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A Spatial Vision of Sustainable Development Concept

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Abstract: Since, sustainable development meets the needs of the present without compromising the ability of future generations to meet their needs that is equality and equity between generations and through examining the definition, we notice that sustainable development focuses on the temporal aspect (temporal equality), neglecting the spatial aspect. Neglecting the spatial aspect of the sustainable development process which is needed for sustainability, leads to the dual-spatial development in the present and future times where preserving a temporal developmental aspect without focusing on space will create a spatial gap in the development which in turn will lead to create different poles in the present time which will be reflected over time on the next generations causing a defect in the concept of sustainability, this called for introducing the spatial aspect as an active element in the concept of sustainability but the requirements of this dimension should not be consistent with what has been mentioned in the definition above where the concepts of balance and quality should be distinguished. Sustainable development requires equal temporal and spatial balance. The aim of this paper is to discuss the concept of sustainability and to include this concept in the mechanisms of sustainable development as an indispensable component of development. It will be a method for equality between present and future generations, both temporally and spatially.

Key words: Sustainability, sustainable development, spatial dualism, development dimensions, future generations, temporal aspect

INTRODUCTION

Modern concepts of development suggest introducing the concepts of equality and balance in order to face the threats facing the environment to produce a world where phenomenon as poverty, inequality, selfishness and depredation against nature disappear from our societies, so that, present and future generations can benefit from resources in a complementary (but not equal) way according the available potentials around parts of global. This means assigning the responsibility to the patterns of prevailing development within the space.

Sustainable development in its various dimensions is considered the main regulator of the economic policies that neoliberal globalization has reached in dealing with the environment and the natural resources spatially in such way that threats the feel of security and stability of human beings, after it was believed that the earth is a source of inexhaustible resources and an energy for unlimited natural renewal which made many people move from one place to another due to the failure of sustainability to achieve a spatial balance. Many expert's reports have undoubtedly confirmed that sustainability policies are sometimes responsible for the risks on the future of humanity as a whole.

On the other side, the sustainable development represents a new opportunity to assess the type of development and how the benefits are distributed on all strata of society and among different regions. Thus, the sustainable development forced itself as a practical concept to solve the various problems facing the humanity, it allows assessing the risks, raise awareness and temporarily orienting the work on local, regional and international levels. The problem facing the sustainability is: it's neglecting the spatial aspect or forgetting its role in solving these problems. And considering the storing coherence between time and space and in order to make the human development a reality for all human in a spatially and temporarily sustainable manner, it is necessary to activate the role of space as an active element to achieve sustainability on all levels.

MATERIALS AND METHODS

Sustainable development-historical perspective: One who follows the history of development on the global level

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sees a clear and continuous evolution in its concept and content, this evolution represents a realistic response for the nature of problems faced by societies and an actual reflection of the international expertise that were built up over years in this field. It is possible to distinguish 4 transition phases for the concept and content of development around the world, since, the end of World War II and till the current time. These phases are:

Economic development phase: This phase which lasted almost from the end of World War II until the mid-1960's, was based on the industrialization strategy as a means of increasing national income and achieving high and rapid economic growth rates (Suzuki, 2015), some countries adopted alternative strategies after the industrialization strategy failed to achieve the required capital accumulation that can help them overcome their various economic and social problems. These strategies include Foreign aid strategy and trade through increasing the exports. The Rostow Model, known as "economic growth phases" is one of the well-known models that reflects the concept and process of development and its content at this phase (Machado and Mata, 2015).

Social development phase: A new type of development began after a significant part of the economic system was reformed during World War II. In the late 1960's and middle 1970's, the concept of development began to include social dimensions after it was limited only on economic aspects, this phases focused on solving the remnants of World War II as poverty, unemployment and inequality through applying basic needs strategies and popular participation in preparing, implementing and following-up the development plans. This is clearly translated in the Todaro-Harris model which discussed migration and determined three causes as its main social dimensions: satisfaction of basic needs, self-esteem and freedom to be able to choose (Mishchuk and Grishnova, 2015).

Comprehensive economic and social development phase: This phase extended from the mid-1970's to the mid-1980's in which the concept of comprehensive development emerged (Barendt, 1974), it means the development that concerns all aspects of society and life, it goals was formulated on the basis of improving the conditions of ordinary people and not only for increasing economic growth rates, this means that it also concerns about the combination of this growth and its distribution to the regions and the population but the characteristic that dominated on this type of development was addressing each aspect of society independently of the other aspects and the solutions were given to each problem individually which made this development unable to achieve the goals in many countries (Green, 2015), this has led to support the concept of integrated development that addresses various aspects of development within sectoral and spatial integration frameworks.

Sustainable development: As a result of the remnants of World War II, the solutions that were assumed and the development experience in the fields of economy and society that were produced and coinciding with the environmental awareness due to the widespread spread of industry, a new look began in the early 1980's to the concept of development. As the world began to wake up to the noise of many serious environmental problems that threaten the forms of life on Earth (Brundtland, 1987) and this was natural as the development of the environmental aspects were neglected over the past decades, hence, it was necessary to find a new developmental philosophy to help overcoming these problems, the efforts resulted in a new concept of developed was known as sustainable development, this term emerged for the first time in the report of the World Commission for Environment and Development, entitled Our Common Future and was first published by Anonymous (1987) and Briassoulis (2017).

RESULTS AND DISCUSSION

Sustainable development, linguistic origin and scientific concept

Linguistic origin: The term of sustainability is originally from the Science of Ecology (Du Pisani, 2006) where sustainability has been used to express the formation and evolution of dynamic systems that are subjected to structural changes that result in changing their characteristics, elements and their relationships of each other. In the development concept, the term sustainability is used to express the nature of the relationship between economy and ecology as the two sciences are derived from the same Greek origin where both of them start with the root Eco which means in English home or house, where the general meaning of the term Ecology is studying the components of a house (Anonymous, 2018) while the term Economy means managing those components. If we assume that the house here means a city, a region or even the Earth, then, sustainability is a concept that studies and analyzes the relationship between the types and characteristics of the components of a city, a region or the Earth and the management of these components.

Sustainable development is perpetuated by people or populations while durable development is a continuous

or persistent development in an automatic and unconstrained manner. In many specialized Arab studies, the two terms were used as synonymous where some scholars said sustainable development while others said durable development as a translation for the English term sustainable development.

On the other hand, the researchers of the term sustainable development said that there are many economic, social and environmental problems in our modern world that have prevented the continuation of the process of development (Kolk, 2016), thus, a self-driving force that persist this process due to a pre-specified mechanism, accordingly, it is possible to say that the term durable development reflects only the principle of continuity of the development process while the term sustainable development includes the principle of continuity and clearly refers to the self-driving forces of this development which ensure its continuity by this we mean the humanitarian efforts represented by popular participation on the one hand and self-reliance in each aspect of the development process on the other.

The concept of sustainability: The concept of sustainable development was first mentioned in the report of the World Commission for Environment and Development in 1987. This development was defined in the report as: "the development that meets the needs of the present time without compromising the ability of future generations to meet their needs" (Anonymous, 1987), Webster dictionary has defined this development as a development that uses natural resources without allowing a partial or complete depletion or destruction to them, William R. Ruckelshaus, the US Environmental Protection Director, defined it as the process that recognizes the need to achieve economic growth corresponds with the capacities of the environment, out of the perspective that economic development and the preservation of environment are integrated rather than contradictory processes (Tzafestas, 2009).

In light of these definitions, it is possible to say that sustainable development seeks to improve the quality of human life but not at the expense of the environment. In its general sense, it does not deviate from the rational use of natural resources, so that, exploitation of resources does not exceed the rates of their natural renewal, especially in case of non-renewable resources. This use exploration of resources should be carried out in such means and methods that do not lead to the production of wastes in quantities that can't be absorbed, transformed and represented by the environment, taking into account that the future and security of the population anywhere around the world depend on the health of the environment in which they live, here, the importance of sustainable development stands out for current and future generation under the conditions of balancing between the consumption rates and the renewable resources without harming the environment. In this regard, one of the most important achievements of the 1994 Conference of Population and Development is to expand the concept of development from its narrow economic scope to a broad concept that involves the quality of life, whether in the present or future (UN, 1994).

It is noticed that many people, including some specialists and researchers, assume that sustainable development has emerged as a reaction to the many and serious environmental problems that the world is facing as a result of development policies and strategies (Hedenus *et al*., 2016), Although, this is partially true and it's a part of sustainable development concept but it does not reflect the entire content of the concept, the environmental conditions in any region are not results only and they can't be treated separately from their economic and social causes.

Therefore, sustainable development, through addressing and handling the environmental issues around the world, it revealed a major imbalance in sustainability policies and strategies in economic, social and physical sectors with no exception and these environmental problems have become major causes of poverty and inequality (WHO., 2016).

This is confirmed by the UN Commission of Environment and Development in its report: "Many of the current sustainable development trends lead to the impoverishment of increasing numbers of people and make them more vulnerable while at the same time degrading the environment (UN, 1994)". Therefore, the it is not just about the existence of environmental problems faced by the world as lots of people imagine; it is also related to the current economic, social and cultural conditions in different world parts which are called in the modern development literature as development circumstances. The talk about stopping the environmental deterioration and limiting the drain of natural resources through exploiting them rationally requires a detailed knowledge of the geographical region which the development targets.

In the view of the above, some researcher's focus only on the environmental aspect as they discuss the concept of sustainable development is considered a distorted shorthand for this concept where many types of these developments is drain natural resources and this drainage may lead to a unsuccessful development process, thus, environmental problems should be handled though a wide perspective includes reasons underlying the poverty and inequality in different parts around the world.

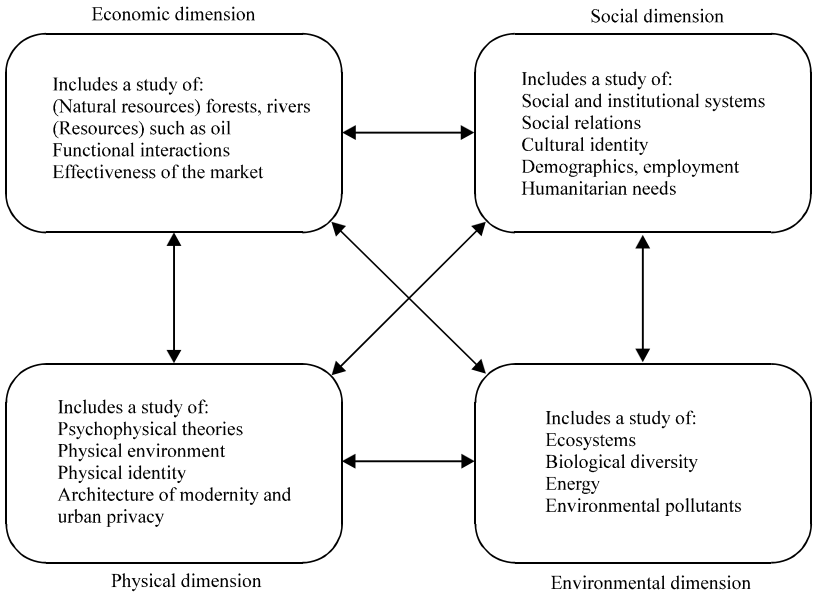

Fig. 1: The four dimensions of sustainable development and their interrelationships

Dimensions of sustainable development: Sustainable development focuses not only on the environmental aspect but also on the economic, social and physical dimensions, thus is a fourfold interdependent interrelated integrated development in a context of an interaction characterize by control, symmetry and rationalization of resources (Hedenus *et al*., 2016).

Economic dimension: Sustainability means continuity and maximization of economic welfare as long as possible through providing fundamentals of economic welfare.

Ecological dimension: The ecological dimension of sustainable development focuses on regarding the environmental boundaries, so that, each ecosystem has certain limits that shouldn't be overcome by the consumption and depletion.

Accordingly, limits should be set on consumption, population growth, pollution, poor production patterns, water drainage and deforestation.

Social dimension: It focuses on the human which forms the essence of development and its final goal through considering social equality, fighting against poverty, providing social services and guaranteeing democracy of people.

Physical dimension: The abovementioned three dimensions cause physical dimension that forms the final material structure. Figure 1 illustrate those elements and their contents.

This interconnection be among the dimensions of sustainable development is related to space, for each development process can't be carried out away from the following four propertiesa (Hak *et al*., 2016; Asongu, 2016):

- Quantity of development
- Quality of development
- Period of development and its sustainability
- Territory of development (Musa, 1997)

In the common planning systems around the world, these dimensions are decided by decision makers as planners, politicians and administrators, this clearly reveals the importance of development.

Neglecting the study of space in development plans leads to negative spatial effects and problems that are of different types and risk and later a defect will be occurred in the other three elements. The logical use of space on the other hand effects significantly not only on the previous elements targeted by development but also on other conditions of development that are related to that place such as (Chisholm, 2017):

- The level of activities based on that space
- The dominating technology level in the country
- The functional interaction between the activities within the space
- The potential energy of the Earth
- The physical environment surrounding the space

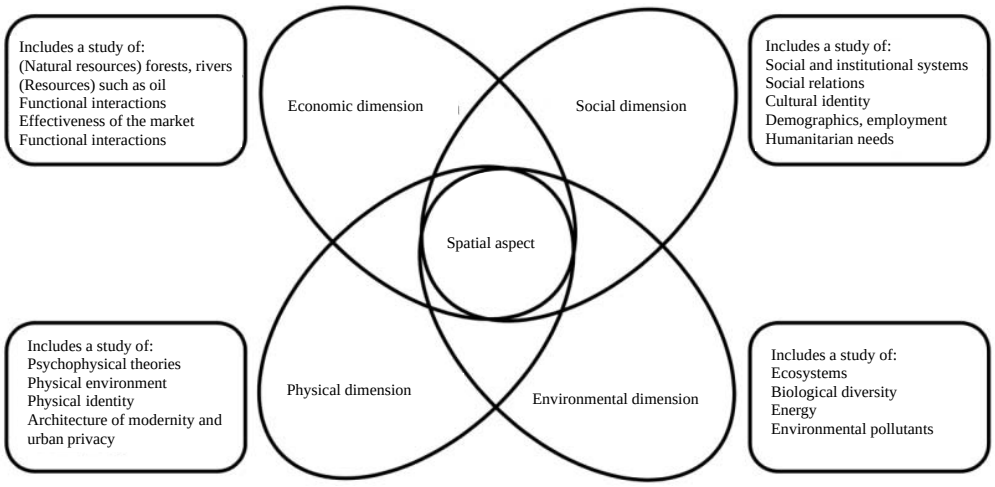

Fig. 2: The result of the overlap between the four dimensions of sustainable development

And other elements related to that space which will open new prospects of activating the development role beside to what was mentioned in the other three dimensions of development.

Spatial dimension of sustainable development: The four dimensions of development can only interact with the presence of a spatial container in order to translate its effects on the on the surrounding environment that contains it and with various degrees and on different levels, although, the development starts with social, economic, environmental and physical dimensions but they will be along with the space that contains these dimensions where logically it is not possible for the development process to be carried out in a site only that doesn't contain development potentials, e.g., desert and even if that happened through creating development poles in that site, yet the progress of the development process will be less than that of development in other site with higher development potentials. Accordingly, the development is complex and multidimensional process that involves a mindful strategy and many processes of integrated aims and goals, it is of a general and comprehensive purposes for a dynamic process occurs in a location where the importance of spatial in the aspect of sustainability (Shuja *et al*., 2016; Govindan *et al*., 2016) is shown by many studies without consider it as an active factor with the temporal aspect, these studies depended on the control of size and type of financial (economy), human (social) and environmental (ecology) resources available in that location to bring them to the highest utilization with minimum possible time period to achieve desired social and economic welfare (Sachs *et al*., 2018). Therefore, the link between the spatial dimension of development to the other previous four dimensions can be explained though the Fig. 2.

Rather, the spatial aspect is consecrated to element that contains these four elements and in which all four sustainable development elements are included, it's because all plans that are made for the four dimensions fall with the limits of space and without it the development desired from sustainability process will notbe achieved.

Also, space is the fundamental element that activates the other four elements because the properties of space or location give the mentioned four elements their effectiveness and the linking processes explained in Fig. 1.

The importance of spatial and temporal redistribution of the four dimension of sustainable development: The experiments carried out in developed countries have proved that the development mechanism and for a long period, depends on the sectorial and spatial aspects in the four development dimensions only, e.g., focusing on the profits of a particular sector and its effects on the domestic product during certain period of time, it lacks the spatial dimension in process of planning which resulted in a significant variation in the levels of development socially, economically, environmentally and physical. However, despite the development there is a region that has a low overall income rates, low vital infrastructure, levels of public services, the urban form or the rates of population condense or growth (all this spatially). Therefore, the need for establishing a strategy to handle the problems of different spatial development levels has emerged through turning the attention to Growth-Oriented Development Strategies (Alkinani, 2008), due this strategy the development process must be oriented socially to the interest of region in which strata of lower incomes live that is deprived of investments and economically by an

accurate determination of the space that is economically underdeveloped compared to regions of a better attraction for investments as capitals and main cities and environmentally to the regions that contain pollution compared to less polluted cities. In other words, the development process is not limited only to sectorial and temporal aspects.

It seems that national planning in many developed countries have effected by the items of the large urban centers in signing the investments which significantly contributed in stabilizing the spatial gap of development in them. The problems suffered by capitals of developed countries as housing, transportation and services crisis and what cities suffer as low incomes, housing levels and general services all are resulted from the absence of spatial planning or ignoring it in the planning methods followed by these countries.

Over time, neglecting or ignoring the spatial dimension in the processes of development has led to deepening the spatial dualism of development economically, socially, environmentally and physically where there are few luxurious cities in which people receive high incomes, social services and vital infrastructure versus large number of small cities of underdeveloped income standards, work opportunities and the quality of services (Shilpi, 2013). So, a spatial structure emerges with rich cities and poor towns and country that suffers of underdeveloped construction economically, socially, environmentally and physically and as a result a significant difference and sever gap in two main directions:

- The first: increased difference in living standards among the members of the same society
- The second: increased spatial difference among the regions of same country

All that resulted from focusing on the sectorial and temporal aspects while the spatial aspect was neglected (Alkinani, 2008).

It is notices from above that when spatial dimension is introduced to the four dimensions of sustainable development, it will play an important role in linking these dimensions by changing the abstract perspective (sectorial temporal) to the dynamic perspective. In other words, economic development was limited to the sector through which the development process will be carried out and the time period that such development will reach. But by entering the space, there will be an interaction between the four dimensions being shared in that space. For example, the economy depends on the industry affects though its pollutants the environment within that place which in turn harms the health of the community (population) inside the limits of space affected by the pollutants where the four dimensions are linked by the spatial dimension. The traditional view of sustainability which views sustainability as its abstract economic concept, abstract social dimension, etc. is not intended here but we view those dimensions associated with that space that brings those dimensions together.

If we move a bit towards the sectorial side, linked the sectors (industrial, agricultural, recreational, social, infrastructure, etc.) and the space, the depth that can reached through this interdependence would be very clear, even, if we add the temporal dimension to the sectors and space. Of all the above three levels are produced:

- Dimensions: social, economic, environmental and physical
- Aspects: temporal, spatial
- Sectors: agricultural, industrial, services, entertainment, infrastructure

Through connecting the dimensions (level 1) to sectors (level 3) through time and space (level 2), so that, all four dimensions are merged together with sectors in space and time, this will lead to change the prevailing view of sustainable development and move us to consider that development with a new perspective that leads to understanding sustainability in its proper sense. As showing in Fig. 3:

Discussion of schema: Taking a part of that scheme as an example: the economic dimension (in its agricultural, industrial and commercial sectors) and at the determined time and space is linked to the environment (the environmental dimension of development) considering the fact that agriculture is a tool of ecosystem reformation, industry is a pollution tool and trade a visual pollution tool.

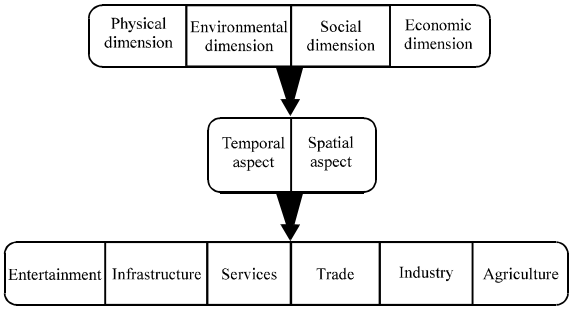

Fig. 3: A schema shows the connection of the four dimensions spatially and temporally with different sectors

If the previous step was repeated though linking each dimension of development with each sector (so that, the sectors are related to dimensions temporally and spatially through adopting the principle of permutations and combinations in mathematics), it would be possible to say that in sustainable development, all possibilities of linking each dimension elements to other sector elements should be studied and each element of space and time as well. In other words, the aspects to be studied for sustainability can be counted in the Eq. 1 and 2:

$$C(n, k) = \frac{P(n, k)}{k!} \quad (1)$$

$$P(n, k) = \frac{n!}{(n-k)!} \quad (2)$$

For example, the number of dimensions in the previous Fig. 3 is which are represented by (k), sectors are and can be more, represented by (n), thus, the number of aspects that should be studies in that development process given to be sustainable is Eq. 3 and 4:

$$P(6, 4) = \frac{6!}{(6-4)!} = 360 \quad (3)$$

$$C(n,k) = \frac{360}{4!} = \frac{360}{24} = 15 \quad (4)$$

The 15 locations to be studied spatially, this process is repeated for temporal links as 15 aspects which means the sum of both is 30 aspects.

In other words, if the concept of sustainability is to be achieved correctly, each aspect of those should be studied in details which means that the economic dimension of the agricultural sector should be spatially studied, the economic dimension of industrial sector should be spatially studied, economic dimension of the trade sector should be spatially studied and so on.

This process is repeated by spatially studying the environmental dimension of the industrial sector and environmental dimension of the agricultural sector etc.

CONCLUSION

Since, the adaptation of sustainable development in the middle of 1980's until the current time, those who work on sustained development plans unknowingly adopted the temporal aspect only which led to the existence of spatially developed space and another one less developed ignored aspect depending on the potentials of each place and its ability to be developed.

Also, the common concept of sustainability indicates that there are four dimensions considered as the foundation on which the sustainable development plans depend, regardless the details that they include but through following and observing the reasons why these plans fail, it was concluded that these plans can succeed only at depending sectors that linked to each other and to these dimensions within the limits of place to be sustained.

Hence, I figured that the links should be determined through the use of permutation and combinations concepts to determine the aspects to be studied and planned and so, we would set the plans to all aspects that leads to sustainability. Therefore, depending the obtained results to suggest that the spatial aspect should be one of the sustainable development dimensions with which the development would have a new concept links all dimensions together spatially, also, the spatial dimension should have the priority over other dimensions, since, it includes all sectors and spatial equality is preferred on the spatial and temporal equality and both they lead to sustainability.

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