustainable Planning	29
3.1	Introduction to Planning – and its connection to Sustainability	30
3.2	Definitions	33
3.3	Goals and conflicts in Planning	35
3.3.1	Planning goals correspond to the SD dimensions	35
3.3.2	Livability is introduced.....	37
3.4	Sustainable planning in cities	39
3.4.1	Garden cities - an ancestor of urban sustainability.....	39
3.4.2	Cities – can they ever be sustainable?.....	40
3.4.3	Visions of Sustainable cities.....	41
3.4.4	Principles of sustainable cities	47
3.5	Holistic model of Sustainable Planning	56
3.6	Review of Sustainable Planning critiques	58
3.6.1	Critique based on theoretical considerations	58
3.6.2	Critique based on practical cases	61
4	How Sustainable is Sustainable Planning? Discussion	62
4.1	Similarities	63

4.2	Differences	67
4.3	Sustainability adding value to planning	69
4.4	Planning adding value to sustainability.....	70
4.5	Methodology and limitations of the research	70
5	Conclusion and recommendations.....	71
5.1	Recommendations	72
	References.....	74

1 Introduction

The world population is predicted to be nearly 70 percent urban by 2050 (currently it is around 50 percent) (UN 2008). However, the trend of an increasing urbanized world is not an exclusive affair of the 21st century.

Urbanization is referred as the greatest migration in human history, stimulated by the industrial revolution, and although seen mostly as a demographic or economic matter it represents also a transformation in the relation of humans and nature (Rees and Wackernagel 1996). Besides urbanization other consequences of the industrial revolution started to be more evident in the sixties and seventies, with increasing concerns about the capacity of the environment to absorb pollution both by industries and agricultural practices heavy in pesticides use (Rachel Carson's *Silent Spring* in 1962), relations between resource use and exponential population growth (Paul Erlich's *Population Bomb* in 1968), and questions of environmental limits to economic and population growth (Club of Rome's *Limits to Growth* in 1972). Some of the most successful environmental non-governmental organizations (NGO's) were founded in these times: Friends of the Earth in 1969 and Greenpeace in 1971.

It is from this increasingly environmentally aware public debate that the term sustainable development (SD) evolved, entering the political arena in the eighties in reports such as *The World Conservation Strategy* (IUCN 1980) and the Brundtland report (WCED 1987). These reports were issued by international organizations: the International Union for Conservation of Nature (IUCN) and the World Commission on Environment and Development (WCED), established by the United Nations. The SD concept appears to have emerged not as a result of academic theories but as a political and societal imperative.

Since then, the concept of SD has been endorsed at every level, from the United Nations to networks of local municipalities (e.g. Agenda 21, Aalborg commitments), by NGO's, states and businesses. It has also been integrated and theorized by numerous academic fields, including Planning.

While urbanization is associated with the Industrial Revolution, and thus the origins of large -scale environmental problems, it consists of an ongoing trend, which makes urban areas and cities crucial spaces wherein the future feasibility of SD is to be decided.

Planning for sustainable urban areas or cities appears then as a logical imperative and most essential challenge.

1.1.1 Sustainability or Sustainable Development

The concepts of sustainability and SD are often used interchangeably as in this paper. It should be clarified, however, that some authors use them with different meanings. Yanarella and Levine (1992) refer to sustainability as the goal and sustainable development as the process to reach it, which may or not be sustainable. Robinson (2004) goes back to the original distinction between both terms to provide some

insights into the main divergent opinions in the sustainability /SD debate. Robinson argues that “sustainability” focuses on questions related to values and fundamental changes in individual attitudes towards nature while sustainable development is often more pragmatic, based on efficiency gains and technological improvements.

1.1.2 Sustainable Development and Climate Change

Increasing consensus on the reality of climate change (IPCC 2007) puts further pressure on cities, to on one hand reduce their contribution to climate change and, on the other hand prepare for local adaptation to climatic changes (OECD 2010). Climate change concerns often appear closely interlinked to sustainability concerns. Often, strategies directed at climate change mitigation and adaptation and sustainability aimed strategies are rendered undistinguishable from one another.

1.2 Problem Definition and Research Question

Sustainability and SD have been addressed by innumerable authors in the Planning field, both at the Academic and Practical levels. In fact, Berke (2002) refers to Sustainable Development as the new far-reaching vision that is to lead the planning agenda in the twenty first century, and Campbell (1996) sees it as the concept that rests at the epicenter of planning goals.

However, sustainability is considered by many as a holistic concept (Wheeler 2000; Campbell 1996), which means, by definition, that *the wholeness and the interdependence between the parts of the whole* should be emphasized. This implies that if sustainability is to be seriously addressed by planning, all its principles and aspects must be recognized.

Despite SD being increasingly utilized in Planning, it still constitutes a new concept within the Planning tradition, raising questions regarding the way it is integrated and interpreted. Gunder (2006) and Davidson (2010) are some of the authors who critically examine this integration.

The way in which sustainability is interpreted and the extent to which the holistic concept is incorporated by planners can in turn determine how substantial planning’s contribution to the long-term SD quest will be. This research will address this topic by focusing on the following research question:

How are the principles and main issues of the holistic sustainability concept addressed and adopted by the Planning field?

A remark should be made with regards to the expression “*holistic sustainability*”. It was opted to use this expression to refer to the wholeness of principles and discussions which must be addressed and taken into consideration when using the concept of sustainability as an adjective for an action/procedure/field, as in “*sustainable planning*”. It was preferred over the expression “*theoretical sustainability*” as sustainability was introduced by political documents rather than academic theories.

1.3 Sub Research Questions

The proposed research question is quite comprehensive. So as to address this, a set of subquestions is here introduced to guide the several research stages.

A - What are the principles and main issues that compose the holistic sustainability concept?

➔ Goal 1: Arrive to a holistic model of sustainability

B – What are the main aspects/discussions concerning sustainable planning which can be found in the academic literature?

➔ Goal 2: Arrive to a holistic model of sustainable planning

C - To what extent are the aspects of sustainability reflected in the academic planning literature?

By addressing these questions the final goals of this research will be reached:

Goal 3 – To provide an overview of the main differences and similarities between Planning and Sustainability, bringing into light the main issues and opportunities that arise in the context of addressing the combination of these fields/concepts: Sustainable Planning.

Goal 4 – To establish if there is a gap between the holistic concept of SD and its adoption by the Planning field, and if so, why;

Goal 5 – To gather and propose recommendations regarding if and which additional efforts should be undertaken by Planning in the quest for SD.

The research question focuses on how sustainability principles are addressed by the planning field. In order to analyze Planning’s interpretations of sustainability and the extent to which holistic sustainability aspects are incorporated it is essential to reflect on the concept of sustainability itself. A first chapter will therefore expose the main discussions encompassing this notion, and arriving at a model encompassing the main aspects which will be referred to as the *holistic sustainability model* (A). This model will serve as a summary of the first chapter, and as a tool to be used in the second chapter.

Secondly, the main topics involved in sustainable planning (B) are reviewed at the academic literature level. Consequently, a holistic sustainable planning model results from the aspects covered in (A) and (B).

Thirdly, an analysis of these topics is performed (C) and discussed, using the aspects of the sustainable planning holistic model as starting points for the discussion. In this way an exploratory research will attempt to provide some clues on three matters: which sustainability aspects are being addressed by academic planning, which sustainability aspects are not addressed or covered with less emphasis, and which other aspects not present in the holistic model should be included in a holistic sustainable planning model.

In order to better grasp how sustainability matters are interpreted and worked out in the planning field interviews with experts will be carried out. Besides complementing the theoretical research with feedback from the field the other purposes of the interviews are: to realize how experts see the integration of sustainability by Planning and to find out their view on what is/should be the role of Planning in the quest for global sustainability. This third chapter (C) includes the inputs of interviews in order to better reflect on the findings of the research.

Lastly a final chapter will present the conclusions and recommendations.

The sub-questions intentionally remain with a quite broad focus. The purpose is to not restrict the scope of the research within the fields of sustainability and planning, since it deals with holistic concepts. In this way it can be better ensured that the “main aspects” of sustainability and sustainable planning are the result of a thorough and extensive literature review rather than constrained by pre-determined topics.

In the next page Fig.1.1 shows a scheme of the research, representing how the subquestions relate to each other in a logical way and ultimately lead to insights that can show the way to improved ways of planning urban sustainability.

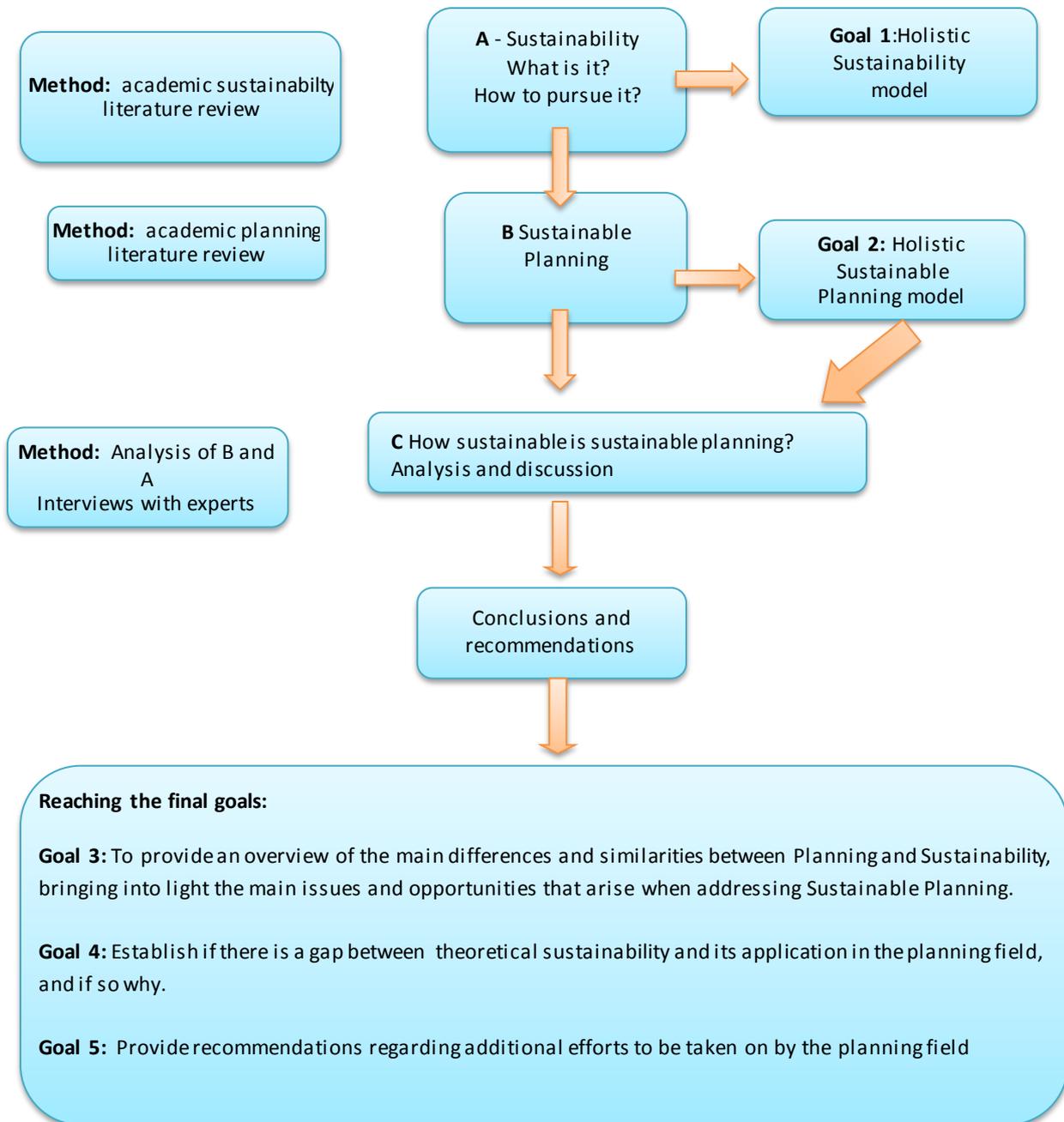


Figure 1.1 -Steps of the Research

1.4 Method

In the section A and B of the research the data needed are the different main principles and discussions on sustainability and sustainable planning. This data will be drawn from an academic literature review and analyzed by comparing the main principles/discussions of the different sections.

Also for further understanding of the conclusions drawn from the comparison of parts A with B, extra material is gathered through interviews with experts in the sustainable planning field and used in part C.

1.5 Academic Context and Relevance

At first sight this research seems to deal with the assessment of sustainable planning. That is not the point of this research. An abundant academic literature covers topics of assessing different aspects of sustainable spatial planning. For instance, Dasgupta & Tam (2005) look at indicators for assessing sustainable infrastructure, Xing et al. (2009) develop a framework model in order to assess how sustainable is urban development, Lee & Burnett (2008) analyze three distinct integrated assessment models of urban sustainability (LEED, BREEAM and HK-BEAM), with regards to the assessment of energy use and Ravetz (2000) proposes an integrated assessment tool to analyze the sustainability appraisals of cities, regions or even policies.

Clearly, most of these models emphasize the highly relevant “integrated” character, which consists generally in displaying the interconnections between the different aspects of sustainability. However, in many cases, integrated assessments of sustainable planning/buildings/urban areas consist in lists of indicators, referent to the different dimensions.

The “indicators approach” primes for its easy operationalization but might provide a narrow understanding of the complete potential of sustainability, by leaving out aspects which are difficult to measure and operationalize, such as prioritizing between sustainability goals, or aspects of lifestyle changes.

This research aims to incorporate those broader aspects of sustainability by purposing a holistic model of sustainability and of sustainable planning. It can show with this that the roots of the discussions in sustainability and sustainable planning lie on different stances over a few aspects of sustainability.

Delivering a sound review and analysis of the main issues involved in Sustainability and in Sustainable Planning, and of the differences between the two, seems to add value to the academic literature.

2 Sustainable Development

Sustainable development is...“meeting the needs of the present without compromising the ability of future generations to meet their own needs”
(WCED 1987).

Sustainable development or sustainability is expressed by aspirations as the ones quoted above, from the Brundtland report (WCED1987). That formulation of SD is understandable and will seem reasonable to most people. However, when it comes to what it means in practice or how to implement it, many debates arise, advocating different approaches and stances. The concept is often used to mean different things, e.g. something in the process of becoming less unsustainable, something that will *sustain itself* for a long term, something that is not harmful for the environment or something that promotes social cohesion.

This chapter aims to clarify the roots of such different interpretations and to offer an overview of the main topics revolving around SD. To better epitomize the diversity of aspects involved in SD, the symbol of

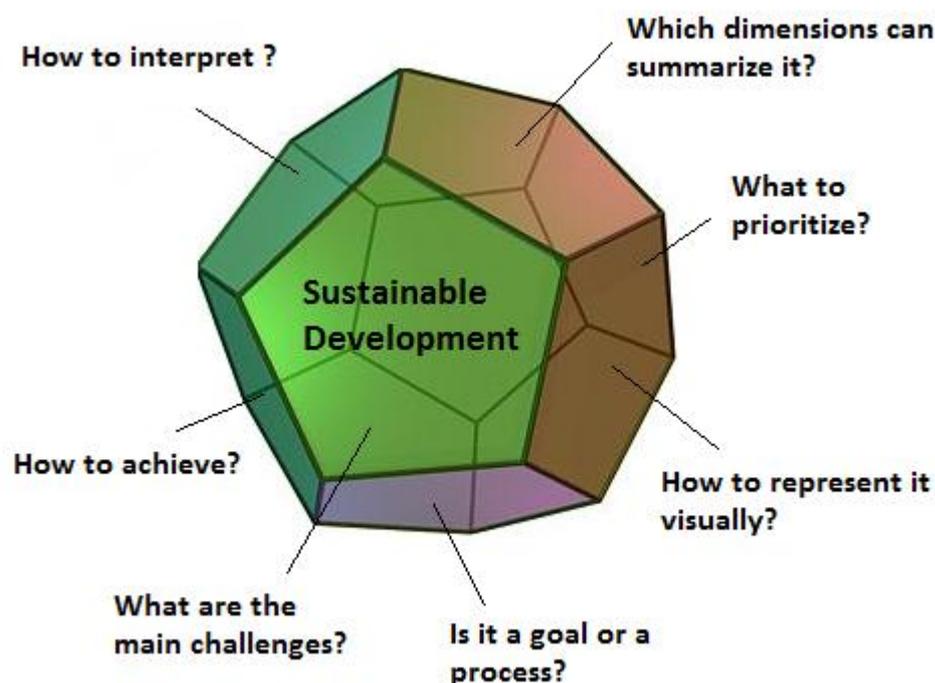


Figure 2.1 - The dodecahedron of Sustainable Development.

the dodecahedron is introduced in Fig.2.1.

The dodecahedron is a regular polyhedron with twelve equal pentagonal faces. One can envisage the sustainability concept as lying at the center of the dodecahedron. A multitude of questions and aspects arise from the concept, represented here by the many faces of the solid. Just as each face connects to five other faces, the answers to one question also influence the answers to other questions. SD is a challenging

multifaceted concept being used throughout the world in a diverse array of contexts. This chapter aims to summarize the main discussions on sustainability by addressing the seven questions emerging from the facets of the SD dodecahedron. It should provide answers to the first subresearch question:

A - What are the principles and main issues that compose the holistic sustainability concept?

This chapter culminates with the formulation of a holistic model of Sustainable Development. This model will summarize the essential aspects of SD which were found by addressing the aforementioned questions.

2.1 The three imperatives

The concept of sustainability originated in the natural sciences, in the context of renewable resources like forests and fisheries (Lélé 1991). In such settings, it was crucial to devise sustainable yields of resource extraction – yields that would allow the resource to regenerate (the trees and fish, in this case). The sustainability concept also has roots in ecology (E. Holden & Linnerud 2006), in which it is defined as the ability of living systems to maintain and maximize themselves over time (Jepson 2001). The concept has been adopted and linked to the concept of human development by The Brundtland Commission in the 1987 *Our Common Future* report. This report argued that continued human development is needed, especially to address the needs of the poorest, but it should be pursued in ways that do not endanger the long-term viability of the planet's natural systems, on which ultimately all humanity depends.

This report popularized the notion of SD and triggered its swift adoption by all levels of the political arena (Appleton 2006), throughout different sectors (businesses, NGO's, etc.) and across academic fields (from sustainable urban planning, to sustainable economies, or sustainable energy systems).

Consequently, there is a profusion of Sustainable Development (SD) and sustainability definitions reported in the academic literature (Robinson 2004; Mebratu 1998; Pezzoli 1997) and these are still evolving (Appleton 2006; M. Holden 2008; L. Newman 2006). Many criticize the concept for its vagueness (Yanarella & Levine 1992). Yet, Robinson (2004) argues that there is a political advantage in a vague definition of the concept for two reasons: firstly, any strict definition would leave out some sustainability proponents, whose views were not represented; secondly, it would be more sensible for definitions to arise from practical attempts of SD rather than having them strictly specified *ex-ante*.

The Brundtland Commission authored the most widely quoted definition of sustainable development:

“meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987).

Text box 2.1: Different interpretations of the Brundtland Report

The Brundtland Report (WCED 1987) produced the most widely quoted definition of SD, however there is still a myriad of interpretations of its call for SD. Hereby, two main interpretations are summarized.

Prioritizes Environmental Dimension: Authors like (Coffman and Umemoto 2010) see the Brundtland report as defending ecological sustainability as a primary goal for affluent regions since it prescribes that “sustainable development requires those who are more affluent to adopt lifestyles within the planet's ecological means”.

Prioritizes the Economic Dimension: Banerjee (2003) states that the report aims at reconciling the irreconcilable by simultaneously achieving economic growth, environmental protection and equity, and criticizes the difficult operationalization of concepts such as the concern for future generations. Furthermore, Banerjee (2003) refers to an underlying assumption that market forces can be relied upon to achieve sustainable development, although political interventions, international agreements, and national environmental regulation also have a role to play. Haughton (1999a) and Jepson (2001) also see the report as adopting an economic growth compatible vision of SD and explain this vision by the fact that it is more politically acceptable and the reason why it has gathered political support, comparing to more radical SD views.

Despite the fact that different interpretations of this report still exist, as summarized in Text box 2.1, it is used in this research as the main source of SD definitions and aspirations.

From the Brundtland report, three equally important imperatives can be discerned, although different authors phrase them in slightly different ways. Table 2.1 quotes the three imperatives according to E. Holden & Linnerud (2006), Sneddon et al. (2006), Robinson (2004) and the Brundtland report (WCED 1987). The three authors were chosen because they are some of the most widely cited. The formulation of the imperatives by E. Holden & Linnerud (2006) is chosen to be used in the rest of this research, as these authors convey the meaning of the imperatives in the most concise way.

Table 2.1 - The three imperatives, according to different authors and supported by quotes from the Brundtland Report (WCED 1987)

Sources	SD Imperatives		
	I (Ecological) Limits	II (Human) Needs	III (Generational) Equity and governance
Brundtland Report (WCED 1987)	<p><i>“At a minimum, sustainable development must not endanger the natural systems that support life on Earth: the atmosphere, the waters, the soils, and the living beings.”</i></p> <p><i>“SD requires that the adverse impacts on the quality of air, water, and other natural elements are minimized so as to sustain the ecosystem’s overall integrity. “</i></p>	<p><i>“... development that is sustainable has to address the problem of the large number of people who live in absolute poverty - that is, who are unable to satisfy even the most basic of their needs. “</i></p> <p><i>“Sustainability requires views of human needs and well-being that incorporate such non-economic variables as education and health enjoyed for their own sake, clean air and water, and the protection of natural beauty. “</i></p>	<p><i>“..The case for the conservation of nature should not rest only with development goals. It is part of our moral obligation to other living beings and future generations. “</i></p> <p><i>“...Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation. “</i></p>
Robinson (2004)	<i>“To stay within the biophysical carrying capacity of the planet”</i>	<i>“To provide an adequate material standard of living of all”</i>	<i>“To provide systems of governance that propagate the values that people want to live by” (quoting Robinson and Tinker 1997)</i>
Sneddon et al. (2006)	<i>“Development that encourages ecological integrity over inter-generational timescales”</i>	<i>“Improvement of human well-being”</i>	<i>“More equitable distribution of resource use benefits across and within societies”</i>
E. Holden & Linnerud (2006)	<i>“Long-term safeguarding of natural systems”</i>	<i>“Satisfying basic needs of all”</i>	<i>“Promoting intra and inter-generational equity”</i>

Nonetheless, these three imperatives substantiate just part of what SD consists of. According to Robinson (2004), SD acts at two levels: the substantive level, formed by these imperatives, and the procedural level. Both are represented in Fig 2.1. The procedural level sees sustainability as emerging from a continuous social debate, integrating both scientific/expert knowledge and the values and preferences of the people involved, in a way that future visions and possible and preferred outcomes are co-devised by all (Robinson 2004). Leiserowitz et al (2006) also refers to the procedural level, though implicitly: *“the achievement of long-term sustainability goals, [...], will require an open, inclusive, and continuing global*

dialogue about what “the good life” should look like, how to live it, and the values, attitudes, and behaviors, both individual and collective, that will support it.”

To characterize SD by these two levels of action is very convenient since it draws a clear distinction between the ultimate goals (substantive) and the principles to follow in the process of achieving those goals (procedural). For instance, in Table 2.1, Robinson formulates the third imperative as the provision of governance structures which foster the values that people choose to live by. This feature is not captured by E. Holden & Linnerud’s formulation, which concerns only the promotion of intra and inter-generational equity. Yet, it can be integrated in the procedural level of sustainability. In Fig. 2.2, both levels are explicit.

Another aspect introduced in this scheme is the identification of each SD goal with a different dimension: environmental, economic and social. It should be noted though, regarding the second imperative, that human needs are not exclusively economic. Moreover, human needs comprise also access to education and health on the one hand, and to clean air, water and a natural environment on the other hand. This is indicated in the Brundtland report (Table 2.1). These non-economic needs can be incorporated into the social and environmental dimensions, respectively.

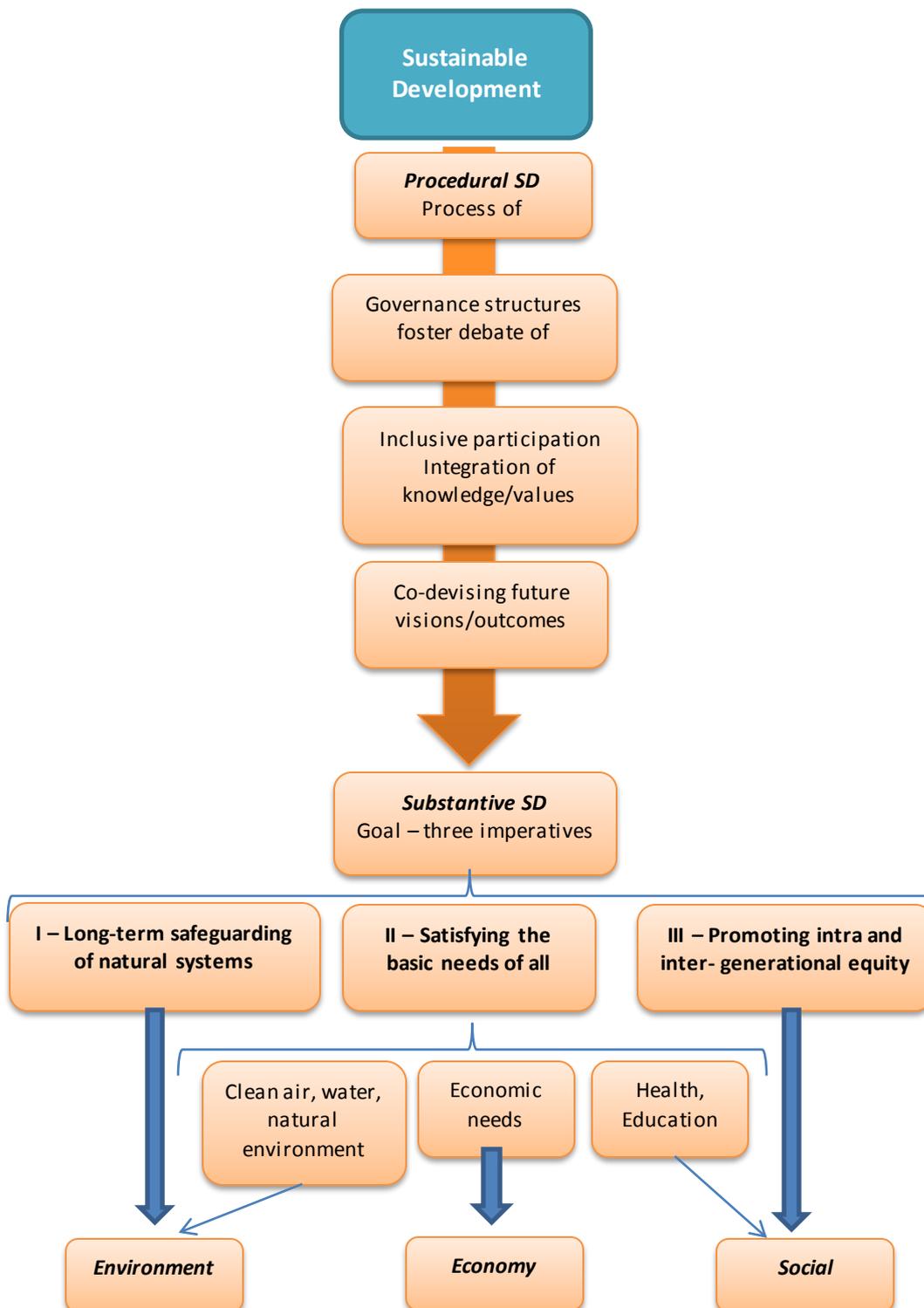


Figure 2.2 - Sustainable Development - a goal and a process. Inspired in Robinson (2004) and E. Holden and Linnerud (2006).

2.2 The dimensions of sustainability

As mentioned before (Fig 2.2), the main goals of SD can be broadly aligned with the three dimensions: environmental, economic and social. Elkington (1998) was one of the first to have

conceptualized sustainability in this way. Elkington was concerned with the integration of sustainability principles by corporations and coined the term “triple bottom line”. A business following a triple bottom line would have to include, in addition to their economic profit, their social and environmental added value. In this way the company or business should pay close attention to not only their economic performance, but also to their social and environmental responsibility.

This three-dimensional conceptualization of sustainability, also called the “People, Planet, Profit” approach, in spite of being developed for businesses, has since then been used by many different actors transcending the domain of corporate accounting. The *three P’s* or *three pillars* approach became dominant in the nineties (Zaccai 2012) and sees SD as striving to balance these three types of concerns as represented in Fig 2.3.

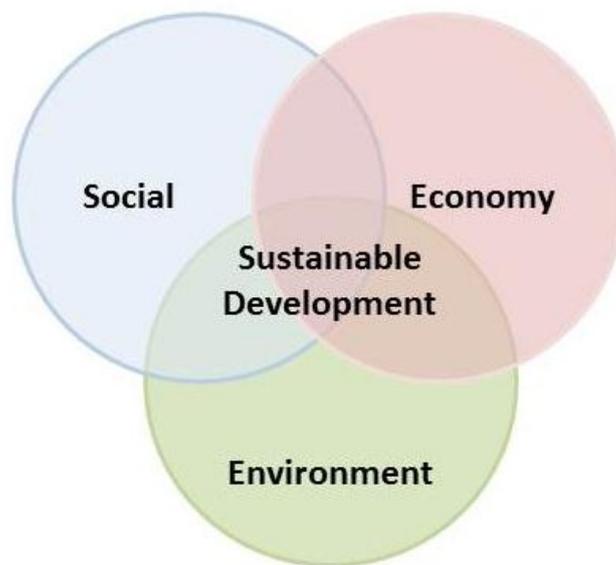


Figure 2.3 Classical representation of Sustainable Development.

Since Elkington’s publication, many other visions have emerged regarding the dimensions pertaining to sustainability and how to represent it visually. This section will address these two questions using a small but diverse sample of sustainability representations as a basis for discussion (Fig 2.3, Fig 2.4 and Fig 2.5).

The debate regarding which SD dimensions should be acknowledged takes place when an author identifies a topic or field relevant for sustainability which he considers not being represented by the other three traditional dimensions. For instance, O’Connor (2006) in Fig 2.4, and other authors (Briassoulis 2001; Hosseini & Kaneko 2012) argue for a fourth dimension – the institutional/political one. This dimension would represent the arena through which the debate on how to balance concerns and objectives in the other three dimensions takes place (O’Connor 2006; Briassoulis 2001; Hosseini & Kaneko 2012).

Mebratu (1998), in Fig.2.4, also conceptualizes four dimensions but instead of the term *dimension* uses the term “*Cosmos*” and defends the existence of an Abiotic cosmos as the 4th dimensions within which the other three dimensions exist: Biotic (Environmental), Social and Economic.

Mauerhofer (2008), in Fig 2.4, enumerates the environmental, economic and social capitals in a three-dimensional representation. Despite referring the same dimensions as Fig 2.3, the visual representation is very different which will be analyzed further below.

Pezzoli (1997) whose model was slightly adapted in Fig 2.5, uses four dimensions, the fourth being the institutional sphere in which laws and policies are designed, similar to O’Connor (2006). The particularity of Pezzoli’s representation is that more issues are covered in each dimension. For instance, the Environmental dimension covers not only the natural systems but also History and power relations. In Pezzoli’s Economic dimensions, Technology is also included and the Social sphere comprises Culture and Civil Society as well.

Upon analyzing all of these conceptualizations of sustainability, it is possible to distinguish two approaches. One approach aims to represent the dimensions as they exist in an objective reality. This approach is taken by Mebratu’s model, as it attempts to remind us that the reality is formed not only by the three classical dimensions, but also by an abiotic dimension which is free of interaction with the other three (Mebratu 1998). The other approach aims to represent the dimensions not of the physical reality, but of the socially-constructed reality in which the quest for sustainability takes place. Pezzoli (1997) and O’Connor (2006) take this approach when adding the Institutional/Political sphere.

A similar distinction can be observed in the discussion of how to visually represent sustainability. This discussion is addressed by many authors (Mebratu 1998; O’Connor 2006; Mauerhofer 2008; Pezzoli 1997).

Visual representations allow depicting dependence relations between dimensions. For instance, by making the dimensions equally sized, it is implied that they have equal importance. On the other hand, representing them by circles contained in circles can emphasize that a certain dimension exists completely dependent on the dimension within which it is inserted.

Dependence relations, implicit or explicit, are important because they determine the author’s perspective of what dimension(s) should be prioritized.

This point can be illustrated by comparing two visual models representing the same dimensions: Mauerhofer’s in Fig. 2.4 and the classical SD representation in Fig. 2.3. The classical representation presents equally sized spheres, thus implying equal importance, and shows overlaps between each two of the three dimensions. Mauerhofer’s model however represents the dimensions as hierarchally dependent: the economic dimension exists completely within the social dimension, which in turn is completely inserted within the environmental dimension.

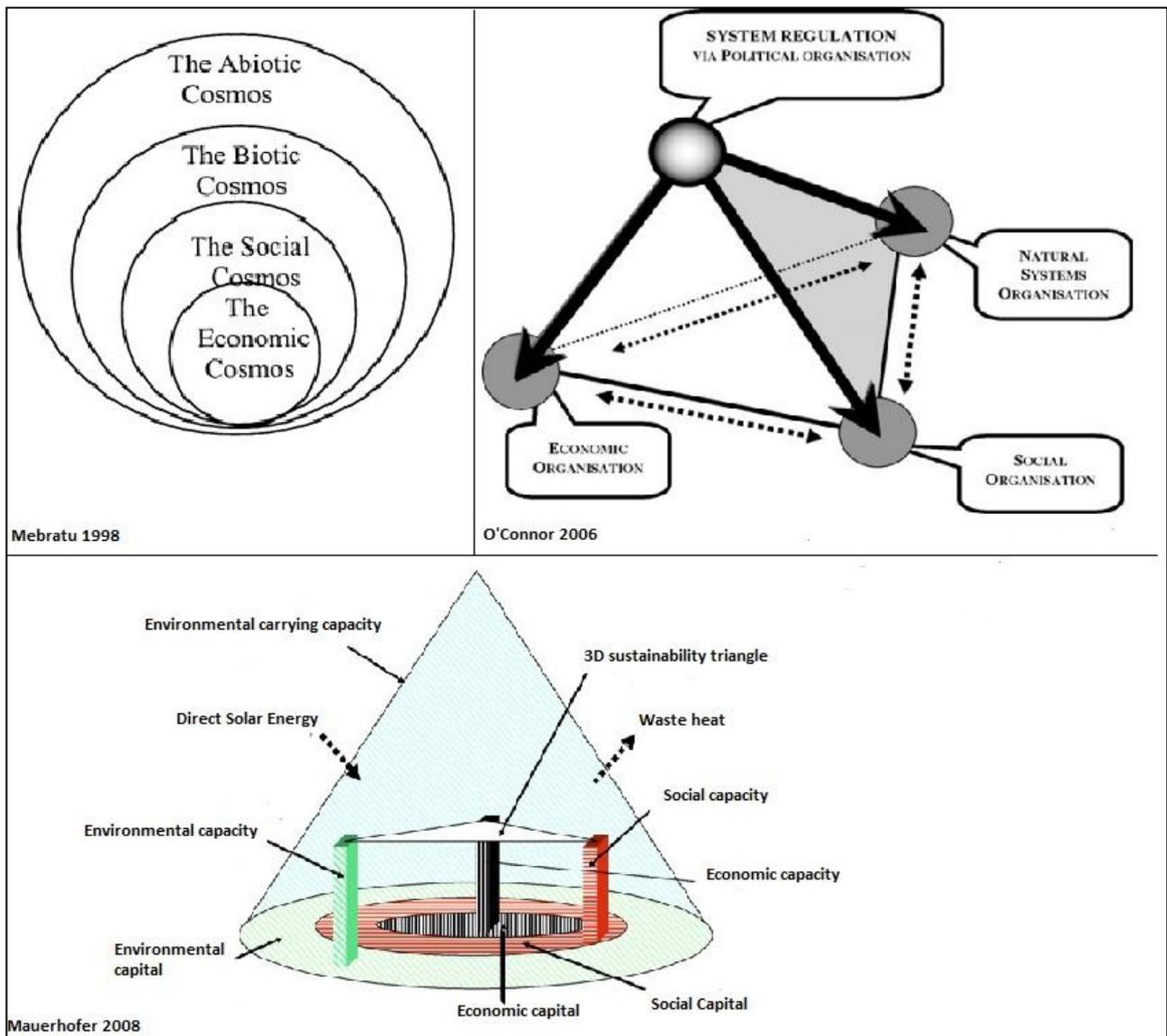


Figure 2.4 - Visualizing the dimensions involved in SD as perceived by Mebratu (1998), O'Connor (2006) and Mauherhofer (2008)

This kind of hierarchical model views economic capital as completely dependent on social capital, and the latter one completely dependent on the environmental capital. It is useful in the way that it emphasizes how ultimately, even the economy is highly dependent on the natural systems and on social factors. However, it can also be erroneous, since more and more business opportunities arise in the field of software applications in recent years, whose dependence on the natural environment is very limited.

Pezzoli's model in Fig 2.5 is partially hierarchical, using a combination of partly overlapping circles as in the classical representation (Fig 2.3), but also an overarching circle within which the other dimensions exist. In Pezzoli's model, the overarching dimension is, as in Mauherhofer's (2006), the environmental one. The most interesting of Pezzoli's model is actually the fact that Pezzoli's representation results from an

extensive transdisciplinary sustainability literature review, from which he draws some interesting conclusions.

In this model, four dimensions are expressed, the environmental one which consists in the natural and social environment (social in terms of history and power relations) and which serves as the background in

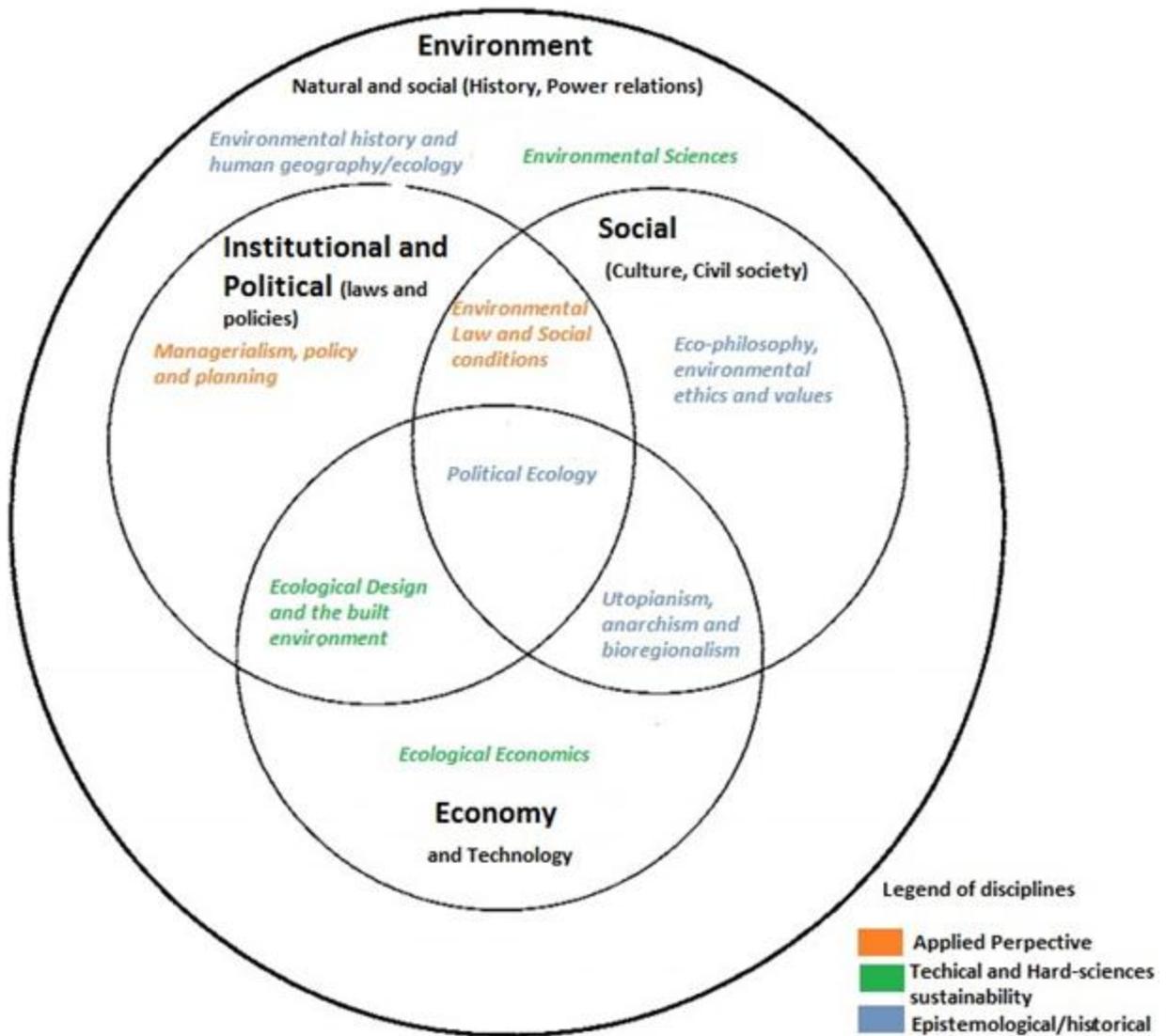


Figure 2.5 - The dimensions and disciplines of Sustainable Development. Adapted from Pezzoli 1997. The model was slightly altered in order to make it more consistent with the names of the dimensions used so far.

which the other dimensions exist. These are the Institutional/Political, the Social and the Economical/Technological. In this way, it shows clearly the four different fields/dimensions from which sustainability minded literature arises. Additionally, it allows distinguishing between disciplines which mainly arise from one dimension and disciplines whose focus lies in the intersection of various dimensions. Examples are the disciplines of environmental sciences and environmental history which arise from the

environmental domain, and the ecological design and built environment which arise from the overlap of the environmental, economic/technological and the institutional/planning domain.

An interesting aspect presented by Pezzoli (1997) was the categorization of the SD related disciplines according to its instrumental focus:

- **Applied:** Managerialism, policy and planning literature, but also environmental law and social conditions
- **Technical / Hard-sciences of sustainability**, which include work produced by the environmental sciences, ecological economics and topics of eco-design and the built environment
- **Epistemological /historical/ structural-transformative**, including environmental ethics, environmental history and human geography, utopianism, anarchism, bioregionalism and political ecology.

These characteristics are represented by different colors in Fig 2.5.

The other interesting point that Pezzoli (1997) reports, in his analysis of stances on sustainability in each discipline, is an increased criticism of the more fundamental-focused disciplines compared to the more applied disciplines, in terms of questioning the viability of the economic system.

In my opinion, this is not surprising since applied disciplines work in the practical world within legal, socio-economics systems. These disciplines are more concerned with being effective than with being critical. More theoretical academic disciplines have more space, and a different mindset which allows them to question the actual system.

Pezzoli's model is useful for showing the diversity of disciplines that arise from several dimensions which deal with the sustainability concept. In the real world, work integrating different disciplines is necessary in order to answer specific problems. One of the issues which come up when working across different fields is that each field has its own understanding of what lies in the roots of the unsustainability crisis, and consequently what should be the solutions and the main actors involved. Mebratu (1998) made this point very explicit with the Tables 2.2 and 2.3. Table 2.2 shows how a discipline more economic minded, another more environmental-concerned and one more social oriented view differently the causes of the crisis, and the solutions and instruments which should be used. On Table 2.3 a similar point is made, but for the main actors in society: governmental organizations, civil society and non-governmental organizations and business actors.

The added-value of conceptualizing dimensions seems to be:

- It allows depicting the different areas of intervention for sustainability. In terms of both disciplinary fields and societal actors.

- It can show the existing overlaps, interlinks or dependences between dimensions, especially visually.
- It makes it easier to outline sustainability discussions and conflicts, as different disciplines/actors interpret the concept in different ways (Pezzoli 1997) and see the unsustainability crisis as having different sources and consequently, different solutions (Mebratu 1998). See illustrative examples on Table 2.2 and Table 2.3.

Table 2.2 - Academic disciplinary views on SD, from Mebratu (1998)

Disciplines :	Environmental Economics	Deep Ecology	Social Ecology
Cause of the crisis	Undermining Ecological Goods	Human domination over nature	Domination of people and nature
Solution is	Internalizing externalities	Reverence and respect for nature	Co-evolution of human and nature
Instruments used	Market-based	Philosophical – biocentric egalitarianism	Rethinking the social-hierarchy

Table 2.3 - Institutional views on SD, from Mebratu (1998)

Institutions:	Brundtland Commission UN (governmental)	International Institute for Environment and Development (NGO)	World Business Council for SD (business)
Solution is..	Sustainable growth	Environmental care	Eco-efficiency
Solution platform	Nation-states	Communities	Business and industry
Main actors involved	Governments and international organizations	National and international NGOs	Corporate leadership

For this research, the dimensions considered are the three classical ones plus the institutional/political one, as in O’Connor and Pezzoli. The purpose of using these dimensions in this research is not so much to focus on the interdependencies between dimensions, but on analyzing how the concerns of each dimension are integrated or prioritized in the pursuit of sustainability. Therefore, this research sees the institutional/political sphere as the overarching one, in the sense that it is at that level that the concerns of each dimension are mediated and prioritized. Moreover, Planning is pointed by Pezzoli (1997) as belonging to the institutional sphere.

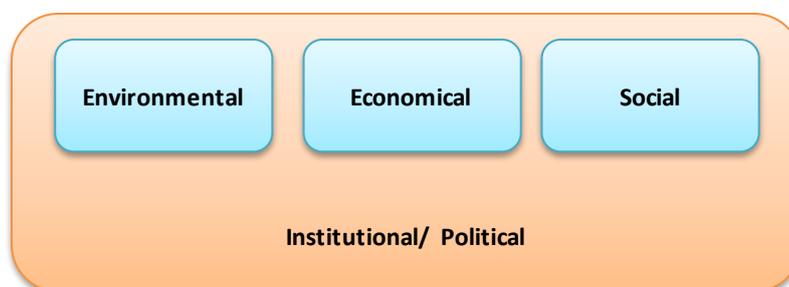


Figure 2.6 - The four dimensions of sustainability

2.3 How to achieve sustainability –different views

Lélé (1991) reports, in the beginning of the nineties, a turn in the sustainability debate from questions of disproving the paradox of the sustainable development to discussions on how to achieve it. Nowadays, divergent opinions of how to pursue sustainability still abound. In this section, the main stances are explained as pairs of dichotomies.

Robinson (2004) argues that the Brundtland report integrates two different approaches: a radical and reformist one. According to him, a radical element is explicitly linking environmental and development issues. It is argued that ecological sustainability cannot be achieved if the problem of poverty is not successfully addressed around the world, and that both issues have to be resolved simultaneously. Another radical element I have identified is the call for lifestyle changes in the affluent regions of the world. It is expressed in the report by “SD requires those who are more affluent to adopt lifestyles within the planet's ecological means” (WCED 1987).

A reformist element is promoting more human development as a solution, calling for an increase in gross world industrial activity over the next century to meet the needs of the poor (Robinson 2004)

Robinson links these ideas with the conservation/preservation debate of wild natural areas in the 19th century. In this debate, the proponents of conservation showed a utilitarian approach defending the conservation of nature areas for future human use. The preservation supporters advocated the preservation of pristine areas, showing a more idealistic/spiritual approach.

Leiserowitz (2006) quoting the Natural Resource Council 1999 states that in the quest for SD, most SD proponents admit the need for changes in human values, attitudes and behaviors. This can be in some way counterposed to the sustainability approach, which favors technology as the main motor for change. For instance, Binswanger (2001) mentions von Weizsacker et al. (1997) who defended the power of technology contributing to a future society with the same or higher life standard but simultaneously more efficient use of resources and energy. These two differing approaches can be defined as fundamental change vs technological-fix.

I argue that the concepts of weak and strong sustainability can also be broadly connected to these dichotomies. Sustainability definitions are said to be *weak* or *strong* depending on the extent to which it is seen as admissible to replace natural capital with human capital (Haughton 1999a). According to Agyeman et al. (2002) and Krueger & J. Agyeman (2005), *weak* sustainability admits the depletion of certain resources as long as they are replaced by others over time. For example, natural capital can be used as long as it is converted into manufactured capital of equal value. *Strong* sustainability on the other hand defends that the environment provides some functions or eco-systems services that cannot be replaced by technology (Agyeman et al. 2002). According to (Krueger & J. Agyeman 2005) the problem with weak

sustainability lies in the difficulty with assigning monetary value to the natural world and in not considering the impossibility of replacing some natural materials by manufactured goods.

With these concepts in mind and going back to Pezzoli's (1997) observation in the last section (2.2) on the different stances taken by various disciplines, it can be said that it seems that the more applied disciplines of management and policy tend to use weaker definitions of sustainability while the technical and more epistemological based disciplines take a stronger approach.

In summary, the main divides in the SD or sustainability debate relate to how sustainability is to be achieved. What is needed? Is the technical-fix and reform enough to lead the world into sustainable pathways or is there need for more fundamental values and behavioral change?

The principle taken by some authors is that both reform and fundamental change are needed (Robinson 2004). This means including more of the aspects on the right side of the SD in Table 2.4, as the common SD discourse focuses more on solutions in the left side (Robinson 2004, Davidson 2010).

This is the stance taken by my research. Thus, both Reform approaches including technological improvements, efficiency policies, and Fundamental change approaches covering issues of life style changes and deeper questioning of the socio-economic systems are comprised in the SD holistic model.

Table 2.4 - Main polarizations in sustainability. Adapted from Robinson (2004)

Sustainable Development/ Sustainability		
<i>..to be achieved through..</i>		
Nature conservation (utilitarian)	vs/and	Nature preservation (spiritual/idealistic)
Incremental Reform (CSR, efficiency gains, etc.)		Radical change (power relations, redistribution, exploitation)
Technical-fix (technological improvements)		Fundamental value change, Life-style change
Weak sustainability (natural capital is replaceable)		Strong sustainability (irreplaceable natural capital)
Reform		Fundamental change

2.4 Sustainability challenges

From the theoretical literature review on sustainability, it is clear that both as a goal and as a process it gives rise to multiple challenges.

A combination of the main challenges is here shortly summarized:

Transdisciplinary thinking – According to Robinson (2004) and Pezzoli (1997) it is necessary to focus on the connections among fields as much as on each field contents, e.g. bridging sociological and natural sciences, to understand how development and the environment interplay.

Flexibility - The systems addressed by SD are inherently unpredictable. Strategies must be devised to deal with that (L. Newman 2006), by being flexible. Flexibility is especially relevant when it comes to

strategies of adaptation to climate change, due to the uncertainty and unpredictability inherent to the climate system.

Integration – In order to achieve sustainability, it is necessary to work across fields, sectors and interests Robinson (2004). It is also required to focus on multiple scales: spatial and temporal (Newman 2006, Robinson 2004). Integration means to look at the interconnections between the different spatial scales, and to take into account the views and interests of different fields, sectors and actors. This can be hampered by how distinct sectors and actors present diverse views on how sustainability is to be achieved, as mentioned in section 2.2.

2.5 Holistic model of Sustainable Development

The main topics and discussions in the Sustainability literature were here addressed and will be used as the stepping stones of this paper, by guiding the analysis of the sustainability discourse at the academic level of planning. For that purpose, a SD holistic model was devised and can be observed in Fig.2.4.

In order to pursue and achieve sustainability, a multitude of aspects should be recognized and addressed. These exist at the procedural and substantive level of SD:

- Procedural level:
 1. Challenges that must be recognized and proactively addressed:
 - **Integration:**
 - temporal scales - to act now, out of concern for future generations.
 - spatial scales - interconnections between local and global systems.
 - different actors and interests – to reconcile various societal actors (business, civil society, state, science), and interests pertaining to the different SD dimensions (environmental, social, economic).
 - **Transdisciplinarity** – to promote academic work that will cross disciplinary boundaries, in order to find out more about interconnecting relations, and to devise holistic solutions.
 - **Flexibility** – every approach towards future sustainability should address the uncertainty and complexity involved in the natural and socio-economic systems by devising strategies that can be adapted in case of future changes.
 2. SD has to be achieved by both

- **Reform** – practical approach, advocates incremental change. Includes focus on Technological innovations, Energy and Resources Efficiency, Economic growth.
 - **Fundamental Change** – fundamental criticism implying sometimes profound change of socio-economic systems on the one hand and, on the other hand, values, lifestyles and behavioral changes.
3. **Continuous debate** – a societal debate should be promoted in order to co-devise future visions for societies.
 4. **Inclusive participation**- all different actors/people should be called to give their opinions, and express their values.
- Substantive level
1. The three non-hierarchical imperatives:
 - **Long-term safeguarding of natural systems**
 - **Satisfying the basic needs of all**
 - **Promoting intra and inter-generational equity**
 2. The dimensions involved in attaining these imperatives:
 - **Environmental**
 - **Social**
 - **Economical**
 - **Political/Institutional**

These aspects are summarized by the SD holistic model - Fig. 2.7.

In the following chapters, it will be analyzed if and how the Planning field acknowledges and integrates the aspects of the holistic model of sustainability.

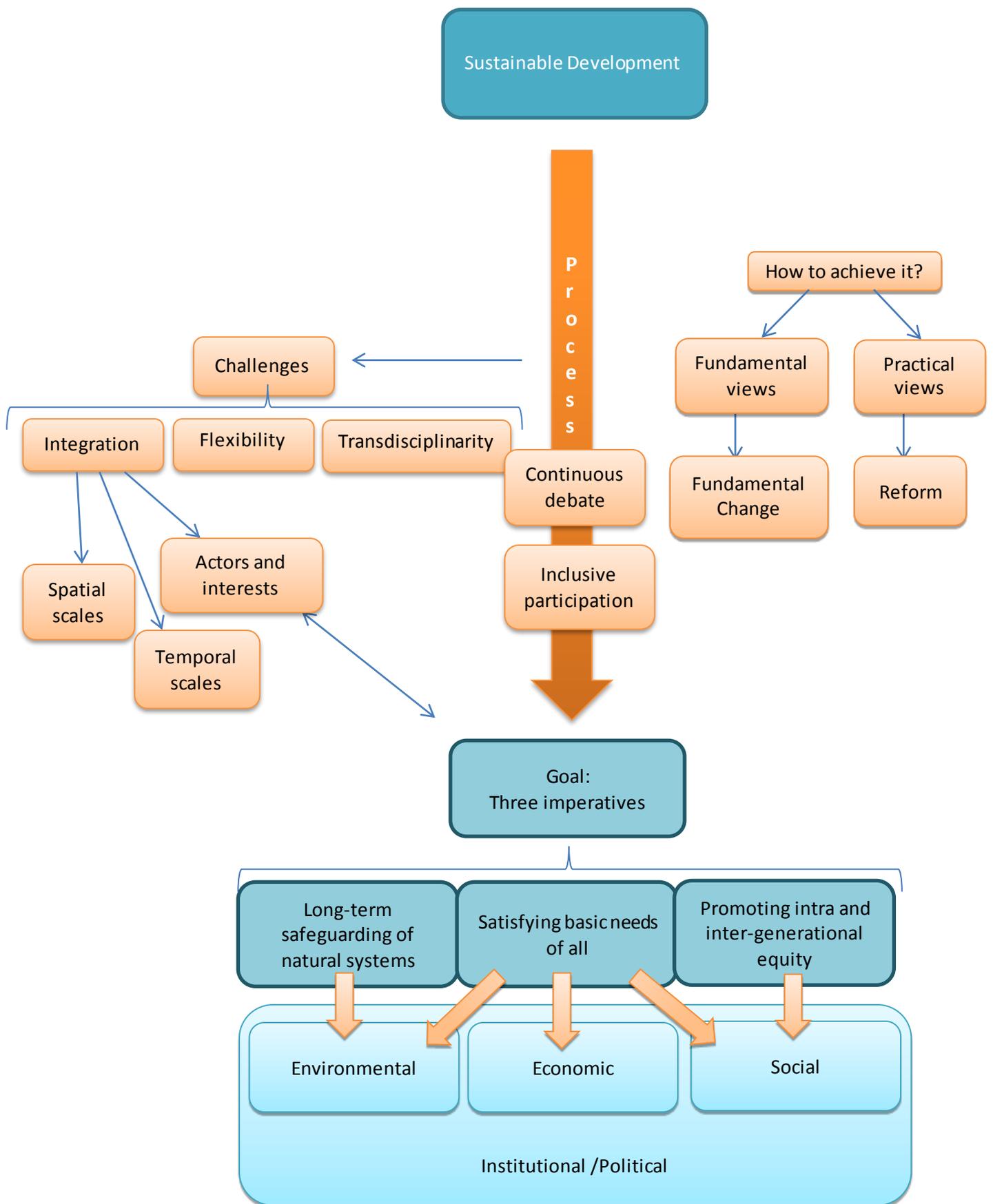


Figure 2.7 - The SD holistic model

Critiques of the SD concept can be distinguished to be either directed at aspects inherent to the concept or arguing that one of the dimensions is favored over the others.

Grosskurth & Rotmans (2005) criticize the SD concept with basis on its inherent aspects of normativeness, subjectivity, ambiguity and complexity. The authors acknowledge the main norm of intergenerational equity and report its contestation by the scientific advisory board of the Dutch government in 1994, due to its apparent arbitrary nature. SD is subjective when it comes to define what should be considered as the needs of current or future generations –it will vary according to one’s personal beliefs and values. Grosskurth & Rotmans (2005) also point out the lack of prioritization of dimensions in the Brundtland report which they consider ambiguous. The other aspect the authors acknowledge is the complexity of SD as it aims to transgress multiple scales: temporal, spatial and dimensional. They propose that any approach for communicating sustainability should clearly map out its inherent subjectivity to make clear the different perspectives on what the advocates consider should be sustained.

The other type of critique comes from favoring one dimension over the others.

Robinson (2004) refers to the critic that SD is distracting the public debate from the real problems and potential solutions, and the arguments differ according to if one's stance is biophysical/ecological or social.

- **Ecological** - From the ecological dimension, the problem is that the SD position is mainly anthropocentric, advocating sustainability for solely human purposes and defending the ability of humans to solve environmental and social problems solely through the use of reason. The right strategy, according to the biocentric advocates, would be to develop a new ethic, a new set of values and new ways of relating to nature as suggested by Arne Naess in its call for deep ecology (Blewitt 2008).

- **Social** - From the social dimension, the main criticism is that the reformist direction of SD avoids approaching questions of power relations, exploitation and inequalities, while it should strive to go beyond technical-fixes. In the same line, Zaccai (2012) states that the interests of the global environment, and of future generations, seem still considered among the least important when it comes to taking action, just as they were at the time of the Brundtland Report.

There is also quite some criticism regarding the economic dimension of sustainable development, even if economic growth is seen by some streams as essential for meeting the other goals of sustainable development. Critics argue that the assumption of desirable continuous economic growth should be questioned as the market-driven model seems to have caused part of the environmental degradation (Seabrook 1990 and O'Connor 1993, 1994 in Haughton 1999a).

Some economists however acknowledge the need of proposing new economic theories to incorporate the new ideas of sustainability (Chichilnisky 1997; Chichilnisky 2012) According to Chichilnisky (1997) the

challenge is to develop a sustainable economic theory that provides as clear and solid foundations as the neoclassic economic theory that addresses issues such as the standard cost-benefit analysis which discounts the future, leaving fewer options for long-term beneficial policies.

Still about the economic dimension, a recent discussion is that of green economy, which is one of the main topics of this year's Rio +20 UN conference (Zaccai 2012) and aims to reach win-win situations merging economic and environmental concerns. Onestini (2012) defends that in Latin America the international debate has shifted from Sustainable Development to a "green economy" and argues that as there is no consensus about what should a green economy be like, the discussions around this topic tend to ignore the social dimension in terms of equity and social justice and focus solely on the interface between economics and the environment. Brand (2012) also addresses this topic and stresses that the point is to question which societal interests are strengthened and which understanding of the economy and well-being is promoted when a greening of an economy takes place.

3 Sustainable Planning

Similarly to Sustainable Development, Sustainable Planning is also a complex concept which can be regarded from a multitude of angles. Therefore the image of the multi-faceted dodecahedron is here again introduced, but this time to represent Sustainable Planning.

From an extensive review of academic planning literature certain topics were deemed the most relevant regarding Sustainable Planning, and thus could be pictured as arising from the different facets of the Sustainable Planning dodecahedron (Fig3.1). However, two general topics can be distinguished: one with a more theoretical focus on planning and another more applied, concerned with the issues of planning sustainable cities. For simplicity purposes, the acronym of SP for Sustainable Planning was used in figure 3.1.

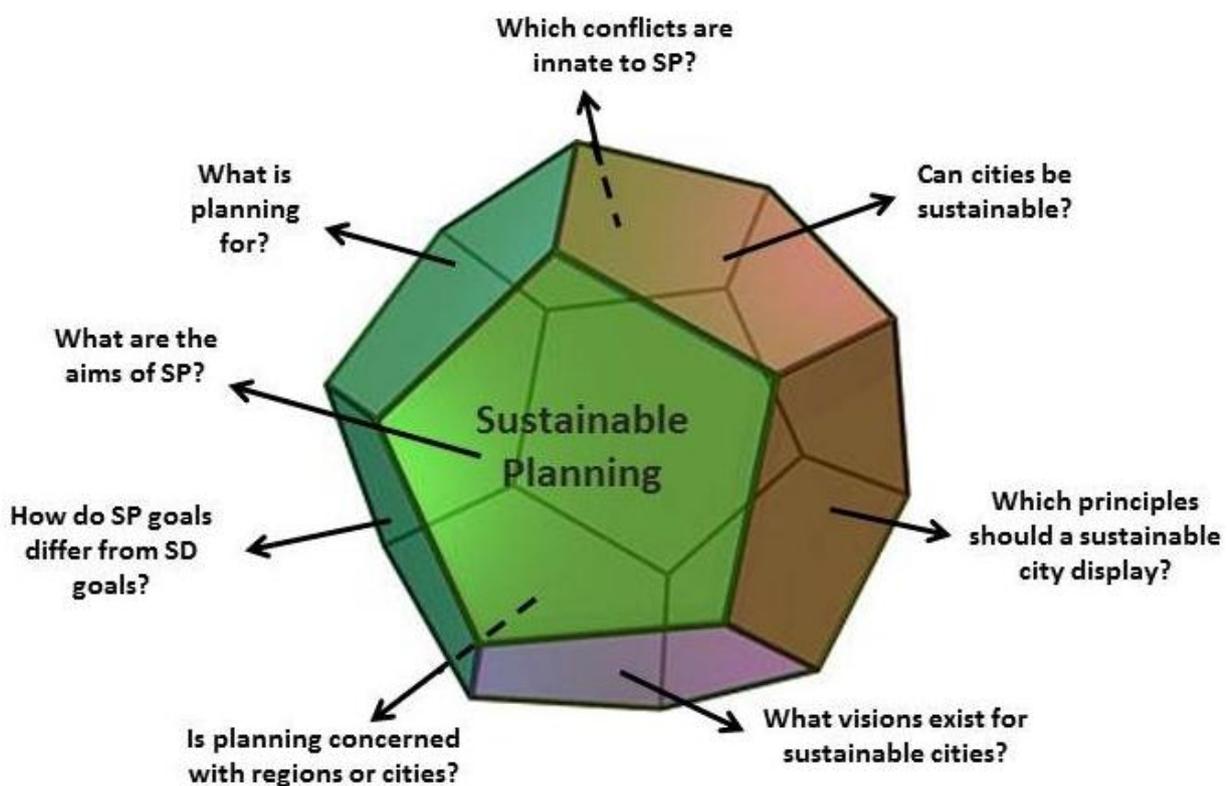


Figure 3.1 – The dodecahedron of Sustainable Planning.

Each section will deal with one or two aspects, although some sections can refer or incorporate aspects covered beforehand. It is intended, in this way to provide answers to the previously defined subresearch question:

B – What are the main aspects/discussions concerning sustainable planning which can be found in the academic literature?

The answers to this question will result in the development of a holistic model of Sustainable Planning, incorporating principles of the SD holistic model but adding aspects manifested only in the context of sustainable planning.

3.1 Introduction to Planning – and its connection to Sustainability

The general meaning of “Planning” is often to prepare for future actions. In this paper it is mainly used in the context of Urban Planning, which means according to the *Encyclopedia Britannica (2012)*:

“Urban planning: design and regulation of the uses of space that focus on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it. Because urban planning draws upon engineering, architectural, and social and political concerns, it is variously a technical profession, an endeavor involving political will and public participation, and an academic discipline.”

Planning can also focus on the level of regions and it is named, in that case, Regional Planning. However, as it becomes more common to approach urban areas as urban regions instead of clearly limited cities (Bogunovich 2009) it becomes more difficult to draw clear distinctions between Urban and Regional Planning. Henceforth this research will use more generally the term “Planning” but mentioning, when necessary, if it concerns mainly urban or regional areas.

Planning is sometimes referred as spatial planning, which is, according to Eggenberger & Partidario (2000):

“(…) the pre-emptive coordination of human activities with an impact on development. [It] aims to allocate different land-use functions and activities as efficiently and effectively as possible. This allocation is aimed at maximizing the benefits/profits at a given location.”

The above definition refers to the location of different activities within urban environments. This is also called allocation of different land-uses. Assigning land-uses may prove to be quite challenging, considering the variety of functions and activities pressing demands on land, such as: Transport, Housing, Agriculture, Commerce, Industries, Natural Areas, Recreation, Public Space and even historical areas.

Managing competing demands for land is a complex issue, and it could explain the fact that planning goals are often defined for each activity/planning field: Transport, Environment, Housing, etc.

Alexander (2009) names this type of planning goal as *Descriptive*. In that paper Alexander addresses the question “*what is planning for?*”. According to Alexander’s review, the goal of planning can be perceived as being merely *instrumental* or *substantive*. Seeing the purpose of planning as instrumental, understands planning as a coordination of future action which leads to an outcome which is better than if planning would not have occurred. Within the substantive perspective of planning goals Alexander differentiates between the already mentioned *Descriptive* and the *Normative* goals (Fig.3.2). The *normative* view denotes the use of subjective goals such as producing the “good society” (Friedman 1987, quoted in Alexander 2009), which can often be associated with underlying ideologies. In Fig. 3.2 two illustrative examples of normative views on planning are exposed: Davidoff’s (1967) cited by Alexander (2009), view that planning should strive to promote the interests of the disadvantaged, which can be associated with ideals of progressive social democracy, and on a different line, Webster’s (2005) cited by Alexander (2009), neo-liberal view that planning should aim to coordinate/regulate the race for resources.

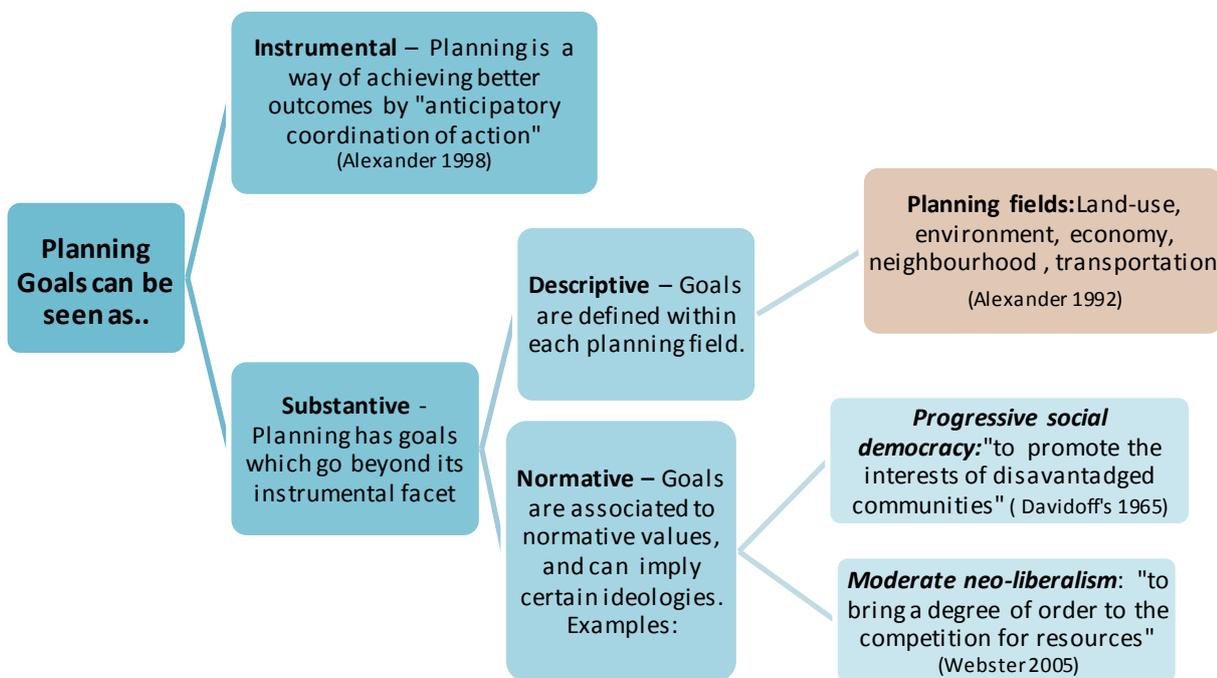


Figure 3.2 – Types of planning goals. Adapted from Alexander (2009)

The *descriptive* view of planning goals always comes up when reviewing any practice-oriented planning literature. The planning fields enumerated by Alexander (1992) in Alexander (2004) consist of: environment, economic, neighborhood, land-use, and transportation planning. In Fig. 3.2 these are represented in a differently colored box, since they do not refer to a type of planning goals. Yet, planning fields/themes are indisputably widely used in the practical planning as a way of operationalizing planning goals. However, this list of planning fields can vary within planning actors, from place to place, according to multiple factors such as the geography of the area, historical local concerns, the political system, national

priorities, etc. For instance, in the Netherlands the field of “Water” is always clearly depicted in municipal plans. This is due to the country’s particular geographic position, with a great part lying below sea level, and it underlines the need of dealing with a variety of water issues, including draining water from all over the country and pumping it out to the sea. In other places with high social unrest, “Public Order” could be one of the main planning concerns.

Fainstein (2000) mentions amongst other models of planning theory, the “communicative model” in which the planner is seen as a mediator between the different interests of the stakeholders involved in the planning process. Fainstein (2000) makes a reference to “the enduring tension within planning thought between a focus on the planning process and an emphasis on desirable outcomes”. This is closely related to the parallel described of planning as a substantive goal, and planning as a procedural instrument.

The fact that even within the Planning discipline there is a lot of discussion regarding the question of which is, or should be its purpose, might have its roots in the fact that Planning is considered to lie close to some social sciences as geography but feeding also from fields like architecture. It is, very practical-minded, like architecture, in the sense that it deals with projects or policies which intervene directly in places and populations. Therefore it is not surprising that its concerns and focus were always context dependent, be it historical, geographical or socio-economic contexts.

Friedman (1998) makes an interesting point while explaining the difficulties involved in theorizing about Planning. The arguments used are the following: planning is deeply rooted in practice; it is difficult to specify who should be considered as “a planner” since so many different actors are involved in the planning process – architects, city engineers, housing experts, public officials in municipal planning offices, etc.; and the planning process varies significantly, from more bureaucratic and simple “zoning”- allocation of different uses to spaces, to very complex mega-development plans which can involve national governments, the civil society and even international investors (Friedman 1998).

Moreover, planning besides depending on cultural and political contexts (Friedmann 2005) has also modified across time. An example is the focus of the planning field which is not strictly defined and has evolved and changed over time. Kaiser & Godschalk (1995) contend that the field had its roots in design but argue that its focus had become more policy-oriented during the twentieth century and was returning again to its roots of physical design. On a similar note regarding the twentieth century, Breheny (1997) in Berke (2002) considers that planning had lost its interest in visionary ideas and had become more pragmatic-oriented. However, as reported by Haughton (1999a) and Agyeman et al.(2002), there was a resurgent interest in social and environmental issues and its inter-links. Haughton (1999a) states that this interest was accompanied by the development of normative theoretical approaches within planning and geography which incorporated ideas of values, ethics and quality of life.

The concern with ideas of values and ethics on one hand and the existence of a normative approach within planning made it very suitable to integrate sustainability within its theory and practice. In fact Jepson (2001) defends that the adoption of the sustainability concept by the planning field is somehow natural due to the many aspects shared by both concepts. These are summarized in Table 3.1.

Table 3.1 - Shared characteristics of Planning and Sustainability (adapted from Jepson 2001)

Planning and Sustainability	
<i>Intrinsic...</i>	Long-term perspective
<i>Both recognize...</i>	Human welfare has effects on flows and processes of the natural environment
	Links between urban dynamics and environmental degradation
<i>Both are prone...</i>	To be applied/concerned to/with local or regional scale
<i>Both concerned with ...</i>	Systems and systems interconnections
	Integration across disciplines, actors, values and institutions

Cowell & Owens (2006) contend that although many acclaim the crucial role of planning regarding SD, the tools that can be used by the field are more instrumental and technical than deliberative and political. This seems to suggest that a relevant role promoting a societal debate to co-devise future visions, or touching upon issues of behavioral change should not be expected from planning. However Fig 3.2, based on Alexander (2009), suggests that Cowell & Owens’s arguments derived from a rather instrumental or rather descriptive view on planning goals. In contrast, more normative views on planning goals could argue in favor of planning having a pertinent role concerning the continuous societal debate and fundamental change.

3.2 Definitions

A sample of definitions related to sustainable planning is hereby introduced and analyzed. This sample was selected to serve as an illustrative example of how sustainability aspects are emphasized differently depending on the definition.

How to define a sustainable city? There is no easy answer, as Chiesura (2004) notes, similarly to SD, there is not a widely established definition of a sustainable city and “*many interpretations exist of which characteristics a city should present to be considered sustainable*”.

The concept of sustainable city can be enlarged to encompass a society as is the case in the definition of a sustainable society proposed by Agyeman et al.(2002):

“One where wider questions of social needs and welfare, and economic opportunity, are integrally related to environmental limits imposed by supporting ecosystems.”

In this definition Agyeman et al. emphasize the relation between the three dimensions of sustainability and suggest a prominence of the environmental dimension, limiting the others, which is in agreement with the Brundtland report

Furthermore, it is stressed that *“unless society strives for a greater level of social and economic equity, both within and between nations, the long-term objective of a more sustainable world is unlikely to be secured”* (Agyeman et al. 2002).

Lastly, Agyeman et al. (2002) state that *“sustainability implies a more careful use of scarce resources and, [...] a change to the high-consumption lifestyles experienced by the affluent and aspired to by others.”* Which they consider to be difficult since it deals with controlling one’s self interest out of concerns with unknown others, who are not born yet, or live in distant places.

These points refer to the imperative of intra-generational equity within and across countries, and to aspects of fundamental change in terms of lifestyles.

Briassoulis (2001) defines planning for sustainable development as

“a continuous process of designing courses of action to assist spatial systems to achieve and maintain non-declining levels of welfare over time”.

Briassoulis acknowledges the continuous process of SD, but does not explain what is meant with “welfare” and does not refer to the imperatives of safeguarding of the natural systems nor the imperative of inter and intra-generational equity.

Berke & Conroy (2000) propose a definition of sustainable development in the context of planning:

“Sustainable development is a dynamic process in which communities anticipate and accommodate the needs of current and future generations in ways that reproduce and balance local social, economic, and ecological systems, and link local actions to global concerns.”

Berke & Conroy (2000)’s definition seems the most complete, taking into account the SD holistic model, since it makes reference to the procedural nature of SD, to the imperative of intergenerational equity and to the three dimensions. This definition also emphasizes the link between local action and global concerns, which can be related to the intra-generational equity imperative and to the integration of multiple spatial scales. On a similar note, Houghton (1999a) defends that the sustainable city can only be achieved if besides being internally sustainable, it contributes effectively to the global aims of sustainable development, in which SD is seen as much as a process as an end-product.

In this way, Houghton (1999a) refers to two important points expressed in the holistic SD model. The first is the dual nature of SD as a goal and process. The second is, as in Berke and Conroy’s (2000) definition, the link expressed between local action and global concerns, by using the argument that any city that aims

to be sustainable can only be so, if it does not contribute in some way to unsustainability in other parts of the world.

Definitions can shed some light over the variety of issues involved in sustainable planning, but are not enough to grasp the complexity of the topic. The next section makes this more explicit by portraying the different goals and conflicts inherent in discussions of sustainable planning.

3.3 Goals and conflicts in Planning

Some authors have pondered about the main planning goals and the corresponding conflicts that arise from attempting to conciliate these goals in ways that best lead to sustainability. In this section the visions of two authors will be reviewed and analyzed. The authors epitomized their views using visual schemes. Although these schemes do not appear to be so common in the academic planning literature, they prove to be very useful at this level of conceptual discussion. They are valuable for making explicit the inherent tensions between the different dimensions, by showing the main points of discussion when passing from the abstract level of sustainability, with which most people agree, to the more complex and practical minded level of Planning.

3.3.1 Planning goals correspond to the SD dimensions

Campbell (1996) envisions Planning as aiming to reconcile at least three divergent interests: to "grow" the economy, distribute this growth fairly and not to degrade the ecosystems, in the process, as represented in Fig. 3.3.



Figure 3.3 – The triangle of the conflicting goals of Planning, Adapted from Campbell 1996

In that paper, sustainable development (SD) is seen as the center of “the planner's triangle”, composed by the three fundamental aims of planning: environmental protection, economic development and social equity. For Campbell, SD can only be achieved indirectly through a process of confronting and solving the conflicts between the different aims of planning. The conflicts arise from the confrontation of each pair of aims and consist, according to Campbell (1996) in the following:

- The **Property Conflict**, between economic growth and equity. It arises from competing claims on uses of property (Godschalk 2004). The conflict defines the boundary between private interest and the public good. It concerns the tendency of defining property as a private commodity but simultaneously relying on the state's intervention to ensure beneficial social aspects. This is related to issues of management and labor, gentrification, etc.
- The **Resource conflict**, between economy and the environment. A tension exists between the perceived “economic utility” of nature's resources in the industrial societies and the parallel “ecological utility” of nature perceived from environmental perspective. Campbell (1996) claims that this conflict can be symbolized by the “city limits”. These limits represent the boundaries between the urbanized, developed city, and the surrounding undeveloped natural areas.
- The **Development Conflict**, between the poles of social equity and environmental preservation. It deals with how to increase social equity and protect the environment at the same time, especially if environmental protection mandates diminished economic growth.

Another interesting point of Campbell's paper is how the roots of the conflicts are explained by an exposition of how the three planning aims perceive differently the places, spaces and competition existent within the city. For example while the dimension of economic development sees the city as a place of production of goods, consumption and opportunities for innovations, the environmental dimension sees the city as a consumer of natural resources and producer of waste. The social dimension, on the other hand, sees the city as place of conflict, between different social groups, over the distribution of resources, services and opportunities. These and the aspects of competition and space within the city are quoted from Campbell (1996) and are summarized by this research in Table 3.2.

Campbell (1996) admits that planners do not have yet concrete strategies to achieve sustainable development, but argues that to achieve complete sustainability across all sectors and/or all places will require a long process of contested negotiation over all the different policies (land use, transportation, housing). He also stresses the importance of testing sustainable development theories in community developments instead of keeping them at the academic theoretical level.

Table 3.2 - The diverse views on the city of the different planning goals. From Campbell 1996

Planning Dimensions	City is seen as place ...	Competition exists between...	Space is...
Economic development	Of production, consumption, distribution and innovation.	The city and other cities for markets and new industries.	The economic space of highways, market areas and commuter zones.
Environmental	Consumer of resources and producer of waste.	The city and nature for scarce resources and land. The city always poses a threat to nature.	The ecological space of greenways, river basins and ecological niches.
Social Equity	Of conflict over the distribution of resources, services and opportunities.	Different social groups, within the city.	The social space of communities, neighborhood organizations, labor unions: the space of access and segregation.

3.3.2 Livability is introduced

Godschalk (2004) built his model using Campbell’s framework as a starting point, but criticizing the absence of a planning dimension and goal –livability, a crucial criteria taken into account when planning for inhabitable places. Adding this 4th goal/ dimension to Campbell planner's triangle, turns the model into a prism (Fig 3.4), which symbolizes, according to Godschalk, the addition of the three-dimensional characteristics of the urban space to the more abstract and conceptual planner’s triangle.

Livability seems to be no less subjective than sustainability. In a literal sense it means “suitable to live” although in the planning context it seems to indicate the qualities of a place which it is not only suitable but “pleasant to live in”. According to Friedmann (2005) it addresses the “*sustainability of human settlements*”, which concerns besides the safeguarding of natural systems and the social issues of cities, the “*aesthetic and spiritual qualities of the built environment*”. Newman (1999) adds that livability consists of individual and community well-being. Godschalk (2004) argues that this 4th dimension highlights the “*three-dimensional aspects of public space, movement systems and building design*”, alongside the other aspects addressed by SD. Still, in the words of Godschalk (2004) “*It expands the sustainability mix to include land use design aspects, ranging down to the micro scale of the block, street, and building, as well as up to the macro scale of the city, metropolis and region.*”

Adding this dimension, allows depicting three more conflicts, which are (Godschalk 2004):

- the **Gentrification conflict** which arises between Livability and Equity. It corresponds to competing beliefs concerning the preservation of poorer neighborhoods for the benefit of their inhabitants or allowing redevelopments that attract more middle and upper-class to the center of the city.
- the **Green cities conflict**, between Livability and Ecology, which deals with competing beliefs concerning the primacy of natural versus built environment.
- the **Growth Management conflict**, between Livability and the Economy, which deals with competing beliefs in the extent to which unregulated development, subordinated only to market principles can provide high-quality living environments.

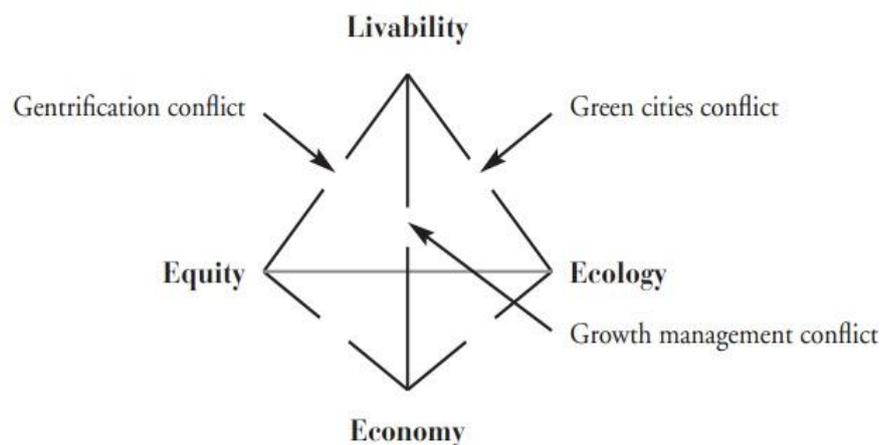


Figure 3.4 -The sustainability/livability prism From Godschalk (2004)

On a first impression Godschalk's model with the three added conflicts seems to touch upon issues that are already covered in Campbell's model, especially if one considers livability as part of the social/equity dimension. The new Godschalk's conflict of Gentrification is even used by Campbell as an example of the Property conflict.

Nonetheless, this model has some strong points:

- Livability, despite being a subjective concept, is unarguably one of the main concerns of planners: to plan places that are regarded by inhabitants as “good” places to live.
- By including livability, the matters of the built infrastructure and of the impression/impacts it has in its inhabitants are made more explicit. This three-dimensional feature of the cities is not explicitly considered by Campbell.
- It makes it possible to depict two conflicts that were not clearly expressed in Campbell's model: the green cities conflict and the growth management conflict.

3.4 Sustainable planning in cities

In the previous section the description of the objectives of planning and their inherent antagonies has further unfolded the complexities of sustainable planning. Still, it covered mainly general aspects, without clarifying how sustainable planning should look like or which features it should comprise. These aspects become more relevant when zooming in to focus on cities/urban areas. Centering our attention on cities is motivated by the increasing trend of urbanization, expressed in studies which forecast seventy per cent of the world population to be living in cities by 2050 (UN 2008). This strongly implies that if sustainability is to be globally pursued, a substantial part of the responsibility lies on the cities of the world and its inhabitants. Addressing aspects of sustainable planning in urban areas emerges then as a necessary challenge for cities to successfully contribute to sustainable development.

This section approaches this topic by addressing some of its multiple aspects, including a brief reference to garden cities - an historical predecessor of sustainable cities, a short discussion on the potential of cities to become sustainable, an analysis of existing visions for sustainable cities, and a comprehensive review of principles and characteristics which should be exhibited by sustainable cities.

3.4.1 Garden cities - an ancestor of urban sustainability

If the concept of sustainable cities has just entered the politic and academic domain with the introduction of the *Sustainable Development* term in the 1980's, according to Gottlieb (1993) cited by Pezzoli (1997) the urban origins of environmentalism go back to the late nineteenth century with movements such as the Garden Cities movement. This visionary movement, initiated by Ebenezer Howard, aimed to develop self-sufficient cities. It emerged as a response to the increasing urbanization accompanying the period of industrialization which caused urban overcrowding in the form of slums (Basiago 1996; Wheeler 2000; Hall 1988 in Heng and Malone-Lee 2009).

Howard intended, with the Garden Cities, to combine the advantages of city life - economic and social, with the benefits of the country life - spacious and close to the natural environment (Basiago 1996). Still, according to Basiago (1996), the idea was to create non-overcrowded circular cities, distributed around a city park and surrounded by large areas of agricultural land. The city would have a maximum population of 32000 inhabitants, and would be connected to other "garden cities" by railways, and the landscape between them would be maintained as natural and agricultural landscape. The sense of community would be promoted and integrated aspects would play an important role, such as the use of the city sewage as manure in the agricultural production – in a type of closed cycle. Although the idea has not spread worldwide as Howard originally hoped for, a few cities were built around these principles, and the concept is still valued for being one of the precursors of sustainability principles, even before the concept existed as such.

3.4.2 Cities – can they ever be sustainable?

Since the industrial revolution, cities have become the living place for more than half of the world population (UN 2008). Numerous cities throughout the world accommodate more and more people with generally growing living standards, increasing the pressure on the world’s resources and on the natural environment. Many of these cities have exceeded the population threshold of Howard’s Garden Cities and do not have rural or agricultural surroundings from which to feed their inhabitants. As modern cities seem to be so distant from Howard’s romantic vision of self-sustaining communities, are there any reasons to believe that it is possible for them to achieve sustainability?

Some authors claim that there are reasons to believe so. (Rees & Wackernagel 1996 based on Mitlin and Satterthwaite 1994) have indicated several aspects which are specific of cities and show their potential to play an important role regarding sustainability. These aspects are quoted in table 3.4.1, together with the planning topic associated and the corresponding SD dimension/Planning goal.

Table 3.3 – Sustainable aspects specific of cities (Adapted from Rees & Wackernagel 1996 based on Mitlin and Satterthwaite 1994).

Specific aspects of cities	It concerns...	Contributes to the SD dimension/planning goal
Lower costs per capita of providing certain kinds of infrastructure like piped treated water, sewer systems and waste collection.	Infrastructure	Economy
Greater possibilities for, and a greater range of options for, material recycling, re-use, remanufacturing, and the specialized skills and enterprises needed to make these things happen;	Infrastructure/ Know-how	Environment
High population density, which reduces the per capita demand for occupied land;	Land-use zoning	
Great potential through economies of scale, co-generation, and the use of waste process heat from industry or power plants, to reduce the per capita use of fossil fuel for space-heating;	Infrastructure	
Great potential for reducing (mostly fossil) energy consumption by motor vehicles through walking, cycling, and public transit.	Transportation	

Most of these aspects relate to topics of infrastructure and urban form. Yet, Rees & Wackernagel (1996) remark that many of the consumption-related human impacts attributed to cities have less to do with the structure of the city and more with societal values and behavior of individual activities and habits.

Also Berkowitz et al. in *Understanding Urban Ecosystems* (2002) bring the attention to the fact that cities by themselves constitute only a small part of the total ecosystem needed to support the urban human populations, as population growth, manufactured goods and services are closely associated with the consumption of energy and materials which are “*first produced by nature*”.

These points suggest that cities should be aware of the impacts of the lifestyle of their inhabitants and consequently of the dimension of those impacts in local and distant natural environments.

Even though the characteristics referred by Rees & Wackernagel (1996), in table 3.3, focus on the dimensions of Environment and Economy, it should be noted that indirectly these aspects can also contribute to the goal of social equity in a global sense. For instance, when cities decrease its per capita use of fossil fuels, this contributes to lessen the global pollution and global warming, improving the prospects of future generations. Therefore, the potential feedback relations between dimensions should not be overlooked.

3.4.3 Visions of Sustainable cities

Having shown that there are reasons to believe that the idea of sustainable cities is a viable one, the following step is to display the different ways in which sustainable cities are envisioned. Succeeding the Garden Cities of the nineteenth century, many more visions of ideal cities have been developed throughout the twentieth century and the present twenty-first century. These visions point to possible directions which can be pursued to cope with the challenges posed by the developments of the last hundred years - increasing population, urbanization and demand for resources. Some of these planning visions present concerns which are nowadays associated with the concept of sustainability.

Before presenting these theory-based visions for sustainable cities it is sensible to first mention which types of cities exist. Clearly, any categorization used will not encompass the complete diversity of urban areas. Still it is pertinent to touch this topic, even if briefly, as it provides a reference for what the reality currently looks like. Besides, it is only possible to fully understand a vision for change when one has the knowledge of the characteristics of the situation which is to be changed - in the making of scenarios this is called the “baseline scenario”. An illustrative example of a categorization is the one presented by Vale & Vale (2009), which distinguish between three types of cities:

Suburban sprawl

Suburban sprawl, also known as Urban Sprawl, is *“a chaotic mess of low-density housing and commercial strip development created by and dependent on extensive automobile use”* (Ewing 1997 and Gillham 2002 in Jabareen 2006). Urban Sprawl is very common in cities in the United States (Jabareen 2006). It is deemed by most authors as a non-sustainable urban form for scattering the built environment over the natural surroundings of cities and stimulating car-use.

Compact cities

Compact cities, by definition, stimulate compactness, a sustainable urban characteristic further detailed in section 3.4.3. Despite already implemented in many cities, this vision is one of the main ideas considered for sustainable cities. It consists in *“density of the built environment and intensification of its activities, efficient land planning, diverse and mixed land uses, and efficient transportation systems”* (Jabareen 2006). According to Vale & Vale (2009), European cities are typically compact. The advantages of compact cities are: efficient use of land, when compared to urban sprawl; leaving more space for nature in the surroundings of the city; potential stimulation of use of public transport, cycling and walking, therefore reducing the use of fossil fuels; it can be seen as an equitable form since it provides accessibility to everyone; it can be more cost-effective in terms of deployment of infrastructure, since it has to be built over smaller areas; and the density of population is adequate to foster and sustain local commerce and services (Williams, Burton and Jenks 2000 in Jabareen 2006).

According to Haughton (1999b) this is a type of *“Redesigning the city”* approach, because of its roots in architecture and land-use and its assumption that the redesign of the physical urban form can strongly influence a city’s use of resources. Harvey (1995) cited in Haughton (1999b) criticizes this approach because it favors the physical form, disregarding social processes. This can result, according to Harvey, in failed attempts at *“social engineering based on changing the physical fabric of the city”*. However, Burton (2000) demonstrates that compactness can promote social equity in terms of public transport use, less segregation and improved access to different facilities. Yet Burton (2000) also shows that compactness can have negative impacts on social equity, in terms of smaller areas of residential living space, limited availability of affordable housing and increased criminality.

High-density cities

Illustrative examples of high-density cities are Asian cities such as Hong Kong and Singapore with higher levels of density than the compact cities, obtained partly by an elevated number of high-rise buildings. Ng et al, in the book *Designing High-density Cities for Social & Environmental Sustainability* (2009) propose and

discuss the ways by which high-density cities can constitute a sustainable answer to the ever-faster urbanization.

This categorization is based mainly in considerations of the urban form and can be summarized to different extents of compactness of the city. Throughout the twentieth and the present twenty-first century visions for sustainable cities were devised, incorporating aspects which go beyond the urban form. In some cases the visions have emerged as an answer to non-sustainable types of urban development, as urban sprawl. Certain visions are more popular in some countries than others. While some visions can easily be applied in existing areas of current cities, others would better be implemented in new developments. In any case, these are all normative visions, expressing the normative view of planning goals.

In the literature review it is observed that authors categorize these visions in various ways. In this review, an overview is provided of the categorizations put forward by Jabareen (2006), Godschalk (2004), Jepson Jr. & Edwards (2010) and Haughton (1999b). However, when the authors used different names but described identical visions I have summarized it under one vision. This resulted in the following visions for sustainable cities:

New Urbanism

New Urbanism started in the United States in the early 1980's. It advocates designed-based strategies based on traditional urban forms existent in the United States in pre-World War II. It is characterized by mixing different combinations of housing types and services, mainly in neighborhoods in a way of encouraging local walking, supporting neighborhood contacts as in an "architecture of community" (Jabareen 2006; Kemp & Stephani 2011; Godschalk 2004). According to Berke (2002) "streets are narrow and pedestrian-friendly to encourage non-automobile modes of travel such as bicycling and walking". Jabareen (2006) categorizes it under the "neotraditional urban forms" arguing that like other visions, it is based on once traditional characteristics of urban development. Talen (1999) states that theoretical and empirical findings are ambiguous at supporting the assumption that physical design can lead to the development of a sense of community, especially when it comes to *affective* aspects, such as: degree of rootedness and social contentment.

Smart-Growth

The main purpose of smart-growth is to restrain urban sprawl through land-use control and other regional and local policy mechanisms that encourage more compact development. In this vision economic expansion is not seen as incompatible (Jepson Jr. & Edwards 2010 quoting Daniels 2001, Porter 2002 and Ye

et al. 2005). It can be associated with urban containment policies which “*prevent the outward expansion of the urban field and force the development market to look inward*” (Jabareen 2006). An example of a technique is the development of “*green belts - areas of open space land*”, surrounding the limits of a city, “*designed as buffers to protect areas of land or water resources from development impacts*” (Jabareen 2006).

Eco-cities

Eco-cities are envisioned as communities which do not threaten nature’s capacity to sustain them (Jepson Jr. & Edwards 2010). This is similar to what Godschalk addresses as “*Sustainable Development*” vision, in which sustainable development is a clear goal, by trying to reconcile the three E’s: Economy, Environment and Equity (Godschalk 2004). It can be connected to Haughton’s (1999b) “*self-reliant city*”, which has as central concern the preservation of natural assets and “*designing with nature*”. The Eco-city strives to reduce external exchanges, to foster “*local economies [mainly] based on local resources, and on forming small-scale production systems*” to meet local demands (Haughton 1999b).

Free-market cities

Free-market cities are also referred as “*externally dependent cities*” (Haughton 1999b). This vision sees the problems of cities as originated mainly by market and regulatory failures (World Bank 1991 quoted by Haughton 1999b). The proponents of free-market cities argue that there is no problem in being dependent on trade with distant places if market externalities are addressed (Haughton 1999b).

Fair shares city

According to Haughton (1999b), the Fair-shares city incorporates aspects of the visions of Eco-cities and Redesigning the city, but has a major focus on the exchange relations of the city with the exterior. It “*envisages a world [...] where trading in environmental assets and capacities is permitted only where damage is not irreversible*” and adequate compensation is provided. It differs from the self-reliant model in the sense that it does not aim to “*withdraw from hinterland trade*”. Rather, based on the view of White and Whitney (1992) and Ravetz (1994) quoted in Haughton (1999), it defends that there must be a way of trading fairly environmental resources and pollution, without going beyond the environmental carrying capacity and “*benefiting both sides of the trading relationship*”. Haughton (1999) cites the example of Halifax EcoCity, in Adelaide, Australia.

According to Jabareen (2006) the difference between the sustainable urban visions lies in differently prioritizing between certain principles of sustainable urban areas (addressed in the following section 3.4.4).

Similarly, Godschalk (2004) analyzes the visions of new urbanism, smart growth and eco-cities according to the planning conflicts which seem to be primarily addressed. In that analysis, Godschalk (2004) characterizes Eco-cities as addressing primarily the resource conflict, (the struggle between the market demand for natural resources and the necessity to preserve them) and New Urbanism as preferring the growth management conflict (whether to rely or not on the free-market to produce livable places). Lastly, Smart-growth seems to address the conflicts of growth management and green cities (privileging or not undeveloped green areas surrounding the cities) (Godschalk, 2004).

In my research Godschalk's analysis was extended to the other visions and categories here displayed.

The category of Urban Sprawl, High-density and Compact cities seem to relate mainly to the conflict of Green cities, because they express in different ways the struggle between the limits of the city and the surrounding environment. As for the Free-market and Fair-share cities, they deal with the conflicts of Resources, because they address the dependence/use of resources. Additionally Free-market and Fair-cities deal with the question of dependence from resources of distant places, which can be related to matters of equity of access to resources between the local "owner" population and the distant "consumer" population. Therefore I argue that these cities address indirectly with the conflict of Property.

Using the pyramid of planning conflicts developed by Godschalk (2004) mentioned in section 3.3.2, I have represented each vision according to the main conflicts addressed and the relative side it takes on the conflict (Figure 3.5).

It should be noted, regarding Fig. 3.5, that some ambiguities exist within some concepts. For instance *Livability* can also refer to the prominence of the built environment over the natural environment, especially regarding the green cities conflict. The goal of *Equity* can allude to the equity within the city's inhabitants, to the equity between humans sharing the planet at this time (intra-generational), or to equity between generations living in different times (inter-generational). *Environment* refers to the local environment within and around the city, but can also mean the global environment from which resources are extracted. *Economy* can refer to the local economy but also to principles of free-market.

These differences can be seen in the following example: urban sprawl is represented as dealing with the green cities conflict, but favoring livability –in this case it is meant that the built environment is considered more desirable than preserving the surrounding natural environment. On the other side of the green cities conflict lie the visions of high-density cities, smart growth and compact cities, which take the stance of limiting cities' expansion.

Livability takes a different meaning in the growth management conflict, in which new urbanism and smart growth are represented as valuing the design of livable places (here it refers to livability, not the built environment) over market-based developments.

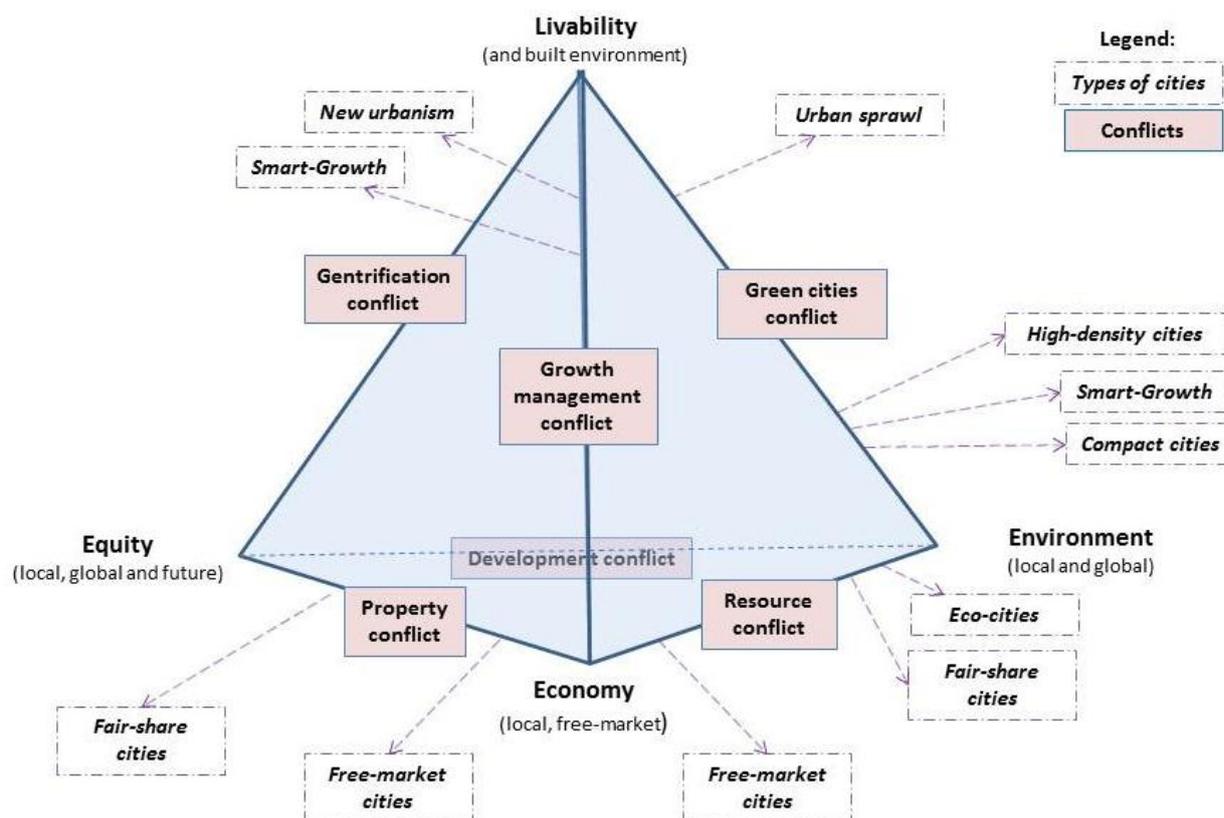


Figure 3.5 – Visions of sustainable cities and planning conflicts. Based on Godschalk (2004).

Eco-cities are represented as having a preference for the preservation of natural resources, over the free-market allocation of resources. Yet, a thriving local economy based on local resources is a main principle of eco-cities, so in that perspective eco-cities could be alternatively represented right in the center of the conflict, balancing equally economic and environmental concerns.

Regarding Fair-share cities, as they allow exchange of resources/goods only when it benefits both parties and does not harm the environment, they can be represent in the Resource conflict, closer to the environmental side, and in the Property conflict closer to the equity side. The Free -market cities, which defend a free-market in which social and environmental externalities are addressed, can be picture d likewise in the Property and Resource conflict, but closer to the Economic /Free -market value.

It is also visible in Fig.3.4.1 that the visions reviewed address more issues related to *Livability*, the *Environment* and the *Economy*, which suggests that Equity is the planning goal that plays a minor role in all the reviewed visions of sustainable cities.

Jepson Jr. & Edwards (2010) conclude, when researching planners’ perceptions of the visions of smart growth, new urbanism and eco-city, that all visions are portrayed by their adepts as ways of operationalizing the concept of sustainable development. This leads to the suggestion by Jepson Jr. & Edwards (2010) that a hybrid approach combining all visions would be more complete, incorporating the

smart-growth concern of containing urban sprawl, the livability aspect sought by new urbanism, and the more pragmatic self-reliant aspect of eco-cities.

As for the visions reviewed in my research, a similar conclusion can be drawn. This review displays a variety of ways of envisioning sustainable cities, and highlights for each vision, the prioritized SD dimensions and planning goals. It represents the diversity of paths and strategies which can be considered in the deliberative process of SD.

3.4.4 Principles of sustainable cities

In the previous section it was mentioned that underlying the distinct visions of sustainable cities are preferences for different principles of sustainable urban areas (Jabareen 2006). Many authors have reviewed and presented general principles to follow in sustainable cities or urban areas (Wheeler 2003; Jabareen 2006; Wheeler 2000; Basiago 1996; Cooper et al. 2009; Kemp & Stephani 2011; Berke & Conroy 2000; Kenworthy 2006; Marazzo 1997). These principles or characteristics encompass a broad variety of topics, and in a seemingly fragmented but tangible and practical way, embody the aims of sustainable development at the city level. Most of the authors reviewed emphasize that each set of principles/characteristics is by all means, not comprehensive, but more indicative of ideas regarded as being conducive of urban sustainability.

A summary of the principles found in the literature review is hereby introduced. It should be noted though that some authors refer to similar principles but designate them differently. I have compiled under the same designation, principles that I found in the review to be distinctly titled but similar in content.

The first principles introduced here seem to use the urban form and patterns of land-use as main tools.

- **Compactness and contiguity** – According to Wheeler (2000), Wheeler (2003), Jabareen (2006), Kenworthy (2006) development should occur in already developed areas, increasing its density. Compactness limits urban sprawl and makes more efficient use of land. It protects rural areas, concentrates services promoting social interactions and allows for energy and CO₂ savings through more efficient distributions of energy, and water, and in the transport systems. According to Wheeler (2003), contiguity refers to development being allocated next to already developed areas to limit urban sprawl into rural and nature areas.
- **Connectivity** - According to Wheeler (2003), it is important to establish good connections with the region in terms of streets and paths, to avoid a “disjointed landscape”, facilitate the access to all

places in the city and promote a sense of participation of the residents in the “broader urban and regional environment”.

- **Mixed land-uses** - According to Jabareen (2006) there is a consensus on the necessity of mixed land-uses for sustainable urban areas. The mixed use of land is correlated with the diversity of functions in place, for instance: residential, commercial, industrial, institutional, transportation Jabareen (2006). In this way, it promotes the proximity between different activities which can reduce the need for travelling. The other advantage is according to Elkin, McLaren and Hillman (1991) quoted in Jabareen (2006), is the potential for renewing life in some parts of the city and “enhancing security in public spaces for disadvantaged groups”.
- **Livable built environments** - This characteristic is presented by Berke & Conroy (2000), meaning the facilitation of a “fit between people and urban form by creating spaces adapted to desired activities of inhabitants, encouraging community cohesion and supporting a sense of place and of community identity”. Wheeler (2000) also advocates the “creation of livable and community oriented human environments”. Kenworthy (2006) mentions the necessity of a “high public realm” which would express the values of “a public culture, community, equity and good governance”. Kemp & Stephani (2011) also allude to this topic by stressing the idea of “connecting people and culture by developing an understanding of the history of a site and region”.
- **Density** - According to Jabareen (2006), refers to the rate of inhabitants or dwellings per unit of area. Jabareen quotes the Transportation Research Board of the National Academy (1996) which found that “higher-density areas were more likely to commute by transit, walking, bicycling, or combinations thereof, and less likely to drive, than people who live in lower-density areas”. High-density appears as a pre-requisite for sustainable urban areas. This issue is not so straightforward as Clark, Burall, and Roberts (1993) and Robertson (1990) quoted in Jabareen (2006) defend lower densities in order to have land for supporting the self-reliant economy and to revive rural values. Also Cheng (2009) emphasizes how the density concept can be decomposed in different concepts such as physical density and perceived density. The perceived density depends not only on the building density but also on the urban morphology. Furthermore, it is argued that high building density although increasing the overall population density on the area, has decreased the density within the dwellings. This shows that there are a lot of facets to the topic of density.

- **Sustainable transport** - According to Barrett (1996) quoted in Jabareen (2006) the transport technologies available at certain times have shaped the form of the cities. This underlines the relevance of promoting sustainable transport systems which, as indicated by Jabareen (2006), “should include measures to reduce the need for movement and to provide favorable conditions for energy-efficient and environmentally friendly forms of transport.” Land use is important in the sense that it is assumed that if services/activities are less separated physically, this lowers the needs of travelling and promotes the use of slower modes of transport such as walking and cycling. Kenworthy (2006) argues for minimizing car-related infrastructures like freeways and roads, by building instead railways, walking and cycling paths. Wheeler (2000) also mentions the reduction of automobile use as one of the objectives of urban sustainability.

- **Diversity** - According to Wheeler (2003) and Jabareen (2006) diversity refers to a mixture of land uses, building and housing types, architectural styles and rents. The purpose is to avoid monotonous urban landscapes associated sometimes with class and racial segregation. Also, Jacobs (1961) quoted by Jabareen (2006), argues that “in diversified city areas, people still walk, an activity that is impractical in the suburbs and in most grey areas. The more intensely various and close-grained the diversity in an area, the more walking”. Cooper et al. (2009) argue that diversity refers not solely to the physical urban form but also “the socio-economic and cultural properties of the communities that inhabit and use the city as their behaviors affect sensory perceptions in urban space.”

- **Ecological integration** - According to Wheeler (2003) and Jabareen (2006), it deals with incorporating into the urban environment aspects of the natural landscape, and safeguarding and restoring environmental elements. It promotes the creation of green corridors, parks, and the protection of wetlands. It is connected with the principle pointed by Wheeler (2000) of preservation of open space and sensitive ecosystems. Berke & Conroy (2000) defend that “development activities should mimic ecosystems processes rather than modifying them to fit urban forms”. Basiago (1996) also refers to this aspect when quoting Nash (1991) on the relevance of making compact cities in order to leave the nature “to flourish” and quoting McHarg (1969) and Canfield (1972) on the principles of “designing with nature”, in ways that take into consideration the carrying capacity of the environment. This concern with the understanding the carrying capacity of the local environment is also emphasized by Kemp & Stephani (2011). Jabareen (2006) reviews different authors on the advantages of greening the cities: “maintaining biodiversity,

reducing pollution, moderating the extremes of urban climate, improving the image of the urban area, increasing the economic attractiveness of a city, health benefits, and educational purposes”.

The following principles still use the urban form, but focus also on other aspects such as water, energy, waste and food.

- **Resource Efficiency and Renewable Energies** – Resource efficiency can incorporate a variety of measures, across different scales (Kemp & Stephani 2011). It can include efficient use of water and energy in dwellings, but also seeing “infrastructure as an asset” by integrating stormwater sewages into the landscape, reducing the need of materials (Kemp & Stephani 2011). Marazzo (1997) also stresses the need of making “old systems more efficient in terms of natural resource use and wastage”. Besides resources efficiency another strategy is to meet energy demands using renewable sources. This is mentioned in Kemp & Stephani (2011) and Jabareen (2006) who refers to the need of passive solar houses using renewable energy sources and Basiago (1996) quoting Corbett and Corbett (1984) on a city that relies on solar energy.
- **Closed loop systems/circular metabolism** – these are two expressions of the same concept. According to Girardet (1992) quoted by Basiago (1996) compactness is not enough to achieve sustainable cities. Rather, a circular metabolism should be in place, in contrast to the linear metabolism existent in modern cities. In the linear metabolism food, water, fuels, processed goods and building materials enter the city and are transformed and degraded into sewage and wastes (Girardet (1992) quoted by Basiago (1996)). A circular metabolism emphasizes the reusing and recycling of materials, reduction of pollution and waste which are defended by Wheeler (2000). Marazzo (1997) indicates minimization of waste as a fundamental strategy for sustainable communities. Kenworthy (2006) supports the notion of turning the life support systems of the city – energy, water, waste – into closed loop systems. Vale & Vale (2009) refers to a closed-cycle use of sewage waste as agricultural manure, as being a common practice in the past and one rather easy to perform in medium or low density settlements.
- **Local food production** - Basiago (1996) quotes Corbett and Corbett (1984) on the “edible landscape” which should exist in cities. Mollison (1978) and Roley (1991) are also quoted by Basiago (1996) as advocating the establishment of permaculture practices in cities to “restore agriculture wealth in urban setting”, tackling the waste that comes from packaging and transporting food. Kenworthy (2006) argues that most of the food consumed in cities should be grown within the cities or in the cities’ hinterland.

- **Place-based economy** – This concept is advocated by Berke & Conroy (2000), Wheeler (2000) and Kenworthy (2006). Berke & Conroy (2000) propose a local economy which “should strive to operate within natural systems limits”, “produce built environments that meet locally defined needs and aspirations”, “create infrastructure that enhances community livability and the efficiency of local economic activities”. Wheeler (2000) refers to the “development of a restorative local economy” and Kenworthy (2006) mentions that “the economic performance of the city and employment creation are maximized through innovation, creativity and the uniqueness of the local environment, culture and history”.

These two principles deal more with aspects of equity, both at local and global levels.

- **Equity** – This aspect is proposed by Berke & Conroy (2000) who remarks that “land use patterns should recognize and improve the conditions of low-income populations” by providing “equitable access to social and economic resources”. In a similar line, Wheeler (2000) presents the principles of “decent, appropriate and affordable housing” and of “improved social equity and opportunities for the least disadvantaged”.
- **Responsible Regionalism** – According to Berke & Conroy (2000) “communities should not act in their own interests to the detriment of the interests of others, and should be responsible for the consequences of their actions”. This principle, in the words of Berke & Conroy (2000), expresses the “link local to global concerns [...] wherein communities act with a broader obligation to others”. Another principle which can be related to this is “conscious material choice” (Kemp & Stephani 2011), which proposes that materials should be chosen taking into account aspects of the origins of the materials, the energy use, the waste produced, environmental and social impacts of its manufacturing, transportation, maintenance, operation and disposal.

The last principle refers to aspects of procedural sustainability.

- **Debate and decide** – This principle is expressed by Kenworthy (2006) when stating that the future of the city should be devised by a process of debating and deciding, as opposed to the method of “predicting and providing” which was common practice between post-WWII until recently. In this debate a starting question could be “What kind of city do we want in the future?” or “Can our urban environment sustain the predicted levels of future traffic?” (Kenworthy 2006). Moreover Kenworthy (2006) adds that “the decision-making process should integrate social, economic,

environmental and cultural considerations and should be democratic, inclusive and empowering”. This can be connected to the idea expressed before that built environments should be the reflection of local demands and desires (Berke & Conroy 2000) rather than externally imposed.

The urban sustainability principles reviewed in this research are summarized in the following table 3.4. It is possible to discern that the principles refer to different aspects of planning, such as urban form, land use, transportation, and water, amongst others. In my research I have specified them in column “planning aspects”. Similarly, each characteristic of sustainable urban areas seems to contribute primarily to some goals of sustainable planning. Therefore, in the last column of the table are indicated the primarily affected Sustainable Planning goals.

Table 3.4 – Review of principles of sustainable cities.

Principles	Description	Mentioned by the authors	Planning aspect	Sustainable Planning goal
Compactness and contiguity	Development should occur in already developed areas. Contiguity refers to development occurring next to developed areas to limit urban sprawl into rural and nature areas	Wheeler 2003, Jabareen 2006, Marazzo 1997, Wheeler 2000, Kenworthy 2006	Urban form, Land-use	Environment
Connectivity	Providing good connections with the region in terms of streets and paths.	Wheeler 2003	Urban form, Land-use	Environment, Social
Mixed land uses	To promote different land uses in the same areas, including residential, transportation, commercial, industrial and institutional functions.	Jabareen 2006, Cooper et al 2009, Kemp & Stephani 2011, Kenworthy 2006	Urban form, Land-use	Livability, Environment
Livable built environments	Cities should have built environments pleasant to live in. The places should reinforce and stimulate the sense of community and reflect the site’s history and identity.	Berke & Conroy 2000, Wheeler 2000, Kemp & Stephani 2011, Kenworthy 2006	Urban form, Land-use	Livability, Economy, Social
Density	Density refers to the rate of inhabitants or dwellings per unit of area. In general higher density urban areas are desirable to limit urban sprawl.	Jabareen 2006	Urban form, Land-use	Environment

Sustainable transport	Promoting the decrease of the need of movement, and improving conditions for the uptake of environmentally friendly modes of transportation, such as walking and cycling. Part of this can be done through land-use policies.	Jabareen 2006, Kenworthy 2006, Wheeler 2000	Urban form, Land-use, Transportation	Environment, Social
Diversity	To promote a mix of land uses, types of buildings, styles of architecture, rents. It refers also to the socio-economic conditions and cultures of the communities in the city. Diversity can prevent segregation and promote walking.	Wheeler 2003, Jabareen 2006, Cooper et al 2009, Kenworthy 2006	Urban form, Land-use, Culture	Social, Livability, Environment
Ecological integration	Promoting green corridors, parks, protecting wetlands, the preservation of wilderness areas around the cities, and of ecosystems. Ecological integration is concerned with the respecting the carrying capacity of the surrounding environment and has plenty of benefits, such as reducing pollution, attenuating the weather impacts in the city as well as visual and health advantages.	Wheeler 2003, Jabareen 2006, Wheeler 2000, Berke & Conroy.2000, Kenworthy 2006, Kemp & Stephani 2011 and Basiago 1996 quoting Nash 1991, McHarg 1969 and Canfield 1972.	Land-use, Urban form,	Livability, Economy, Environment, Social
Resource Efficiency and use of Renewable Energy	Efforts should be made to reduce the demand for resources and to use resources more efficiently at all levels (water, fossil fuel for transportation, energy in buildings). The use of renewable energy sources should be promoted, by building for instance passive solar houses.	Jabareen 2006, Marazzo 1997, Kemp & Stephani 2011, Basiago 1996 quoting Corbett and Corbett 1984	Urban form, Transportation, Water, Energy	Environment, Economic

Closed loop systems/ circular metabolism	The linear metabolism of cities which consumes resources and produces large wastes should be replaced by a circular metabolism in which most resources are re-used or recycled.	Basiago 1996 quoting Girardet 1992, Kenworthy 2006, Marazzo 1997, Wheeler 2000	Water, Energy, Urban form, Waste	Environment, Economy
Local food production	A significant part of the food consumed by cities should be grown in the cities and in their surroundings.	Basiago (1996) quoting Corbett and Corbett (1984), Kenworthy (2006)	Food, Agriculture	Environment, Economy
Place based economy	The local economy should use as values the city's culture and history. It should operate under the environmental carrying capacity, be a product of local aspirations, and be innovative and creative.	Berke & Conroy (2000), Wheeler (2000), Kenworthy (2006)	Local business, culture, innovation	Economy, Environment, Social
Equity	Disadvantaged communities should not be segregated in parts of the city with less accessibility to resources. They should be provided with decent housing at reasonable prices and with opportunities to improve their lives.	Berke & Conroy (2000), Wheeler (2000)	Local equity, Housing,	Social
Responsible Regionalism	Cities and communities should take into account the global impacts of their local actions: their use and choice of goods and materials, their consumerism lifestyle, fossil fuels based energy use, etc. Communities should strive to neutralize their harmful direct and indirect impacts on other communities and parts of the world.	Berke & Conroy (2000), Kemp & Stephani (2011)	Informed consumption of goods and resources	Environment, Social (intra- generational equity)
Debate and decide	Decisions for the future of the city should be made through processes of debate involving the whole community, in democratic and inclusive ways.	Kenworthy(2006), Berke & Conroy (2000)	Decision-making process (deliberative and inclusive)	Procedural sustainability

From this set of principles it is visible the prevalence of principles which are based on the urban form and land-use within the city. Aspects less based on the physical design of the cities, as consumption, food, and the decision-making process, seem to be less addressed. As for how the principles affect planning goals, it appears that most principles contribute positively to more than one goal, suggesting that integrated solutions are being considered. It should be remarked, nevertheless, that in a more in depth analysis, the application of each principle would have to be regarded within its context. For instance, “Ecological integration” can refer to the favoring of green spaces within cities, to the detriment of new real estate. Economically, the green spaces can represent an added value to the surrounding area, raising real estate prices. Still, for the owners of the land, a green space can represent fewer profits than selling it for construction. Therefore, the full complexity of planning can only be grasped if understanding the motivations and different interests of each actor or stakeholder involved in the process.

Prior to this section, visions of sustainable cities were addressed. I have indicated in the following table 3.5, the principles which seem to be preferred by each vision of sustainable city.

Table 3.5 – Sustainable urban principles favored by each vision of sustainable cities

Types /visions of cities	Main sustainable urban principles
Urban sprawl	<i>Free- market for housing developments</i>
High-density cities	Density
Compact city	Compactness,
New Urbanism	Mixed-use, Diversity,
Smart-Growth	Compactness, Mixed-use
Eco-city	Ecological integration, Place based economy,
Free-market city	-
Fair shares city	Social (intra-generational equity),

In this review of characteristics of urban sustainability it is visible:

- That a significant part of the characteristics are concerned with issues which are natural to the planning domain, such as land-use, urban form, livability, transportation. These aspects are not discerned at a theoretical level of sustainability but have to be taken into consideration when addressing urban sustainability or sustainable planning.
- All the dimensions of SD are represented and even the aspect of procedural sustainability is evident in the “Debate and decide” characteristic.
- There is a lot of interaction between and within different SD dimensions and Planning fields and goals. This is observable when a characteristic, which is concerned with one field, affects other

fields/SD dimensions. This stresses the importance of transdisciplinary work across planning fields and of integration of the different interests that arise from the SD dimensions.

- The principle of circular metabolism is an excellent strategy to address the imperatives of SD: the safeguarding of natural systems and intra-generational equity. It addresses the former by aiming to reuse and recycle all its waste, reducing the need for new materials, and hence the extraction of more resources. It addresses the latter by diminishing the waste exported to, and the extraction of resources from other sites.

3.5 Holistic model of Sustainable Planning

The Sustainable Planning holistic model is represented in Figure 3.6. Arriving to this model was possible by adding the aspects found to be of relevance for Sustainable Planning to the aspects already represented in the SD holistic model. The aspects which were added are represented in rectangular boxes with right angles, while the older aspects are represented in rectangular boxes with curved corners.

A main characteristic of Sustainable Planning and of Planning per se, is that it is focused and somehow constrained to a specific spatial area. It can be a whole country, in the case of national planning, but can also refer to regions or to municipal areas.

Sustainable Planning introduces the goal of planning livable places, which constitutes the 4th goal of planning, besides the classical sustainability concerns of Environment, Social Equity and Economic Growth. The formulation of divergent planning goals cannot be dissociated from the inherent conflicts which arise when confronting them. The emergence of conflicts is related to the need to integrate the views and interests of a diverse field of actors, and this is represented by the double arrow connecting these two aspects in Fig. 3.6.

These conflicts are addressed in different ways and to different extents by visions devised by planners for sustainable cities. These visions incorporate various and distinct strategies by which cities can become sustainable. Some of the strategies are more based in specific fields of planning, as land-use, and built environment, while others integrate distinct aspects, which underlines the transdisciplinary of the planning field. It is possible to establish a relation between the principles formulated for sustainable cities on one side, and the different visions and planning fields on the other.

If Planning is by nature more concerned with national, regional or local goals, Sustainable Planning additionally includes the global dimension of these concerns, by emphasizing its contribution to the three SD imperatives.

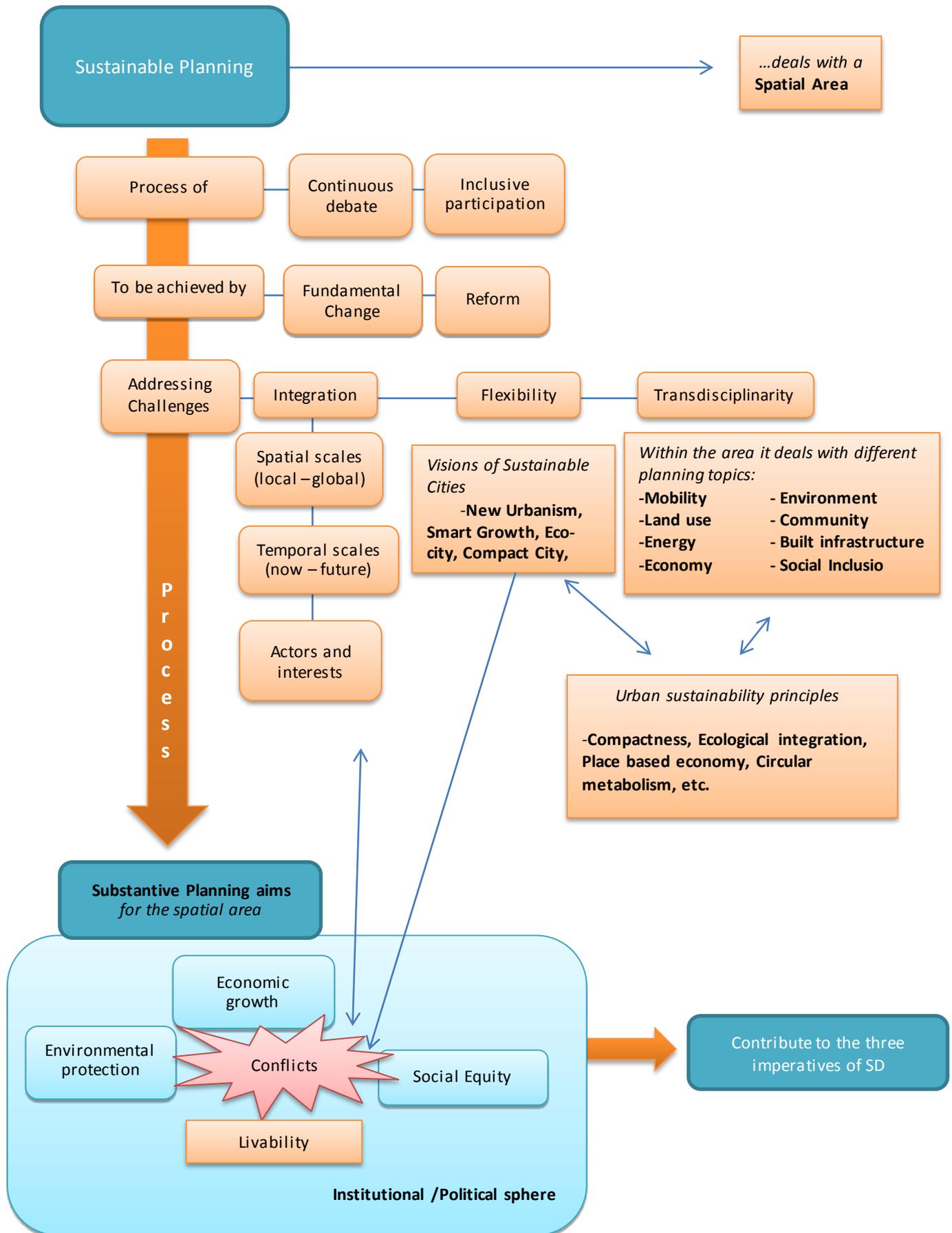


Figure 3.6 - Sustainable Planning holistic model

3.6 Review of Sustainable Planning critiques

While it is clear in the literature an agreement on the basic principles of sustainability (Briassoulis 2001) and, on the need to move towards the sustainable city (Houghton 1999a), an important question in planning is whether some sustainability dimensions should have priority over the others. Most of the critiques on the integration of SD by Planning have its origins in different perspectives on which dimensions must be prioritized and can be connected to various aspects of the Sustainable Planning holistic model. This section presents a review of the different types of critiques which can be found in the academic literature. There are two kinds of arguments /observations on these topics: what is argued for in the academic discussions, and academic remarks regarding practical cases.

3.6.1 Critique based on theoretical considerations

Some of the critique regards the problematic incorporation of SD by Planning. Holden (2008) reviews the different explanations for the difficulties encountered by planning while including SD in its policies. Some of these difficulties lie in the perceptions of the actors involved in the planning process. Holden claims that on one hand there are divergent ideas of how to address sustainability: focusing in acquiring more knowledge to better address the problems versus a preference for including “a plurality of voices”. On the other hand, Holden adds, the various actors involved in the planning process lack a shared understanding of the roots and ways to solve sustainability issues.

Fundamental Change and the Economic Preponderance

The difficulties are also explained by factors inherent to the concept, as it calls for “*unprecedented shifts in thinking about time, space, responsibility and relationships*” (Hopkins 2000 in Holden 2008). Also according to Dovers (1997) quoted in Holden (2008), the SD concept undergoes “*distortions*” when integrated into conventional policy procedures, “*economic growth is not questioned, the integrative nature of the concept is de-constructed into sectoral categories, possible ecological limits to growth are not recognized, uncertainty is not adequately addressed, and the global equity dimensions of decisions are ignored*”. Therefore, while the concept has become common in the planning sphere, it should be acknowledged that its substantial integration calls for “*a wholesale paradigm shift*” (Dovers 1997 in Holden 2008).

In a similar consideration Gunder (2006) contends that although the sustainability discourse has been very much integrated into the planning discipline, the dominant worldview of the imperative of the markets, especially within big business and governmental institutions, results in a business as usual expression of the sustainability ideal. The outcomes are policy measures that promote marginal change

when the problem demands fundamental change (Gunder quoting Rees 2003). Moreover, Rees (2003) cited in Gunder (2006) claims that sustainability poses a serious challenge to many of society's most basic beliefs and analytical concepts. One of these beliefs is the idea of a better future being based on materialistic growth (Gunder and Hiller 2006 in Gunder 2006).

Less attention to the Social dimension

The academic planning literature was found to present several critiques reporting an apparent minor role of the social dimension in SD.

Gunder (2006) argues that the concept of sustainability has supplanted traditional aims of planning such as equality and social justice. Haughton (1999a) defends the importance of social equity, arguing that if a society is unjust the social tensions existent “*undermine the recognition of reciprocal rights and obligations which can lead to environmental degradation and political instability*”, affecting the economic and environmental dimensions.

Finn & McCormick (2011) argue that the classical model of sustainability does not allow an insightful analysis of municipal plans and suggest a further addition of sustainability dimensions more equity-focused: Procedural equity, Geographic equity, Social Equity, and Equitable economic development, besides the more classical Environmental protection and Green economic development. Procedural Equity refers to a decision process open to all stakeholders, deliberative and transparent, Geographical Equity concerns the spatial locations of environmental harms and of desirable services, while Social Equity addresses municipal policies which aim to tackle social inequalities in the city, and Equitable economic development should ensure that the economic activity provides safe and reasonably paid employment to the working class (Finn & McCormick 2011). This alternative formulation of sustainability dimensions is discernibly Equity-minded, and is valuable for making very explicit the various types of Equity which should be considered in Planning.

Another aspect of Social Equity is the reference to future generations and to common generations but living in distant places.

Jepson (2001) on planning and sustainability claims that regarding equity, the concern for inter-generational justice is more often advocated than the concern for intra-generational equity. He considers that this is explained by the fact that it is easier for most people to relate to future generations since it includes their future descendants. Intra-generational equity on the other hand might be more difficult to advocate, since it may imply a decrease in one's standard of living to benefit others who are living at the same time but are unrelated.

Manderscheid (2012) in a similar consideration claims that equity is generally reduced to the equity between present and future generations, and that usually comprises merely concerns for preserving the natural systems for the future. Manderscheid (2012) adds that the intra-generational equity is more often

considered in its global aspects of inequalities between different countries, making the issue of equity within populations of the same country or even within the EU more of a secondary aspect of SD.

Environmental dimension

There is a field of research which addresses cities from the perspective of the environmental dimension: it studies them as urban ecosystems. In the book *Understanding Urban Ecosystems* (2002) the authors take the approach of understanding the city as an ecosystem. The ecosystem approach can be used to understand how cities work, how they interact with surrounding local and global ecosystems, and how expected changes in landscapes and regions resulting from increased urbanization will affect the future of Earth's systems.

In this way of perceiving the city, Grimm et al. (2002) indicated the crucial points in which cities are unique in comparison to natural ecosystems. These characteristics can show implicitly critiques of the ways cities function from the perspective of the environmental dimension.

- Cities are heterotrophic, they consume much more than what they produce, and use energy intensively;
- Cities necessitate much higher external inputs of energy and materials, in comparison to natural ecosystems;
- Cities produce great quantities of waste and often lack efficient assimilation mechanisms to handle them;
- The functions within the urban ecosystem are determined by social and political factors and not only biophysical;
- One species, human, dominates the processes of the ecosystem.

Economic dimension

An alternative approach on the economic system which can have significant implications when planning cities is how ecological economics sees the economy: "*as an open, growing, wholly dependent subsystem of a materially closed, non-growing, finite ecosphere*" (Rees 1995, Daly 1992, in Rees 2002), as represented in Fig 3.7.

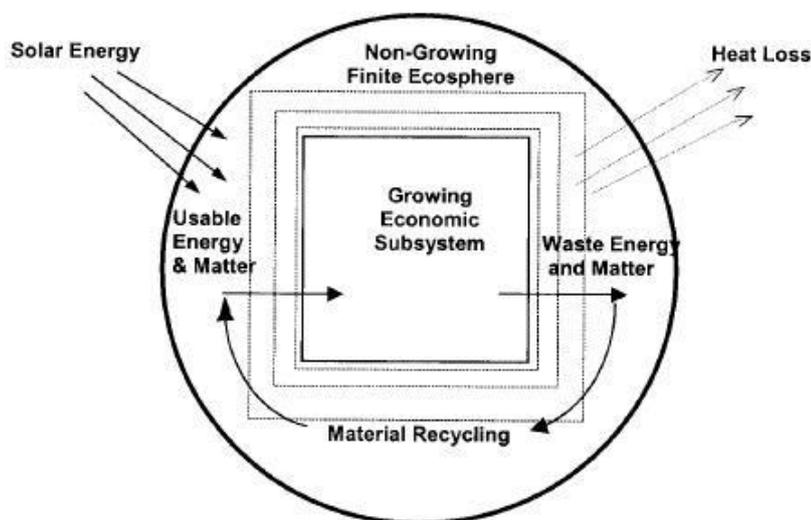


Figure 3.7 - How ecological economics sees the economy. From Rees (2002) quoting Rees 1995 and Daly 1992)

3.6.2 Critique based on practical cases

In terms of observations found in the academic literature regarding the integration of SD principles by the planning practice, there are several interesting points.

The first point is related to the discussion of how to achieve sustainability: using current approaches (in this case, neo-liberal) which can be connected to the Economy dimension and to the Reform aspect, or favoring environmental and social aspects. With regards to this, Raco (2005) provides an interesting insight on the different views which claim that modern developments prime for its strong SD focus, or are rather dominated by neo-liberal approaches. While analyzing the planning agenda for sustainable communities proposed by the British government Raco (2005) concludes that a variety of approaches is present in current development practices, including some more traditional neo-liberal views, but also aspects of sustainable development as environmental preservation, empowerment and social equity.

The second point is brought by Saha (2009), and refers to the adoption of urban sustainability principles without using the sustainability “label”, which is in a way analogous to the example of the Garden Cities. Saha (2009) brings attention to the fact that a higher number of cities might be involved in sustainability initiatives than what can be observed at first sight, when looking into cities which issue Sustainability Action Plans, or other documents voicing an explicit concern with sustainability matters. Moreover, Saha (2009) quotes Berke & Conroy (2000), who found this to be the case, when examining municipal planning policies which included sustainable urban principles as mixed-use, which were not part of Sustainability Agendas.

Thirdly, Coffman & Umemoto (2010) make a reference to the disadvantages of framing the development discussions on the basis of the three-equally important dimensions of sustainability. Coffman

& Umemoto (2010) base their article on Hawaii's Sustainable Development Plan in which the concept of triple-bottom-line was used to frame their participatory inquiries on sustainability. The authors criticize the use of this concept in two points. First it juxtaposes environment and economic interests, which results in the premature notion of trade-offs, tends to polarize positions and hampers collaboration in the search for creative solutions during the planning process. The other point is that the triple-bottom-line suggests that the three dimensions have equal priority, while on their opinion, ecological sustainability and the carrying capacity of the natural system should be emphasized.

Lastly, Gunder (2006) quoting Mees (2003) uses Melbourne's 2030 Plan an illustrative example of the difficulties with which municipalities address sustainability, when two seemingly contradictory projects/goals are proposed: on one hand to achieve 20% of public transit by 2020, and on the other hand to allocate 3 billion Australian dollars to the development of freeways. This point is related to the aspects of the integration of different interests, but also to the aspect of descriptive planning goals, defined within different planning fields. In this case there was a weak integration of a seemingly Environmental goal (increasing Public Transportation) with an Economic/Transportation goal (developing more freeways).

4 How Sustainable is Sustainable Planning? Discussion

In this section the last subresearch question is addressed and discussed:

C - To what extent are the aspects of sustainability reflected in the academic planning literature?

The holistic model of Sustainable Planning was used as a starting point to address this question. It can be asked, for the diverse aspects exposed, how they were addressed by the reviewed academic Planning literature. It is then possible to conclude which aspects appear to be of greater and lesser concern in the Planning literature, which eventually answers the last subresearch question.

Interestingly, another facet of the subresearch question is that it implicitly inquires about the similarities and differences between the aspects of holistic sustainability and planning. This type of analysis seems more valuable because besides depicting the sustainability aspects which are less addressed by planning, highlights the aspects which are particular of planning.

In that way, considerations can be made on another level: the added value. This analysis can indicate a few points of the value added of sustainability to planning, and likewise, the value added of planning to sustainability.

Therefore, in this section the findings of my research are discussed under four main topics: Similarities, Differences and Adding Value: Sustainability to Planning and Planning to Sustainability.

For this discussion it was very valuable the input acquired through interviews with experts from the Planning field. The interviews were used to complement this research as they were too few to be accepted as representative, and be used as a test instead. Three experts involved in Urban Planning and Development were interviewed on the aspects discussed in this section (Ng 2012, Kamphuis 2012 and Kuijpers 2012 – see References).

4.1 Similarities

It is evident, since the beginning of the Planning chapter, the profound similarities shared between Planning and holistic sustainability. In this section the main common points are indicated and analyzed. In other words, this section summarizes the holistic SD aspects which are more addressed by Planning, or alternatively, the most *sustainable* aspects of Sustainable Planning.

Substantive and instrumental/procedural

In the introduction to planning (3.1), Alexander's review (2009) differentiates between instrumental and substantive planning goals. While some authors argue that planning is mainly an instrument, or the means to an end – to achieve better outcomes; others emphasize the substantive character of planning goals, which can be normative or descriptive. This resembles the dual nature of sustainable development, represented in Fig. 2.2, in which SD is exhibited both as a process and a set of substantive goals. Moreover, Fainstein (2000) remarks the ongoing debate in the Planning field, regarding these two aspects: the planning process *versus* the desirable outcomes (substantive goals) of planning.

Normativeness

Alexander (2009) in section 3.1 introduces the notion of normative planning goals, expressed by, for instance, aims of reducing social inequalities. Sustainability clearly embodies normative principles, criticized by Grosskurth and Rotmans (2005) in section 2.6. Thus, the existence of a normative view on planning goals implies that the adoption, by the planning field, of normative principles, as sustainability, is not completely unprecedented. Also, Kuijpers (2012) indicates that Planning is normative since it has to weigh the different planning aims and interests of the actors involved in the planning process in order to make decisions.

Similar goals and dimensions

It is remarkable that the Planning aims identified by Campbell (1996) in Fig. 3.3 correspond precisely to the dimensions depicted in the classical representation of sustainability in Fig 2.3. However, if "Economic development" means economic growth, there is substantial criticism on that, referred to in section 2.6. The critiques contend that economic growth has been responsible for a great part of the environmental

degradation, and therefore its expression as a main goal of sustainability should be questioned (Seabrook 1990 and O'Connor 1993, 1994 in Haughton 1999a).

Overall, this additionally supports the idea of complementarity or natural association between Sustainability and Planning. It suggests as well that the field of planning is experienced in dealing with conflicts arising from the diverging priorities of sustainability.

Ancestors of sustainable cities

Not only can one observe a close connection between planning and sustainability regarding planning goals but also in historical planning views, like the Garden cities of Howard in the late nineteenth century. These constituted an urban planning solution for the environmental and social issues prompted by the rapid urbanization associated to the period of the industrial revolution. The vision of Garden Cities was focused on aspects of self-sufficiency, closeness to nature and promoting a sense of community. These aspects are very present in modern visions of sustainable cities (3.4.3), and seem to be aligned with some of the sustainable cities principles summarized in table 3.4.

The main difference though, lies in the fact that these antecedents of sustainable cities were prompted not by global concerns but by local factors such as overpopulated urban slums and the heavily polluted environment of industrial cities of the nineteenth century.

Another interesting point mentioned in the Garden cities section is the closed cycles. This concept, which seems to be of common practice in the pre-Industrial past, consisting in the re-use of waste for other purposes, is widely used in current planning to prevent the waste fulness of resources (detailed in section 3.4.4).

Transdisciplinarity

In section 3.1, Alexander's (2009) review of the goals of Planning introduces the notion of Planning fields that makes the variety of topics within which sustainability is to be incorporated more explicit. This suggests that within planning departments in municipalities, different planning sections deal with different planning fields, which can hamper the devising of integrated sustainable solutions. This stresses the challenges of transdisciplinary work and of integration of different actors and interests, indicated in the section 2.4 of the sustainability chapter, and relates to some critiques in 3.6.2.

It can be argued that the relation between Transdisciplinarity and Integration is such that when transdisciplinary work is under way, it positively influences a fruitful integration of different views and interests.

The natural tendency to handle transdisciplinary issues was also detected in the analysis of the planning goals which most benefitted by sustainable cities principles (table3.4). In that analysis it was

visible that most of the principles comprised topics related to different planning fields and ultimately affected positively several planning goals.

The difficulties of transdisciplinary work; especially concerning cities are very well addressed in Table 3.2, by Campbell's formulation of the different views on the city of the different planning dimensions.

Integration of different interests

The topic of transdisciplinary work is analogous to the views of different disciplines and societal actors on the roots of the unsustainability crisis and its solutions displayed by Mebratu (1998) in Tables 2.2 and 2.3. These aspects stress the difficulties inherent to the integration of views and interests concerning diverse disciplines and actors, expressed in section 2.4.

Institutional and Political dimension

The institutional and political sphere is very much addressed since planning is embodied in the institutional sphere. In countries with older Planning traditions, the ways by which planning is performed are deeply institutionalized. This means that it is dependent, restricted and oriented by laws or policies at different levels. In European countries there is legislation at European level and then depending on the country, at national, regional and municipal level. This connects to the aspect of integration of multiple spatial scales. Kamphuis (2012) exemplifies for the Netherlands, how the planning priorities changed throughout the last century according to different political priorities: in the fifties after WWII where there was hunger, agriculture became a priority, and large extensions of the Netherlands were destined to agriculture. In the nineties a counter-movement emerged, which resulted in returning agricultural fields to its natural environment (Kamphuis 2012).

Dominance of the Economic dimension

Similar to the critiques of SD (section 2.6), also in Planning (section 3.6), there are authors who claim that Economic aims seem to prevail over the other dimensions. The interviewees agreed. Kamphuis (2012) admits that in many cases the alternatives with most short-term benefits are preferred over the most integrated approaches. Kuijpers (2012) explains this with the dominance of a cost-benefit approach as the main criteria for decision-making, which ends up favoring options whose costs and benefits are easily measurable. She adds that this is not particular of Spatial Planning but a characteristic of our societies, in particular of the social value system in the Western world.

However, the principles of sustainable cities reviewed in the research do not display a bias for economic goals. The visions of sustainable cities though, addressed more conflicts which incorporated the economics dimension than conflicts incorporating the Social dimension (3.4.3).

The dominance of the economic dimension appears to be more visible in the practical field, since it was mostly addressed in the review of critiques and in the interviews.

Inferiority of the Social dimension

Some critics consider social equality issues to be less addressed in sustainable planning discussions (section 3.6), similarly to SD discussions (section 2.6).

This was also found by this research while analyzing the visions for sustainable cities with respect to the main conflicts addressed. This analysis showed that the conflicts which included Equity as one of the dimensions were the less addressed by the sustainable cities visions, in particular the gentrification and the development conflicts. It is interesting though that while the gentrification conflict deals with matters of local equity; the development conflict is more related to issues of global or intra-generational equity, since it raises questions on how possible it is to reduce the global consumption of resources, when there is still a significant part of the world population living in poverty. Despite being integrated in some definitions of sustainable places and societies (section 3.2), local and global intra-generational equity seem not to be a main priority in sustainable planning, when it comes to the visions devised, and to the practical implementation (critiques).

Debate and participation

This aspect is highly praised by the academic Planning literature. In section 3.3.1, Campbell (1996) presents a strong focus on the procedural nature of sustainable planning, by mentioning the necessary long-process of negotiation, which is in line with the SD holistic model. It is also listed as one of the principles for sustainable cities in 3.4.4.

Another interesting point was the reference by both Kuijpers (2012) and Kamphuis (2012), to the undergoing decentralization of planning taking place in the Netherlands. This concerns a transition towards a more bottom-up approach of planning, and corroborates the sustainability principles of continuous debate and inclusive participation for co-devising future outcomes (Robinson 2004 in section 2.1).

Integration of spatial scales

This aspect is addressed by planning in the sense that it has to consider the connections of the city to its region and also to the national sphere. This is expressed in the principle of Responsible Regionalism in section 3.4.4.

4.2 Differences

Despite the numerous common points found between the holistic sustainability and Planning there are some aspects which present clear differences. Those aspects are here indicated. Firstly the discussion of aspects which are particular to Planning: Livability and Conflicts.

Livability

The concept of livability, introduced by Godschalk (2004) in section 3.3.2, brings into attention the matter of how a place is perceived by its inhabitants, and it carries the normative idea that people should live in *livable* places. This aspect is evidently relevant as it is used in the visions of sustainable cities (New Urbanism) and in principles of sustainable cities (livable built environments).

An interesting question which can be posed is whether this value can be considered to be included in the second imperative of SD: satisfying the basic needs of all. Can the livability of a place be considered a basic need? Perhaps not if compared to the needs for food, shelter or even education. However, it appears natural that for planners who focus on the planning of places used, inhabited or visited by people that livability arises as a basic concern. It adds more complexity to the sustainability debate, by introducing another subjective goal, which can be difficult to externally and artificially promote, as Talen (1999) mentions regarding New Urbanism (3.4.3).

It seems that while remaining a subjective concept, livability helps to clarify and to make more tangible the potential conflicts that arise from the diverging planning aims.

Conflicts

The conflicts of the planner, expressed by Campbell (1996) and Godschalk (2004) (in sections 3.3.1 and 3.3.2) make very explicit the main struggles with which planners are confronted when trying to promote and achieve sustainable development. As mentioned before, the conflicts clearly depict the main points of discussion which arise when passing from an acceptance of sustainability principles *in theory*, to the practical attempts of implementing these principles. Furthermore, conflicts can be used to position sustainability approaches in reference to each other, emphasizing which conflicts and conflicts' sides are mostly addressed. This was performed with the visions of sustainable cities in section 3.4.3.

Finally, are discussed the aspects of holistic SD which are less addressed by Planning.

Integration of spatial scales

Despite the apparent alignment between the planning priorities and the SD dimensions (Economy, Environment and Social Equity), observed in section 3.3.1, it seems that the planning goals are more concerned with local issues, and therefore do not reflect completely the global nature of the SD imperatives. The adjective *local*, can refer to local as in cities, or municipalities, but also to regional or national areas of concern. In practice all these spatial scales can be considered local when in comparison to the global.

Planning is concerned with the local economy, the local environment and its surroundings and social equity within the population of a certain area. Although this inclination for local concerns from the planning field can be considered quite natural, it might fade certain essential aspects of SD. While planning does definitely deal with issues of spatial integration, it does seem to address less the global impacts of the local activities and lifestyle of the city. Kamphuis (2012) argues that this is dependent on the topic; for instance Energy and CO₂ emissions are quite relevant topics nowadays in the Planning field, and are clearly related to the global impacts of the cities. However, when it comes to the individual consumption patterns of the citizens, for example regarding meat consumption (Ng 2012), the interconnectedness between one's actions and its impacts is much less exploited.

A local initiative which deals with this aspect, and also with Fundamental Change is the *Transition Towns* initiative (Transition Network 2012) which aims to prepare towns and cities to become more self-sufficient and resilient in face of climate change, environmental degradation and depletion of fossil resources. It can be argued that these initiatives are prompted more by the potential threats of global issues present to their local sphere than by the damaging impacts of the local on the global sphere. The outcome however is identical. A striking feature of this initiative, and the reason why it was not addressed in the section of visions of sustainable cities, is that Transition Towns initiatives are mostly set forth by groups of citizens, rather than proposed by local (planning) governments.

Nevertheless, considering the attention Planning aims to give to the aspirations of the citizens, embodied in the Debate and Participation principle, this principles can serve as an interface between the local governments and the communities. Furthermore, it can provide a gateway for transition and fundamental change initiatives, started by citizens, to be incorporated and supported by (institutional) planning policies.

Fundamental Change and Reform

In section 3.4.2, Rees and Wackernagel (1996) explicitly refer to the significant role of societal values, individual behavior and activities on the consumption-related impacts of cities which highlights the importance of the aspect of "fundamental change", expressed in the SD holistic model and in section 2.3. Moreover, some of the visions of sustainable cities (3.4.3) appeared to incorporate aspects of fundamental

change, regarding the lifestyle cities' (Eco-cities tendency for self-reliance) and the economic system (Free-Market cities counting on the internalization of social and environmental externalities).

Yet, overall matters of fundamental change seem to be less addressed, as visible in the more urban form and land-use oriented characteristics of sustainable cities in table 3.4.3, and in the Sustainable Planning critiques (3.6.1). Kuijpers (2012) argues that this is explained by Planning being more reactive than active, responding to changes manifested firstly in the public opinion and civil society. Therefore, according to Kuijpers (2012), this kind of matters should be first appraised as highly relevant by the civil society, before becoming a fundamental concern of Planning.

Both Kuijpers (2012) and Kamphuis (2012) referred to a recent book, *Hungry Cities*, authored by an English architect, who introduces the topic of Food in cities –where it comes from, how it enters the city, how it is stored, prepared, consumed and what happens to the waste. As food is much related with global sustainability concerns but also essential in everyone's daily life, it seems to be a way of making the connection between both aspects clear to people.

The fact that Planning addresses few matters of fundamental change is corroborated by Pezzoli (1997) in section 2.2, in which it is explained how more practical disciplines are less inclined to pose more fundamental questions about the socio-economic systems.

It can be assumed that Fundamental Change is less addressed due to the more Reform-minded approach of Planning.

Flexibility

Flexibility did not come up in the reviewed literature as a significant challenge for sustainable planning, however this can be due to the fact that the reviewed focused on topics of sustainable planning, and flexibility and its close term resilience are more likely to be mentioned in the climate-proof and adaptation domain.

4.3 Sustainability adding value to planning

The particular aspect of sustainability appears to be its focus on global concerns. Its three imperatives encompass the safeguarding of all natural systems, satisfying the needs of all humans and promoting equity among all present and future generations. This incredibly global focus comprehends all spaces, present and future times and all humans of this planet. Sustainability calls for ways of considering all the interactions between the parts that comprise the global. Upon understanding those interactions and interdependences action is needed, in order to modify those interactions in ways that can better contribute to the three imperatives. Sustainability expands the scope of the traditional concerns of Planning by including the global interactions of the local parts. It acts both as an inspiration and a challenge, as it calls planning to reconsider its ways of thinking about cities and city life.

However, Kamphuis (2012) on the other hand, considers that in order to contribute to meaningful changes, planning has to make sustainability concerns tangible to the inhabitants of a place. Planning should not only address technological matters, but mainly topics that people relate to, so that people will support, legitimate and get actively involved, in the process of making their places more sustainable .

4.4 Planning adding value to sustainability

Planners are experts in dealing with the implementation of policies and plans. Planning is deeply grounded in the pragmatic reality. Despite the fact that planning is concerned with local issues and sustainability highlights global issues, they share similar aims, and the task of turning a city sustainable could be considered analogous, but in smaller scale, to the quest for planetary sustainability. So, the depiction of conflicts inherent in planning can benefit the global sustainability discourse by making more tangible the challenges and clashes involved in the process of deliberation and negotiations towards sustainability. This is valid for issues at local level, the ones generally addressed by planning, but also for the options that have to be considered at national and even global levels.

Moreover, the local domain can provide a closer connection between politics and citizens. This means that the political decisions might be potentially more inclined to be influenced by public opinion, if the citizens hold more fundamental views of sustainability.

The different visions proposed for sustainable cities display a broad range of options, which can be considered when aiming for more sustainable places and ways of living. This broad range of possibilities emphasizes that when actually contributing to sustainability, independently of being more market-oriented, or more directed at self-sufficiency, no approach should be overlooked, as the process of sustainability calls for a multitude of efforts crossing all disciplines, interests and dimensions, to be taken within the most various socio-economic, geographic and political contexts.

4.5 Methodology and limitations of the research

The number of interviews was very limited (3) and therefore its contribution is more illustrative than representative.

The planning field as mentioned before is deeply ingrained in practice, which makes it difficult, as Friedman (1998) noted, to develop planning theories. This is highly due to the strong context dependence of every planning situation. The conclusions drawn by this research are limited to the literature reviewed, which inherently holds certain interpretations and to the experts interviewed, who were for the most part from the Netherlands.

5 Conclusion and recommendations

This research reviewed and analyzed numerous aspects, covering the different facets of Sustainable Development and of Sustainable Planning. Answers were provided to the questions that arose from the Sustainable Development and Sustainable Planning dodecahedrons (Fig 2.1 and Fig 3.1), initially introduced. The results have shown a close association between the two concepts.

Planning seems naturally inclined to embrace sustainability principles, with its similar dual nature of procedural and substantive goals, its normative tendency, its role as a field of negotiation over competing claims, interests and values for places; and finally its long-term experience in striving to understand the interconnectedness between distinct fields, actors and dimensions within spatial areas, requiring transdisciplinary work.

Planning has a profoundly action-minded approach, which is very valuable for SD in a world where it is necessary to go from praising sustainability to actually and actively pursuing and achieving it. Its long experience in dealing with competing claims between its different aims can provide Sustainability with useful insights. Finally, Planning reminds Sustainability that ultimately everything is local. Even when having global consequences, activities and behaviors that cause unsustainability issues are first expressed in concrete places.

Sustainability, in turn, challenges Planning to consider the global nature of the sustainability principles it incorporates.

It was found in this research that despite sharing many principles, some sustainability aspects appear to be less addressed by Planning. These aspects are fundamental change and integration of spatial scales, in terms of the global or distant impacts of local activities and lifestyles. In terms of the SD imperatives, the authors reviewed refer to the equity imperative as the least regarded, in particular intra-generational equity as the least addressed.

I argue that these three aspects are connected. Fundamental change is required on the level of the economic system and of people's lifestyles in order to limit its distant and global impacts on other people and natural environments. The aspect of intra-generational equity appeals for a global consideration of equity, including all humans, and not just the ones which are close to us because of living in the same country, continent, sharing the same culture, or for simply being part of our lives.



Figure 5.1 - The gap between SD and Sustainable Planning

A conclusion representation can be observed in Fig.5.1. The figure displays two (twelve-sided) dodecagons, representing the different facets of Sustainable Development and Sustainable Planning here discussed and the gap between them. This gap is small, considering all the aspects that are shared between both concepts, but it conveys a considerable constraint.

It was suggested in the discussion that the aspect of the needed fundamental change is not something particular of Planning but of our societies. While that might be true, Planning should still be expected to find ways to address this as the other inter-related aspects in the gap.

To further strengthen its engagement with sustainability Planning has to recognize that truly sustainable cities and societies, besides promoting equity, must foster sustainable lifestyles characterized by limited impacts in distant peoples and places.

5.1 Recommendations

The recommendations constitute the last goal of this research, proposing solutions and directions regarding which additional efforts should be undertaken by Planning in the quest for SD.

There are two types of recommendations, the procedural and the substantive ones.

In terms of continuing this research these are the procedural recommendations:

- It would be valuable to study the aspects of holistic SD addressed in the practical planning literature. Despite the high context-dependency of each national/regional/urban practical literature it could be interesting to compare it with the academic planning literature to assess to what extent the holistic ideas of sustainable planning make its way into the practical world.
- Besides analyzing practical literature, it should be worth to investigate the ways by which written guidelines or principles are implemented to assert if there are gaps, between the written intentions and its practical reality.

In terms of substantive recommendations, regarding how Planning can better address issues of global and distant impacts, fundamental change and intra-generational equity:

- Future research:
 - o More efforts can be directed to understand the feedback mechanisms and interdependences comprising the global links between local places. This can result in better information regarding the interconnectedness of global issues.
 - o Looking for case-studies in which Planning has dealt with matters of fundamental change, individual behavior, consumption is valuable for making the best practices known.
- Technical tools: an example is the Ecological Footprint, devised by Rees and Wackernagel (1996). It can be used to better integrate the aspects of global impacts. It is utilized to calculate the resources needed to sustain an individual or a city, as an auxiliary planning tool. Although, according to McMannus & Haughton (2006) this tool is already in use in Planning, its use could be more widespread.
- Practical ideas:
 - o Planning presents the principle of debate and participation of citizens in the planning process. This aspect can be used in two directions. One would be to get input from communities regarding the “gap” aspects. In particular it would be very valuable the input from groups of citizens who are already aware and proactively addressing those aspects. On the other direction, citizens and communities can be prompted to reflect on these questions of global character: the impacts their lives have on the global sphere and distant places, on intra-generational equity and to deliberate which options could be considered in terms of fundamental changes.
 - o From further research, it could be provided for every city, with the involvement of research institutes, local governments and businesses; its network of connections with all the other places in the world. From this information, enlightening actions should make visible to the citizens, the reality behind the apparently easy availability of the most consumed products.
 - o Food seems to be a suitable topic to be addressed at the urban level. It can be used as means for reflection on these myriad of interconnected aspects: lifestyles, local food production, global impacts of dietary patterns, intra-generational inequalities in access to food and the relation between humans and nature.

References

- Agyeman, J., Bullard, R.D. & Evans, B., 2002. Exploring the Nexus: Bringing Together Sustainability, Environmental Justice and Equity. *Space and Polity*, 6(1), pp.77–90.
- Alexander, E., 2009. Dilemmas in Evaluating Planning, or Back to Basics: What is Planning For? *Planning Theory & Practice*, 10(2), pp.233–244.
- Appleton, A.F., 2006. Sustainability: A practitioner's reflection. *Technology in Society*, 28(1–2), pp.3–18.
- Banerjee, S.B., 2003. Who Sustains Whose Development? Sustainable Development and the Reinvention of Nature. *Organization Studies*, 24(1), pp.143–180.
- Basiago, A.D., 1996. The search for the sustainable city in 20th century urban planning. *The Environmentalist*, 16(2), pp.135–155.
- Berke, P.R., 2002. Does sustainable development offer a new direction for planning? Challenges for the twenty-first century. *Journal of Planning Literature*, 17(1), pp.21–36.
- Berke, P.R. & Conroy, M.M., 2000. Are we planning for sustainable development? An evaluation of 30 comprehensive plans. *Journal of the American Planning Association*, 66(1), pp.21–33.
- Berkowitz, A.R., Nilon, C.H. & Hollweg, K.S. eds., 2002. *Understanding Urban Ecosystems: A New Frontier for Science and Education* 1st ed., Springer.
- Binswanger, M., 2001. Technological progress and sustainable development: what about the rebound effect? *Ecological Economics*, 36(1), pp.119–132.
- Blewitt, J. ed., 2008. *Understanding Sustainable Development*, Routledge.
- Bogunovich, D., 2009. From planning sustainable cities to designing resilient urban regions. In *WIT Transactions on Ecology and the Environment*. pp. 87–96.
- Brand, U., 2012. Green Economy the Next Oxymoron? No Lessons Learned from Failures of Implementing Sustainable Development. *GAIA - Ecological Perspectives for Science and Society*, 21(1), pp.28–32.
- Briassoulis, H., 2001. Sustainable development and its indicators: Through a (Planner's) glass darkly. *Journal of Environmental Planning and Management*, 44(3), pp.409–427.
- Brugmann, J., 1996. Planning for sustainability at the local government level. *Environmental Impact Assessment Review*, 16(4-6), pp.363–379.
- Burton, E., 2000. The Compact City: Just or Just Compact? A Preliminary Analysis. *Urban Studies*, 37(11), pp.1969–2006.
- Campbell, S., 1996. Green cities, growing cities, just cities? Urban planning and the contradictions of sustainable development. *Journal of the American Planning Association*, 62(3), pp.296–312.
- Cheng V. 2009 Understanding Density and High-Density, in Ng, E., 2009. *Designing High-Density Cities: For Social and Environmental Sustainability*, Routledge.
- Chichilnisky, G., 2012. Economic theory and the global environment. *Economic Theory*, 49(2), pp.217–225.

- Chichilnisky, G., 1997. What is sustainability? *Land Economics*, 73(4), pp.467–491.
- Chiesura, A., 2004. The role of urban parks for the sustainable city. *Landscape and Urban Planning*, 68(1), pp.129–138.
- Coffman, M. & Umemoto, K., 2010. The triple-bottom-line: Framing of trade-offs in sustainability planning practice. *Environment, Development and Sustainability*, 12(5), pp.597–610.
- Cooper, R., Evans, G. & Boyko, C., 2009. *Designing sustainable cities*, John Wiley and Sons.
- Cowell, R. & Owens, S., 2006. Governing space: planning reform and the politics of sustainability. *Environment and Planning C: Government and Policy*, 24(3), pp.403 – 421.
- Dasgupta, S. & Tam, E.K.L., 2005. Indicators and framework for assessing sustainable infrastructure. *Canadian Journal of Civil Engineering*, 32(1), pp.30–44.
- Davidson, M., 2010. Sustainability as ideological praxis: The acting out of planning's master-signifier. *City*, 14(4), pp.390–405.
- Eggenberger, M. & Partidario, M.D.R., 2000. Development of a framework to assist the integration of environmental, social and economic issues in spatial planning. *Impact Assessment and Project Appraisal*, 18(3), pp.201–207.
- Elkington, J., 1998. *Cannibals with forks: the triple bottom line of 21st century business*, New Society Publishers.
- Encyclopedia Britannica 2012, Urban Planning, Accessed in June 2nd, 2012, available at <http://www.britannica.com/EBchecked/topic/619445/urban-planning>
- Fainstein, S.S., 2000. New Directions in Planning Theory. *Urban Affairs Review*, 35(4), pp.451–478.
- Finn, D. & McCormick, L., 2011. Urban climate change plans: how holistic? *Local Environment*, 16(4), pp.397–416.
- Friedmann, J., 2005. Globalization and the emerging culture of planning. *Progress in Planning*, 64(3), pp.183–234.
- Friedmann, J., 1998. Planning theory revisited*. *European Planning Studies*, 6(3), pp.245–253.
- Godschalk, D., 2004. Land use planning challenges: Coping with conflicts in visions of sustainable development and livable communities. *Journal of the American Planning Association*, 70(1), pp.5–13.
- Grosskurth, J. & Rotmans, J., 2005. The Scene Model: Getting A Grip On Sustainable Development In Policy Making. *Environment, Development and Sustainability*, 7(1), pp.135–151.
- Gunder, M., 2006. Sustainability. *Journal of Planning Education and Research*, 26(2), pp.208–221.
- Grimm, N.B. Baker, L.J. & Hope D. 2002, Familiar Foundations and Uncharted Frontiers, in Berkowitz, A.R., Nilon, C.H. & Hollweg, K.S. eds., 2002. *Understanding Urban Ecosystems: A New Frontier for Science and Education* 1st ed., Springer.

- Haughton, G., 1999a. Environmental justice and the sustainable city. *Journal of Planning Education and Research*, 18(3), pp.233–243.
- Haughton, G., 1999b. Searching for the sustainable city: Competing philosophical rationales and processes of “Ideological capture” in Adelaide, South Australia. *Urban Studies*, 36(11), pp.1891–1906.
- Heng C.K. & Malone-Lee L. C. 2009 Density and Urban Sustainability: An Exploration of Critical Issues, in Ng, E., 2009. *Designing High-Density Cities: For Social and Environmental Sustainability*, Routledge.
- Holden, E. & Linnerud, K., 2006. The sustainable development area: satisfying basic needs and safeguarding ecological sustainability. *Sustainable Development*, 15(3), pp.174–187.
- Holden, M., 2008. The tough minded and the tender minded: A pragmatic turn for sustainable development planning and policy. *Planning Theory and Practice*, 9(4), pp.475–496.
- Hosseini, H. & Kaneko, S., 2012. Causality between pillars of sustainable development: Global stylized facts or regional phenomena? *Ecological Indicators*, 14(1), pp.197–201.
- IPCC (Intergovernmental Panel on Climate Change) 2007 Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.) Available at http://www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html . Accessed March 14th 2012.
- IUCN (International Union for Conservation of Nature and Natural Resources) 1980, World Conservation Strategy: living resource conservation for sustainable development. Available at: <http://data.iucn.org/dbtw-wpd/edocs/WCS-004.pdf> Accessed March 8th 2012
- Jabareen, Y.R., 2006. Sustainable Urban Forms. *Journal of Planning Education and Research*, 26(1), pp.38–52.
- Jepson, E.J., 2001. Sustainability and Planning: Diverse Concepts and Close Associations. *Journal of Planning Literature*, 15(4), pp.499–510.
- Jepson Jr., E.J. & Edwards, M.M., 2010. How possible is sustainable urban development? an analysis of planners’ perceptions about new urbanism, smart growth and the ecological city. *Planning Practice and Research*, 25(4), pp.417–437.
- Kaiser, E.J. & Godschalk, D., 1995. Twentieth Century Land Use Planning: A Stalwart Family Tree. *Journal of the American Planning Association*, 61(3), pp.365–385.
- Kemp, R.L. & Stephani, C.J., 2011. *Cities Going Green : A Handbook of Best Practices*, Jefferson: McFarland.
- Kenworthy, J.R., 2006. The eco-city: ten key transport and planning dimensions for sustainable city development. *Environment and Urbanization*, 18(1), pp.67–85.
- Krueger, R. & Agyeman, J., 2005. Sustainability schizophrenia or “actually existing sustainabilities?” toward a broader understanding of the politics and promise of local sustainability in the US. *Geoforum*, 36(4), pp.410–417.
- Lee, W.L. & Burnett, J., 2008. Benchmarking energy use assessment of HK-BEAM, BREEAM and LEED. *Building and Environment*, 43(11), pp.1882–1891.

- Leiserowitz, A.A., Kates, R.W. & Parris, T.M., 2006. Sustainability Values, Attitudes, and Behaviors: A Review of Multinational and Global Trends. *Annual Review of Environment and Resources*, 31(1), pp.413–444.
- Lélé, S.M., 1991. Sustainable development: A critical review. *World Development*, 19(6), pp.607–621.
- Manderscheid, K., 2012. Planning Sustainability: Intergenerational and Intragenerational Justice in Spatial Planning Strategies. *Antipode*, 44(1), pp.197–216.
- Marazzo, W., 1997. The Challenge of Sustainable Infrastructure Development. *Journal of Urban Planning and Development*, 123(3), pp.37–39.
- Mauerhofer, V., 2008. 3-D Sustainability: An approach for priority setting in situation of conflicting interests towards a Sustainable Development. *Ecological Economics*, 64(3), pp.496–506.
- Mcmanus, P. & Haughton, G., 2006. Planning with Ecological Footprints: A sympathetic critique of theory and practice. *Environment and Urbanization*, 18(1), pp.113–127.
- Mebratu, D., 1998. Sustainability and sustainable development: Historical and conceptual review. *Environmental Impact Assessment Review*, 18(6), pp.493–520.
- Newman, L., 2006. Change, uncertainty, and futures of sustainable development. *Futures*, 38(5), pp.633–637.
- Newman, P.W., 1999. Sustainability and cities: extending the metabolism model. *Landscape and Urban Planning*, 44(4), pp.219–226.
- Ng, E., 2009. *Designing High-Density Cities: For Social and Environmental Sustainability*, Routledge.
- O'Connor, M., 2006. The “Four Spheres” framework for sustainability. *Ecological Complexity*, 3(4), pp.285–292.
- OECD, 2010. *Cities and Climate Change*, OECD Publishing.
- Onestini, M., 2012. Latin America and the Winding Road to Rio+20 From Sustainable Development to Green Economy Discourse. *The Journal of Environment & Development*, 21(1), pp.32–35.
- Pezzoli, K., 1997. Sustainable Development: A Transdisciplinary Overview of the Literature. *Journal of Environmental Planning and Management*, 40(5), pp.549–574.
- Raco, M., 2005. Sustainable Development, Rolled-out Neoliberalism and Sustainable Communities. *Antipode*, 37(2), pp.324–347.
- Ravetz, J., 2000. Integrated assessment for sustainability appraisal in cities and regions. *Environmental Impact Assessment Review*, 20(1), pp.31–64.
- Rees, W. & Wackernagel, M., 1996. Urban ecological footprints: Why cities cannot be sustainable—And why they are a key to sustainability. *Environmental Impact Assessment Review*, 16(4–6), pp.223–248.
- Rees, W. 2002, An Ecological Economics Perspective in Berkowitz, A.R., Nilon, C.H. & Hollweg, K.S. eds., 2002. *Understanding Urban Ecosystems: A New Frontier for Science and Education* 1st ed., Springer.

- Robinson, J., 2004. Squaring the circle? Some thoughts on the idea of sustainable development. *Ecological Economics*, 48(4), pp.369–384.
- Saha, D., 2009. Empirical research on local government sustainability efforts in the USA: Gaps in the current literature. *Local Environment*, 14(1), pp.17–30.
- Sneddon, C., Howarth, R.B. & Norgaard, R.B., 2006. Sustainable development in a post-Brundtland world. *Ecological Economics*, 57(2), pp.253–268.
- Talen, E., 1999. Sense of Community and Neighbourhood Form: An Assessment of the Social Doctrine of New Urbanism. *Urban Studies*, 36(8), pp.1361–1379.
- Transition Network (2012) – What is a Transition Initiative? Available at <http://www.transitionnetwork.org/support/what-transition-initiative> Accessed August 8th 2012
- UN 2008, Population Division - An Overview Of Urbanization, Internal Migration, Population Distribution And Development In The World. Available at http://www.un.org/esa/population/meetings/EGM_PopDist/P01_UNPopDiv.pdf Accessed November 26th 2011
- Vale B. & Vale R. 2009 Is the High-Density City the Only Option? , in Ng, E., 2009. *Designing High-Density Cities: For Social and Environmental Sustainability*, Routledge.
- WCED (World Commission on Environment and Development)1987 Our common future, Available at <http://www.un-documents.net/wced-ocf.htm>, Accessed January 15th 2012
- Wheeler, S.M., 2000. Planning for Metropolitan Sustainability. *Journal of Planning Education and Research*, 20(2), pp.133–145.
- Wheeler, S.M., 2003. The evolution of urban form in Portland and Toronto: Implications for sustainability planning. *Local Environment*, 8(3), pp.317–336.
- Xing, Y. et al., 2009. A framework model for assessing sustainability impacts of urban development. *Accounting Forum*, 33(3), pp.209–224.
- Yanarella, E.J. & Levine, R.S., 1992. Does sustainable development lead to sustainability? *Futures*, 24(8), pp.759–774.
- Zaccai, E., 2012. Over two decades in pursuit of sustainable development: Influence, transformations, limits. *Environmental Development*, 1(1), pp.79–90.

INTERVIEWS

- Kamphuis, Henk, 2012, Retired National Planner, meeting in Den Hague, July 11th 2012
- Kuijpers, Marianne 2012, Director of the Urban Development division of TNO, meeting at TNO, Utrecht, July 30th 2012
- Ng, Edward 2012, Architect and Planner from Hong Kong University, meeting at Utrecht University, Utrecht, April 27th 2012