

## Formation of Sustainable Urban Development Paradigm

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**Abstract:** Sustainability paradigm can be considered as the most common and most commonly used paradigm in the present century. This concept can be related to all matters of daily life – the fact which of course is proven by the introduction of its three dimensions in relation to the society, the economy and the environment. Many experts believe that the formation of this paradigm is relevant to the development of disturbed environmental conditions due to abnormal development, especially in economic areas. One area to which a great attention has been paid after the development of this paradigm and was known as sustainable urban development was related to cases of urban development, particularly in major cities and following the increase in population of cities. This paradigm sees the city as an ecosystem, and tries to provide solutions by which cities become better habitats with higher quality of life for all generations. In these cities, which can be called environmentally friendly cities, humans as well as other creatures will have their own settlements, and there will be minimal energy consumption and waste production and pollution as well. In addition, different indicators have been introduced for the sustainable city, which have been proposed by each expert according to their local conditions and geographical location. This paper is intended to prove the hypothesis that the evolution of environmental movements has led to the formation of sustainable urban development paradigm. To this end, valid internal and external sources have been explored and discussed; and to demonstrate the hypothesis, a closer and more sophisticated look was taken at Brundtland's development paradigm - as one of the most famous definitions of sustainable development. Finally, a chart was developed, which showed the changing paradigm of the sustainable urban development.

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### 1. Introduction

Some serious warnings related to the gradual degradation of human life on the Earth was raised by the growing interest of industrialized human with the material concerns and the increase in economic benefit and excessive exploitation of the planet's resources, as well as the production of a large scale wastes. The warnings tended to draw more attention of the economic developers to the level of exploitation of land resources and the pollution from factories and their products.

Following these warnings and the emergence of environmental movements, such as a group, named Friends of the Earth, the sustainability paradigm was gradually formed. The paradigm in its first formation focused on economic issues and set the term development against growth but it gradually entered in other issues such as social and environmental issues.

One of the important and broad areas in which sustainability entered, was related to the man's main habitats, namely the cities, trying to provide some solutions on the different urban areas, such as physical, social, economic, environmental, managerial disciplines, etc in order to achieve sustainability objectives. In such a situation, a new paradigm was formed as a sustainable urban development paradigm which is today discussed as one of the most important and popular updated concepts of urbanization in the world. How to develop each city in future can be identified through the solutions provided by the paradigm in different areas. Finally, because the cities are considered as the largest consumers of energy and the biggest waste producers in the world, they must be upgrade in line with sustainability and in the direction of improving the quality of life.

## 2. Environmental Crisis

With the industrialization of the societies that aimed to resolve problems and to make life easier and seemingly to be able to meet the human needs in the new era, some new problems gradually formed while simultaneously increasing world population. It can be called as the *environmental crisis*.

Many people, when they discussed the roots of the environmental crisis, referred to the publication of "*Silent Spring*" by Rachel Carson in 1962. The publication of this book can be considered the start of the modern environmental movement. Before Ms. Carson, some people like Malthus (1766-1834) and William Stanley Jevons (1835-1882) were given some warnings due to lack of resources and their exhaustion based on overpopulation (Malthus) as well as reduction of energy sources, such as coal (Jevons) (Baker, 2006: 18). Ebenezer Howard was among others who have tried to find appropriate solutions to the problems associated with an industrial city.

By the publication of his book entitled "*To-Morrow*" in 1898, he tried to find a balance between city and village, to exploit the advantages of nature of both, and to integrate the benefits of energetic and active life in city and beauty and enjoy in countryside. In the 1950s, it also continued in the writings of Osborn (1953), and Ordway (1953). Aldo Leopold (1887-1948) is one of the people who were introduced as one of the leading individuals in modern environmental movement, more than half a century after his death.

In his article, *The "Land Ethic"*, he explicitly rejected the possibility of doing environmental activities by only economic issues. He believed that the social and moral growth is the only possible means for the process, (Leopold, 1996: 22). However the mood of environmentalism by Rachel Carson's analysis of unavoidable damages caused by the widespread and indiscriminate use of pesticides, anti-fungicides and herbicides, was accelerated in 1960s. From the United States, Ian McHarg published his important book "*Design with Nature*" in 1969, seven years after Carson's *warning cry*. His ecological thesis covers disciplines landscape, architecture and planning. He is one of the founding fathers of sustainable development.

MacHarg told that the human development should be planned in a manner that fully considered nature and its natural processes (Moughtin, 2007: 4). The book *The "Limits to growth"* was one of the most influential books in the 70th on environmental criticism, which published by Club of Rome.

A book entitled "*Small is Beautiful*" by Schumacher, published in 1974, is another milestone in the analysis of the causes of environmental

problems and in the development of green principles. Schumacher believed that one causes of environmental problems is the notion that we can increasingly continue to produce and consume in a finite planet. Schumacher warned that the planet, as our stock of capital, is threatened by overproduction. Hence, the human race is consuming its capital at an alarming rate that endangers the tolerance limits of nature. Accordingly, the basic biological systems that feed human can be threatened.

Hardin's "*The tragedy of the commons*" was another landmark in the green analysis in 1977. Hardin suggests that if all people maximize the use of common assets, whether land, sea or air, the result will be the destruction of the commons (Moughtin, 2007: 5).

As can be seen, each expert intends to tell their concern about the situation in the biosphere, and focuses their attention on the threat that if the situation persists, an alarm conditions will occur for human life on our planet. Most concerns are drawing more attention to the protection of nature and natural resources, prevention pollution and minimization of the negative consequences of increased industrialization and population growth. Finally, publication of various books and articles on the environmental crisis was as a prelude to creating the terms sustainability and sustainable development and to penetrate quickly every aspect of life and different issues.

## 3. Theory of sustainability and sustainable development

Both the terms sustainability and sustainable development mean very close together. The stability can be considered as a characteristic of development, which does not reduce its continuity, survival and favorable conditions over time.

The term "sustainability" arises after ecological crises and the experts' attention to the devastating consequences. In its broadest scope, Sustainability refers to the ability of the community, ecosystem or any on-going system to continue functioning into the indefinite future without being forced into decline through the exhausting or overloading of resources on which the system depends (Gilman, 1996).

At first glance, the term sustainable development addressed his critical view of how economic growth. In fact, he addressed the concept "development but not at any cost", and aimed to achieve a type of development that not only doesn't destroy the environmental resources, but tries to protect them. It focuses primarily on economic development, and social issues were gradually included in a larger scale.

By the descriptions above, both the paradigm of sustainability and sustainable development essentially are same. Sustainability can be understood as a concept that has been used to describe a development, especially after the damaging effects of economic growth increased without taking into account environmental issues. We can conclude that sustainability is a process for creating new opportunities that need informed choices and initiative to reach these opportunities.

#### **4. New approach to define sustainable development**

The definitions of sustainable development, raised by different groups and perspectives, are trying to define sustainability and sustainable development, sustainable community and city, as well as sustainable production. Here, some basic question arises: What should be sustained? What should be developed? What is the relationship between them? What is its duration? We will try to extract some answers for these questions.

##### *4.1. What Is To Be Sustained*

The emphases on what is to be sustained fall within three major areas: nature, life support systems, and community. The most common emphases concern life support systems, where the life to be supported first is human. Subsumed within this group are emphases on the classic natural resources—which, while found in nature, are particularly useful for people. Classified as either renewable or nonrenewable, flow or stock, these resources have preoccupied many generations seeking to exploit, conserve, or preserve them. In the last quarter of a century, the concept of natural resources has expanded, from a focus on primary products and production inputs to include the values of aesthetics, recreation, and the absorption and cleansing of pollution and waste. This extended view of natural resources becomes popularly associated with environment and the many features are defined by ecologists as ecosystem services. A recent study catalogued and valued ecosystem services, ranging from atmospheric gas regulation to cultural opportunities. A less anthropocentric view of life and values is found in the emphases on sustaining nature itself for its own intrinsic value. The earth's assemblages of life forms, whether described as biodiversity in general, or as species or ecosystems in particular, are to be sustained not only for their utilitarian service to humans, but also because of humanity's moral obligations. These obligations are characterized as "stewardship"—acknowledging the primacy of humans—or as the proper response to a form of "natural rights" in which earth and its other

living things have equal claims to existence and sustenance. Additionally, not only are biological species seen as endangered, but cultural species are as well. Thus, the concept of communities to be sustained covers distinctive cultures, particular groups of people, and specific places.

##### *4.2. What Is To Be Developed*

The emphases on what is to be developed also fall within three major areas: people, economy, and society. More often than not, when development is discussed, the emphasis is on the economy, with its productive sectors providing both employment and desired consumption, and wealth providing the incentives and the means for investment as well as funds for environmental maintenance and restoration. Yet another form of development stressed is human development. Such people-centered development focuses on the "quantity" of life as seen in the survival of children or increased life expectancy, and on the quality of life in terms of education, equity, and equal opportunity. Finally, some discussions of what is to be developed adopt a broader conception of society, emphasizing the wellbeing and security of national states, regions, and institutions and, more recently, the valued social ties and community organizations known as social capital.

##### *4.3. The Links Between*

The concept of sustainable development links what is to be sustained and what is to be developed. The emphases differ according to whether the links are stated or implied. For example, the U.S. President's Council on Sustainable Development believes in "mutually reinforcing goals of economic growth, environmental protection, and social equity." It sees these goals as equal in importance and linked together. And is the operative conjunction between what is to be sustained, namely, the environment, and what is to be developed, namely the economy and society. But this is just one of many ways of envisioning the links between what is to be sustained and what is to be developed. Some views, while paying homage to sustainable development, focus almost entirely on just one of the two desiderata, the sustaining or the developing (thereby appearing to suggest "sustain only" or "develop mostly"). Others, while clearly emphasizing one or the other, subject this choice to a conditional constraint. For example, a Brundtland Commission member noted "Sustainability is the nascent doctrine that economic growth and development must take place, and be maintained over time, [but] within the limits set by ecology in the broadest sense." Other views tend to leave to some set of publics or decision makers with

determining the exact nature of and tradeoffs between what is to be sustained or what is to be developed.

#### 4.4. For How Long?

It is widely thought that sustainable development is meaningful only if it is intergenerational. Thus, there is general acceptance of the loosely stated time horizon of the World Conference on Environment and Development as now and in the future. The time horizons considered in specific contexts for future sustainable development, however, range from a single generation of 25 years or so, to several generations, as in the Intergovernmental Panel on Climate Change (IPCC) assessments that extend until 2100, to an unstated, but implicit, forever. Each of these time periods presents very different prospects and obstacles for sustainable development. Over the space of a single generation, almost any development appears sustainable. Over forever, almost none do, as even the smallest growth in numbers, resource use, or economy extended indefinitely creates situations that seem surely unsustainable. Over the century encompassed by many energy-environment assessments (e.g., those of the IPCC), the large-scale and the long-term dimensions of the future are both remote and uncertain. The sustainability of development in any usefully concrete sense is even more so (National Academy Press, 1999: 23-26).

WHAT IS TO BE SUSTAINED:	FOR HOW LONG?	WHAT IS TO BE DEVELOPED:
	25 years "Now and in the future" Forever	
<b>NATURE</b>  Earth Biodiversity Ecosystems		<b>PEOPLE</b>  Child Survival Life Expectancy Education Equity Equal Opportunity
<b>LIFE SUPPORT</b>  Ecosystem Services Resources Environment	<b>LINKED BY</b> Only Mostly But And Or	<b>ECONOMY</b>  Wealth Productive Sectors Consumption
<b>COMMUNITY</b>  Cultures Groups Places		<b>SOCIETY</b>  Institutions Social Capital States Regions

Figure 1. Sustainable development: common concerns, differing emphases (National Academy Press, 1999: 24)

#### 5. Brundtland development paradigm

In 1987, when the World Commission on Environment and Development (WCED) published its report, *Our Common Future*, the links between the social, economic and ecological dimensions of development were explicitly addressed (WCED 1987). The WCED was chaired by Gro Harlem Brundtland, the then Norwegian Prime Minister, and *Our Common Future* is sometimes known as the Brundtland Report.

The Brundtland Report makes four key links in the economy – society environment chain (Baker, 2006 :19 ).

Table 1. Causal links in the economy–society–environment chain ( WCED 1987)

- Environmental stresses are linked with one another.
- Environmental stresses and patterns of economic development are linked with one another.
- Environmental and economic problems are linked with social and political factors.
- These influences operate not only within but also between nations.

The now famous and much popularized Brundtland definition of sustainable development is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED 1987: 43). What is often forgotten is that Brundtland went on to argue that: [Sustainable development] contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. (WCED 1987: 43)

The Brundtland concept of sustainable development is global in its focus and makes the link between the fulfilment of the needs of the world's poor and the reduction in the wants of the world's rich. It is difficult to distinguish needs from wants, as they are socially and culturally determined. However, in most cultures fundamental needs are similar, and include subsistence, protection, affection, understanding, participation, creation, leisure, identity and freedom (Pepper 1996).

The second focus on limitations, imposed by the state of technology and social organization, presents an optimistic view of our common future. It is optimistic because it presents a vision of the future that contains within it the promise of progress, opened up through technological development and societal change. The Brundtland conception of sustainable development does not assume that growth is both possible and desirable in all circumstances.



The Brundtland formulation presents an optimistic view, especially in relation to the capacity of humankind to engage collectively and constructively in bringing about a sustainable future. It also places strong emphasis on, and hope in, technological development. (WCED 1987: 46)

What is politically significant about the Brundtland Report is that it does not just address the causes of unsustainable development but also puts forward solutions or pathways to the future. This allows the concept to provide a framework for the integration of environmental policies and development strategies into a new development paradigm – one that breaks with the perception that environmental protection can be achieved only at the expense of economic development. The new development paradigm contains many features (Box 2.2) (Baker, 2006: 22).

Table 2. The Brundtland development paradigm (WCED, 1987)

<p><b>Reviving growth</b></p> <ul style="list-style-type: none"> <li>• Changing the quality of growth: making it less material and energy intensive and more equitable in its impact.</li> <li>• Meeting essential needs for jobs, food, energy, water and sanitation.</li> <li>• Merging environmental and economic considerations in decision making.</li> </ul> <p><b>Population and human resources</b></p> <ul style="list-style-type: none"> <li>• Reducing population growth to sustainable levels.</li> <li>• Stabilizing population size relative to available resources.</li> <li>• Dealing with demographic problems in the context of poverty elimination and education.</li> </ul> <p><b>Food security</b></p> <ul style="list-style-type: none"> <li>• Addressing the environmental problems of intensive agriculture.</li> <li>• Reducing agricultural subsidies and protection in the North.</li> <li>• Supporting subsistence farmers.</li> <li>• Linking agricultural production with conservation.</li> <li>• Shifting the terms of trade in favour of small farmers.</li> <li>• Addressing inequality in access to and distribution of food.</li> <li>• Introducing land reform.</li> </ul> <p><b>Loss of species and genetic resources</b></p> <ul style="list-style-type: none"> <li>• Maintaining biodiversity for moral, ethical, cultural, aesthetic, scientific and medical reasons.</li> <li>• Halting the destruction of tropical forests.</li> <li>• Building up a network of protected areas.</li> <li>• Establishing an international species convention.</li> <li>• Funding biodiversity preservation.</li> <li>• Conserving and enhancing the natural resource base.</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>• Establishing safe and sustainable energy pathways.</li> <li>• Providing for substantially increased primary energy use by the Third World.</li> <li>• Ensuring that economic growth is less energy-intensive.</li> <li>• Developing alternative energy systems.</li> <li>• Increasing energy efficiency, including through technological developments and pricing policies.</li> </ul> <p><b>Industry</b></p> <ul style="list-style-type: none"> <li>• Producing more with less.</li> <li>• Promoting the ecological modernization of industry.</li> <li>• Accepting environmental responsibility, especially by transnational corporations.</li> <li>• Agreeing tighter control over the export of hazardous material and waste.</li> </ul>
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- Ensuring a continuing flow of wealth from industry to meet essential human needs.
- Reorienting technology and the management of risk.

**Human settlement and land use**

- Confronting the challenge of urban growth.
- Addressing the problems caused by population shifts from the countryside.
- Developing settlement strategies to guide urbanization.
- Ensuring that urban development is matched by the provision of adequate services.

While the Brundtland model provides a set of guidelines, it is not detailed enough to determine actual policies. These have to be worked out in practice, through, for example, international negotiations. However, as will be seen, a distinction needs to be drawn between what Brundtland argues ought to be the case and what is actually the case in practice, as actors, including governments, at the international, national or sub-national levels (Baker, 2006: 24).

Table 3. The Brundtland approach to sustainable development

<ul style="list-style-type: none"> <li>• It links environmental degradation with economic, social and political factors.</li> <li>• It presents sustainable development as a model of social change.</li> <li>• It adopts a global focus.</li> <li>• It constructs a three-pillar approach: reconciliation of the social, economic and ecological dimensions of change.</li> <li>• It takes a positive attitude towards development: environmental protection and economic development can be mutually compatible goals and may even support each other.</li> <li>• It argues that the state of technology and social organization limits development: progress in these areas can open up new development possibilities.</li> <li>• It recognizes that there are ultimate biophysical limits to growth.</li> <li>• It takes explicit account of the needs of the poor, especially in the Third World.</li> <li>• It recognizes that the planetary ecosystem cannot sustain the extension of the high consumption rates enjoyed in industrialized countries upward to the global level.</li> <li>• It holds that the consumption patterns of the North are driven by wants, not needs. It thus challenges the North to reduce its consumption to within the boundaries set by ecological limits and by considerations of equity and justice.</li> <li>• It acknowledges the responsibility of present generations to future generations.</li> <li>• It calls for new models of environmental governance, ranging across all levels, from the local to the global.</li> <li>• It has achieved authoritative status in international environmental and development discourse and international environmental governance structures and legal frameworks.</li> </ul>
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## 6. Sustainable urban development

Over the last hundred years, cities have attracted a large percentage of the world population. The UN estimates predict that more than 60 percent of the world population will live in urban areas by 2030. Although only 2 percent of the Earth's surface is occupied by cities, they have more than half the

world's population, growing by about 55 million people a year.

The population consumes  $\frac{3}{4}$  of global resource and is the most major waste producers in the world. Due to need for energy and food, cities have become the large parasitic systems depleting and using up the world: relentless consumers, relentless pollutants. (Egger, 2005: 2).

Today, cities are attracted resources and materials worldwide. Ozone layer depletion and destruction make clear the threat posed by cities and their development mechanism (Hall, 2005: 153).

Thus, the main question on the issue of sustainability should be increased dominance on the cities, and developing regions under their influence. By increasing global dominance of cities, development and management of cities and their surrounding areas is essential as a basis for the formation of social and economic actions and interactions that must be better understood, since it is impossible to achieve global sustainability, as a contemporary topic in the international community, without seeing cities as the most important *spatial*-physical phenomenon of human civilization (Qarekhloo and Hosseini, 2006: 158).

As one of the main issues related to sustainable development, a city is considered as an ecosystem- a dynamic and complex place that cannot escape the various normal and abnormal rules (Tjallingii, 1991).

However, the *level* of impact of a city on the environment distinguishes it from other systems within the global ecosystem. For example, the concept of waste differs somewhat different from what is produced by urban contemporary society in the other systems of global ecosystem. Since there is no accumulation of waste in biological systems, all of its products will be returned to the biological process as a coherent and integrated process.

Contrary to it, urban systems are not yet effective and advanced enough to be able to handle thousands of tons of waste that are imposed on the global ecosystem in the form of air pollution, sewage, waste, etc. Most of the waste does not naturally decompose and can continue to pollute the environment for a long time. The waste *production* in human places is over three times more than what the environment naturally spread (Egger, 2005:3).

Given the issue being discussed here, it is necessary to raise an issue - *sustainable urban development*. Peter Hall has defined the main concept of sustainable urban development as "*a form of modern development which ensures the power of continuous development of cities and urban communities to those future generations.*" (Hall, 1993: 22)

Physically, the sustainable urban development is the changes in land use and densities to meet the needs of urban residents in the areas of housing, transport, and leisure and food preparation so that cities can be environmentally habitable and living (clean air, clean water, land and groundwater and surface water without pollution, etc.), economically durable (i.e. an urban economy consistent with the technical and industrial changes to keep basis jobs and to provide appreciate housing affordable to residents), and socially solidary (land use patterns will enhance social solidarity and sense of citizens belonging to city's heritages) over time (Mukomo, 1996: 266). Thus, a good urban development with the approach to sustainability must simultaneously create a balance in a city from physical, economic and social perspectives.

#### 6.1. Indicators of sustainable urban development

To create more accurate implementation strategies for sustainable urban development, we need to find the indicators related to this issue. Indeed, the indicators should be dependent to policies and programs that could create some potential for improving the city.

Depending on local conditions, different indicators have been presented in developed cities, where the principles of sustainability are taken more seriously. The indicators provided can greatly differ from the local conditions and different situations; but here are some indicators that can be generalized in different cities.

To achieve sustainable urban development, four categories of indicators can be cited:

1. Human Indicators: population, social capital, security, education and health
2. Physical indicators: urban infrastructures
3. Environmental indicators: water quality, air quality, ecological footprint
4. Economic indicators: economic infrastructure, economic potentials.

The indicators introduced, however, can range widely. There are other indicators, such as income level and employment, construction materials, green spaces, housing, etc. which could also be discussed in relation to the subject, but perhaps they can be included in the indicators mentioned. For example, the creation of green spaces can be a considered as a subset of favorable health conditions in cities for leisure; or the income level in employment is related to economic issues in somehow. As was mentioned in the case studies, the type of indicators considered would vary for different settlements, depending on the condition of the habitat.

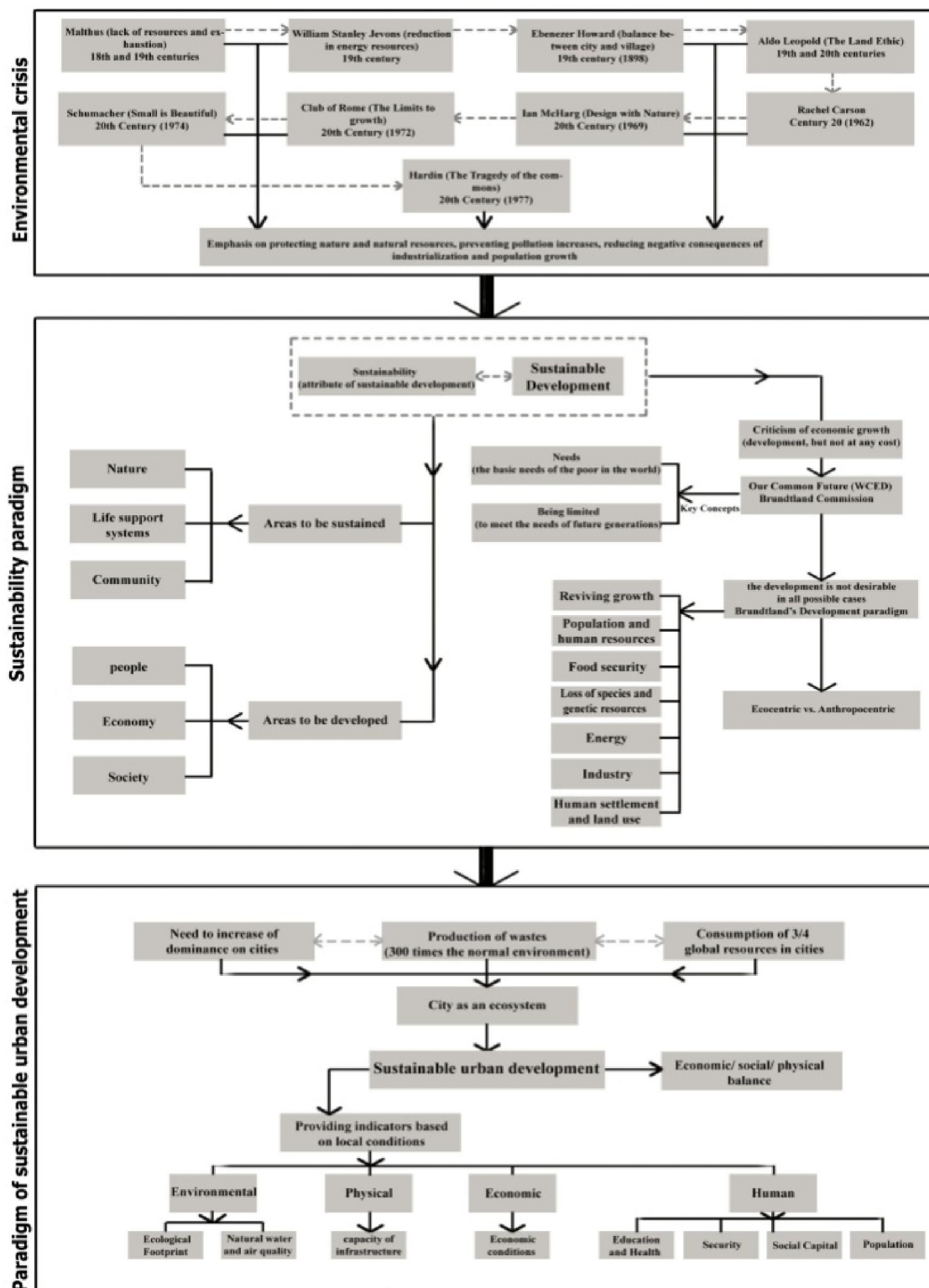


Figure 2. The evaluation of formation of sustainable urban development paradigm

According to what was said, the most important policies and strategies that can be used to achieve a sustainable urban development include:

1. *Establishing* population control policies.
2. Strengthening urban economies.
3. Creating good urban spaces to make social interactions, and increase participation sense in citizen.
4. Enhancing the quality of education and health.
5. Reducing reliance on personal vehicles.
6. Increasing physical density of urban development.
7. Turning to renewable sources (ring development vs. line development) (Saberifar, 2007, 113-114).

## 7. Conclusions

The increase in population on earth and the gradual depletion of its resources, as well as emerging multiple environmental damage incurred by inadequate attention to indiscriminate economic growth (without taking into account the environment) caused some serious warning related. The warnings were added day to day to the extent that prominent individuals and groups draw *people's* attention to it in their books and papers during the 20th century.

*The common point in all* these warnings is an emphasis on protecting nature and natural resources, preventing pollution, and reducing the negative consequences of the industrialization and population growth. It was followed by a new concept, called sustainability, which can be considered as an attribute of sustainable development.

Sustainable development does initially criticize economic growth anyway and doesn't consider it favorable at any cost. For the first time, in 1987, Ms. Brundtland used this concept in a report entitled "Our Common Future" which focused on the essential needs of the world's poor, as well as the needs of future generations.

As the Brundtland's development paradigm said, the development is not desirable in all possible cases. By developing this concept globally and entering into different areas, the paradigm of sustainable urban development forms one of the most common and most used paradigms associated with human habitats, i.e. cities.

The paradigm created after some estimates showing that cities use 4/3 of world resources, and produce about 300 times more waste than the normal amount of environment, hence the need to increase Domination on cities was felt more. The paradigm of sustainable urban development considers the city as an ecosystem, trying to establish a balance in cities from economic, social and physical perspectives.

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What the paper demonstrated was direct dependency of the formation of sustainable urban development paradigm on environmental crises which dated back to the 18th century, and eventually led to the formation of age of sustainability. Since studying the roots of any issue helps to better know and understand it, this paper explored the roots of this paradigm with a closer look at the issue of sustainability in cities. Finally, the general summary of the evaluation of formation of this paradigm can be seen in the figure below.

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