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The Concept of Sustainable Development: From its Beginning to the Contemporary Issues

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Abstract: *The concept of sustainable development has undergone various developmental phases since its introduction. The historical development of the concept saw participation of various organizations and institutions, which nowadays work intensely on the implementation of its principles and objectives. The concept has experienced different critiques and interpretations over the time while being accepted in different areas of human activity, and the definition of sustainable development has become one of the most cited definitions in the literature. In its development, the concept has been adapting to the contemporary requirements of a complex global environment, but the underlying principles and goals, as well as the problems of their implementation, remained almost unchanged. Still, some goals have been updated, and the new goals were set. These goals are united in the framework of the Millennium Development Goals 2015 which outline the challenges that humanity has to fight not only to achieve sustainable development but to survive on Earth as well.*

Keywords: concept of sustainable development

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Introduction

Overall development of humanity over the last decades has led to the increasingly unfavourable climate changes and natural disasters, but also wars and political and socio-economic instability. Through their action, humans have negatively impacted on the environment, endangering the survival of the Earth and the future generations. These conditions have indicated changes in the behaviour aiming towards more rational and efficient management of all resources that will allow less pressure and environmental impact. Such responsible behaviour that will ensure the long-term exploitation of resources, without jeopardizing future generations is considered within

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the concept of sustainable development evolving in the 70s and especially in the 80s of the last century. The concept of sustainable development is based on the concept of development (socio-economic development in line with ecological constraints), the concept of needs (redistribution of resources to ensure the quality of life for all) and the concept of future generations (the possibility of long-term usage of resources to ensure the necessary quality of life for future generations). The essence of the concept of sustainable development derives from the *Triple bottom line concept*, which implies the balance between three pillars of sustainability – *environmental sustainability* focused on maintaining the quality of the environment which is necessary for conducting the economic activities and quality of life of people, *social sustainability* which strives to ensure human rights and equality, preservation of cultural identity, respect for cultural diversity, race and religion, and *economic sustainability* necessary to maintain the natural, social and human capital required for income and living standards. Complete sustainable development is achieved through a balance between all these pillars, however, the required condition is not easy to achieve, because in the process of achieving its goals each pillar of sustainability must respect the interests of other pillars not to bring them into imbalance. So, while a certain pillar of sustainable development becomes sustainable, others can become unsustainable, especially when it comes to ecological sustainability, on which the overall capacity of development depends.

Development and Sustainability

Two fundamental elements of the concept of sustainable development, i.e. development and sustainability, preceded the creation of the concept itself. According to Sharpley (2000), development and sustainability could be in the juxtaposition, where both could have possible counterproductive effects, while neoclassical economists emphasize that there is no contradiction between sustainability and development (Lele, 1991). Sachs (2010: 28) also suggests how there is no development without sustainability or sustainability without development. The notion of development is related to the past western concept of imperialism and colonialism, and in that period it implied infrastructure development, political power, and economic policy, serving imperialists as an excellent tool for marginalization and diminishing the power of certain countries (Tangi, 2005). Certain authors link the meaning of development to economic development and the term "underdeveloped areas" (later called "Third World Countries"), which US President Harry Truman introduced in the mid-20th century, signifying areas with the significantly lower standard of living than developed areas (Estevo, 2010: 2).

Classical theories of development consider development within the framework of economic growth and development. According to these theories, development is a

synonym for the economic growth that every state in a particular stage has to undergo, driven by the transformation of traditional agriculture into modern industrialized production of various products and services, i.e. shifting from the traditional society to the stage of maturity and high consumption. These theories consider developing countries as countries limited by the poor allocation of the resources emerging as a result of the firm hand of government and corruption, inefficient and insufficient economic initiatives, but also political, institutional and economic austerity, whereby being captured in dependence and domination of developed wealthy states (Todaro and Smith, 2003). According to several neoliberal and modern development theories established over the past 60 years (Willis, 2005: 27) and the contemporary understanding, development is a process whose output aims to improve the quality of life and increase the self-sufficient capacity of economies that are technically more complex and depend on global integration (Remeny, 2004: 22). Fundamental purpose of this process is a creation of stimulating environment in which people will enjoy and have long, healthy and creative life (Tangi, 2005). Romer's new or endogenous growth theory suggests that economic growth is a result of the internal state or corporate system, and the crucial role in economic growth is knowledge and ideas (Romer, 1986; Todaro and Smith, 2003). The endogenous growth theory model consists of four basic factors: 1) capital measured in units of consumer goods, 2) labour involving the individual skills, 3) human capital comprising education, learning, development and individual training, and 4) technological development. In accordance with this model, if countries want to stimulate economic growth, they have to encourage investment in research and development and the accumulation of human capital, considering that appropriate level of the state capital stock is the key of economic growth.

In the literature different taxonomies of the meaning of the term *development* are found, and most often the following meanings are emphasized: 1) development as structural transformation, 2) human development, 3) development of democracy and governance, and 4) development as environmental sustainability (Vázquez & Sumner, 2013). Lele (1991: 609) describes development as a process of targeted change, which includes goals and resources to achieve these goals. According to Thomas (2004), development involves the positive changes that society has experienced throughout history, and still experiences, while Sharpley's (2009: 30) development outlines the plans, policies, programmes and activities undertaken by certain institutions, governments and other governmental and non-governmental organizations. Accordingly, the most acknowledged development indicator is the Human Development Index (HDI) which integrates different categories of socio-cultural, economic, ecological and political development of particular areas (Willis, 2005; UNDP, 2015a; WB, 2015). The term *sustainability* literally means "a capacity to maintain some entity, outcome, or process over time" (Jenkins, 2009: 380) and carrying out activities that do not exhaust the resources on which that capacity depends. Since this is a general understanding of sustainability, this meaning can be placed analogously to all human

activities and business processes. Thus, according to the general definition, each activity can be carried out in volume and variations without leading to self-destruction, but allowing a long-term repetition and renewal. However, Shiva (2010: 240) points out that the general understanding of sustainability is dangerous because it does not respect the environmental limits and the need for adapting human activities to the sustainability of natural systems. Natural systems enable people to live and support the outcomes of human activities, therefore sustainability can hardly be considered without an ecological aspect (Jenkins, 2009; Sachs, 2010; Shiva, 2010). Accordingly, ecological sustainability has become a fundamental framework for considering socio-cultural and economic sustainability, but also a subject of arguing in the concept of sustainable development.

History of the Concept of Sustainable Development

In the 18th century economic theoreticians such as Adam Smith pointed out issues of development, in the 19th century Karl Marx and classical economists Malthus, Ricardo and Mill also argued about certain elements of sustainable development, while later neoclassical economic theory emphasized the importance of pure air and water and renewable resources (fossil fuels, ores) as well as the need for government intervention in the case of externalities and public goods (Willis, 2005: 147; Bâc, 2008: 576; Črnjar & Črnjar, 2009: 79). Previous periods, and even the following century, saw the dominance of the economic doctrine with focus on human as a ruler of natural resources (Šimleša, 2003: 404; Črnjar & Črnjar, 2009: 61). The term *sustainable development* was originally introduced in the field of forestry, and it included measures of afforestation and harvesting of interconnected forests which should not undermine the biological renewal of forests (Črnjar & Črnjar, 2009: 79). This term was firstly mentioned in the Nature Conservation and Natural Resources Strategy of the International Union for Conservation of Nature published in 1980 (IUCN, 1980). Although initially sustainable development primarily viewed an ecological perspective, soon it spread to social and economic aspects of study.

Development based on economic growth remained until the 1970s when it was obvious that consumerism and economic growth put pressure on environment with the consequences of polluted and inadequate living space, poverty and illness (Šimleša, 2003: 404). At the same time, the exploitation of natural resources, in particular the stock of raw materials and fossil fuels, has led to deliberation of the needs of future generations and created a prerequisite for defining the attitude of long-term and rational use of limited natural resources. The imbalance between human development and ecological limits has pointed to the growing environmental problems and possible consequences with disastrous proportions. Črnjar & Črnjar (2009) summed up the basic causes of environmental pollution: 1) anthropogenic causes of envi-

ronmental pollution (economic growth, technical and technological development, industrial development, development of traffic and transport infrastructure, population growth and urbanization and mass tourism), 2) natural causes of environmental pollution (soil erosion, floods, earthquakes, volcano eruptions, fires, droughts and winds) and 3) other causes of environmental pollution (wars, insufficient ecological consciousness, imbalance between development and natural ecosystems and limited scientific, material, organizational and technological opportunities of society). The consequences of these factors – seen in various ecological problems, ecosystem disturbances, global climate change, natural catastrophes, hunger and poverty, and many other negative consequences – have been warning about the sustainability of the planet.

Aspiration of developed countries to improve the socio-economic and ecological situation of developing and undeveloped countries gathered scientists, economists and humanists from ten countries in Rome in 1968 to discuss the current problems and future challenges of humankind (limited natural resources, population growth, economic development, ecological problems, etc.). Grouped as an independent global organization called the *Roman Club*, these scientists have published two significant editions – *Limits of Growth* in 1972 and *Mankind at the Turning Point* in 1974, containing the results of their research and appealing the world to change the behaviour toward the planet, while in the first edition the term sustainability was clarified in the framework of the contemporary concept of sustainable development (Drljača, 2012: 20; Meadows et al., 1972). The Roman club warned that excessive industrialization and economic development would soon cross the ecological boundaries. In 1971 Nicholas Georgescu-Roegen published *The Entropy Law and the Economic Process*, similarly warning about the dangers of economic development and marking the beginning of the ecological economics and environmental economics (Levallois, 2010).

Different organizations and institutions participated in the creation of the concept of sustainable development. The most significant is the United Nations (UN), founded in 1945 with headquarters in New York (UN, 2015e), which nowadays includes more than 190 member states. Its main goals include: maintaining the peace and security in the world, promoting sustainable development, protecting the human rights and fundamental freedoms, promoting the international law, suppressing the poverty and promoting the mutual tolerance and cooperation. Since its establishment, UN has been active in the field of sustainable development by organizing numerous conferences, taking actions and publishing various publications aimed to achieve the goals of sustainable development and the Millennium Development Goals (MDGs). A total of 33 programmes, funds, specialized agencies and affiliated organizations are active within the United Nations, while some of them play a significant role in the creation and implementation of the concept of sustainable development. The United Nations Division for Sustainable Development (UNDSD) has also been established to promote and coordinate the implementation of sustainable development, particularly in

Table 1: Overview of the various activities related to the concept of sustainable development

Year	Activities	Brief description
1969	UN published the report *Man and His Environment* or *U Thant Report*.	Activities focused to avoid global environmental degradation. More than 2,000 scientists were involved in creation of this report.
1972	First UN and UNEP world *Conference on the Human Environment*, Stockholm, Sweden.	Under the slogan *Only One Earth*, a declaration and action plan for environmental conservation was published.
1975	UNESCO conference on education about the environment, Belgrade, Yugoslavia.	Setting up a global environment educational framework, a statement known as the *Belgrade Charter.*
1975	*International Congress of the Human Environment (HESC)*, Kyoto, Japan.	Emphasized the same problems as in Stockholm in 1972.
1979	*The First World Climate Conference*, Geneva, Switzerland.	Focused on the creation of the climate change research and programme monitoring.
1981	*The first UN Conference on Least Developed Countries,* Paris, France.	A report with guidelines and measures for helping the underdeveloped countries.
1984	Establishment of *United Nations World Commission on Environment and Development (WCED*).	The task of the Commission is the cooperation between developed and developing countries and the adoption of global development plans on environmental conservation.
1987	WCED report *Our Common Future* or *Brundtland report* was published.	A report with the fundamental principles of the concept of sustainable development.
1987	*Montreal Protocol* was published.	Contains results of the researches on harmful effects on the ozone layer.
1990	*The Second World Climate Conference*, Geneva, Switzerland.	Further development of the climate change research and monitoring programme and the creation of global *Climate Change Monitoring System*.
1992	*United Nations Conference on Environment and Development (Earth Summit* or *Rio Conference),* Rio de Janeiro, Brazil.	In the *Rio Declaration* and *Agenda 21 Action Plan* principles of sustainable development were established and the framework for the future tasks as well.
1997	Kyoto Climate Change Conference, Kyoto, Japan.	The *Kyoto Protocol* was signed between countries to reduce CO2 and other greenhouse gas emissions, with commencement in 2005.
2000	UN published *Millennium declaration*.	Declaration containing eight Millennium Development Goals (MDGs) set by 2015.
2002	*The World Summit on Sustainable Development*, Johannesburg, South Africa.	Report with the results achieved during the time from the Rio Conference, which reaffirmed the previous obligations and set the guidelines for implementation of the concept in the future.
2009	*The Third World Climate Conference*, Geneva, Switzerland.	Further development of the global Climate Change Monitoring System with the aim of timely anticipation of possible disasters.
2009	World Congress *Summit G20*, Pittsburgh, USA.	G20 member states made an agreement on a moderate and sustainable economy.
2012	UN conference *Rio +20*, Rio de Janeiro, Brasil.	Twenty years from the Rio conference, report *The future we want* renewed the commitment to the goals of sustainable development and encouraged issues of the global green economy.
2015	UN *Sustainable Development Summit 2015*, New York, SAD.	*The UN 2030 Agenda for Sustainable Development* was published, setting up 17 Millennium Development Goals which should be achieved by 2030.
2015	UN conference on climate change *COP21Paris Climate change Conference,* Paris, France.	Agreement on the reduction of greenhouse gases in order to reduce and limit global warming.

Source: interpretation of author according to IISD, 2015; SDKP, 2015; UN, 2015ab; UNEP, 2015ab; UNDP, 2015c; WMO, 2015; UNFCCC, 2016.

the field of intergenerational and international co-operation. The Division also serves as a support to policy management and management of sustainable development, and especially as a communication platform for knowledge and data dissemination (UNDSD, 2015). Along with this, the UN has established a Global Network of Sustainable Development (GNSD) geared to achieve the Millennium Development Goals (UNSDSN, 2015).

Since the introduction of the concept, many international conferences, congresses, summits and meetings have been held, resulting in various declarations, reports, resolutions, conventions and agreements and dealing with the environmental problems. *Table 1* gives a chronological overview of significant activities directly and indirectly related to the creation and development of the concept of sustainable development. In the table the variety of events and activities is evident, so it is impossible to cover all of them in past years. Additionally, in the past seventy years only UN has published more than seventy documents significant for human development (UN, 2015b).

Among the various activities, three key events set the fundaments and principles of sustainable development. According to them, the history of the concept of sustainable development is divided into three periods. **The first period** covers the period from economic theories, where certain theorists (Smith, Marx, Malthus, Ricardo and Mill mentioned above) recognized the boundaries of development and environmental requirements, through the activities of the Roman Club, which warned on the negative consequences of economic development, to the First United Nations Conference on the Human Environment held in Stockholm in 1972 (Mebratu, 1998; Drexhage & Murphy, 2010). This conference marked the introduction of the concept of sustainable development, and although it did not fully associate environmental problems with development, it stressed the need for changes in economic development policy (UN, 1972; Mebratu, 1998; Drexhage & Murphy, 2010). In the report published after the conference, the necessity of balance between economic development and environment was proclaimed and 28 principles were set aimed to preserve environment and reduce poverty. Within the action plan, 109 recommendations (socioeconomic, political and educational) were given for quality environmental management, and finally, after the conference, resolution on institutional and financial agreements was signed between the states (UN, 1972).

Years after the Stockholm conference represent **the second period** of the concept of sustainable development. The terms such as *development and environment*, *development without destruction* and *development in accordance with the environment* were increasingly used in publications, while the term *eco-development* was first described in edition of the United Nations Environment Programme (UNEP) published in 1978 (Mebratu, 1998). In 1980, International Union for Conservation of Nature (IUCN) set an idea of linking economics and the environment through the concept of sustainable development (IUCN, 1980). A few years later, more precisely in 1983, the United Nations World Commission on Environment and Development

(WCED) was established to develop a global change programme. This programme was aimed to raise awareness and concern about the negative impact of socio-economic development on the environment and natural resources as well as provision of perspectives of a long-term and sustainable development in accordance with the environmental protection and conservation (WCED, 1987: 5; Drexhage & Murphy, 2010: 7). After several years of work, in 1987 the Commission of 19 delegates from 18 countries, led by Gro Harlem Brundtland (the then Norwegian Prime Minister), published a report *Our Common Future*, better known as the *Brundtland Report*, where the concept of sustainable development was introduced in its true sense (WCED, 1987; Drexhage & Murphy, 2010). In its twelve chapters this report analysed and provided a clear overview of the conditions in the world (socio-economic development and order, environmental degradation, population growth, poverty, politics, wars, etc.) and elaborated the concept of sustainable development. As a new approach, this concept should be able to respond to future challenges, such as achieving balance between socio-economic development and the environment, reducing pollution and environmental degradation, exploiting natural resources, reducing harmful gas emissions and climate impacts, reducing poverty and hunger, achieving world peace and other serious challenges and threats faced by humanity (WCED, 1987). In the second chapter, the concept of sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987: 43), which contains the core of the concept and soon became a generally accepted and probably the most cited definition in the literature, no matter where the context of sustainable development is being discussed.

The fundamental objective of the concept outlined in the document is to provide basic human needs to all people (home, food, water, clothing, etc.), with a tendency to improve living standards, as well to achieve the aspiration of a better life. An imperative of the Brundtland report is: rational and controlled use of resources focused on renewable and long-term usage, protection and conservation of nature, raising ecological awareness, stricter national regulation and international co-operation, stopping population growth, using industry and technology in line with environmental requirements, developing technological innovations in order to reduce impact on environmental (WCED, 1987). Thus, according to the Report, the underlying principles of the concept of sustainable development are assurance of the human needs, while respecting certain environmental constraints. The Brundtland report marked the beginning of a new global socio-economic policy in which the concept of sustainable development has become a key element in environmental management and other areas of human activities (Mebratu, 1998).

This event was followed by the **third, so-called After Brundtland period**, which lasts until today and included several significant events. Marking the twentieth anniversary of the conference in Stockholm, UN conference on environment and development called the *Earth Summit* or the *Rio Conference* was held in Rio de Janeiro in 1992. The

conference saw the participation of numerous governmental and non-governmental organizations from 178 countries. Its focus was to define a global framework for solving issues of environmental degradation through the concept of sustainable development, considering that in the 20-year period the integration of environmental concerns and economic decision-making was ignored and the state of the environment was worse (UNCED, 1992ab; Mebratu, 1998; Drexhage & Murphy, 2010). More than 10,000 international journalists transmitted the conference to millions of people around the world, witnessing the importance of the conference. The preparation of the conference began in 1989 and as a result the following documents were adopted: 1) *Rio Declaration on Environment and Development*, 2) *Agenda 21*, 3) *Non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests*, 4) *Climate Change Convention* and 5) *Convention on Biological Diversity* (UNCED, 1992ab; UNDSD, 1992). The first two documents are key for the concept of sustainable development.

The *Rio Declaration on Environment and Development* contains 27 principles of sustainable development on the rights and responsibilities of the United Nations. These principles also form the basis for future policy and decision making and balance between socio-economic development and the environment (UNCED, 1992b). The Declaration gives people the right for development but also the obligation for preserving the environment, and since the environment is a public and common good, it also highlights the need for cooperation and understanding between the public and private sectors and civil society. Among the principles, it is emphasized how humans are in the centre of concern for sustainable development and should not delay measures to prevent environmental degradation. At the same time, it is emphasized that each country has the sovereign right to exploit its own resources, if this does not endanger the environment of other countries, thereby polluters should bear the costs of pollution. Eradication of poverty, reduction of inequalities and assuring basic living standards and peace in the world are essential for sustainable development, therefore developed countries have the responsibility to ensure sustainable development, particularly for technology and financial resources (UNCED, 1992b).

Agenda 21 is a global programme with objectives of sustainable development and action plans and resources for their implementation set in 40 chapters (UNDSD, 1992). The document comprehensively provides guidelines for socio-economic development in line with the environmental conservation. The document highlights the need for international cooperation and consensus between development and environmental protection, whereby governments play an important role in the adoption and implementation of policies, plans and programmes, although the participation of all other stakeholders is also necessary. Further on, developed countries play a key role, particularly in providing financial funds to developing countries. As a priority goal, the document emphasizes the suppression of poverty, especially in poor countries where it is also necessary to preserve and protect natural resources. At the same

time, in these countries there is a need for improvement of the protection of human health and gender equality. It is also necessary to change patterns of behaviour in production and consumption in order to rationally exploit natural resources and fossil fuels which would result in reduced negative impact on the environment. Finally, Agenda 21 highlights the importance of educational programmes focused on raising awareness and promotion of the sustainable development which are necessary for its implementation (UNDSD, 1992).

From these fundamental activities and documents the three key elements of the concept were identified: **1) the concept of development** (socio-economic development in line with ecological constraints), **2) the concept of needs** (redistribution of resources to ensure the quality of life for all) and **3) the concept of future generations** (the possibility of a long-term usage of resources to ensure the necessary quality of life for future generations). At the same time, concept of sustainable development outlined core principles, namely: ensuring needs and care for the community of present and future generations, continuously improving the overall quality of life and equality, protecting and preserving the environment, biodiversity and ecosystems, protecting and preserving the natural resources, with the rational use of renewable resources and reduced depletion of non-renewable resources, changing production and consumption respecting the ecological constraints, using renewable energy and innovative technologies to reduce the negative impact on the environment, strengthening international cooperation at the national, regional and local level, creating an institutional framework with a strong network of stakeholders interested in implementing the concept of sustainable development, etc. Here it could be mentioned how the three key elements of the concept were also described by the Maslowian portfolio theory (MaPT) and the hierarchy of needs (De Brouwer, 2008).

Contemporary Challenges of the Concept of Sustainable Development

From its origins until today the concept of sustainable development has been faced with different interpretations and criticisms. The Brundtland report stated how concept of sustainable development had different meanings and referred to holistic planning and adoption of strategies, ecology, heritage protection and biodiversity and long-term sustainable development (WCED, 1987). A few years after Brundtland report, Dobson (1996) identified more than 300 definitions and interpretations of the concept of sustainable development. The definitions largely follow the core of the concept set out in the basic definition of the WCED. In these definitions sustainable development is mostly perceived as a socio-economic system that enables human needs, but also a long-term progress towards well-being and improvement of overall quality of life in accordance with environmental constraints. An overview of certain interpretations of sustainable development in the period 1987 – 2015 is given in *Table 2*.

Table 2: Chronological overview of the meaning of sustainable development in the period 1987 – 2015

Authors/publication and year	Meaning and understanding of sustainable development
WCED, 1987	Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Pearce et al., 1989	Sustainable development implies a conceptual socio-economic system which ensures the sustainability of goals in the form of real income achievement and improvement of educational standards, health care and the overall quality of life.
Harwood, 1990	Sustainable development is unlimited developing system, where development is focused on achieving greater benefits for humans and more efficient resource use in balance with the environment required for all humans and all other species.
IUCN, UNDP & WWF, 1991	Sustainable development is a process of improving the quality of human life within the framework of carrying capacity of the sustainable ecosystems.
Lele, 1991	Sustainable development is a process of targeted changes that can be repeated forever.
Meadows, 1998	Sustainable development is a social construction derived from the long-term evolution of a highly complex system – human population and economic development integrated into ecosystems and biochemical processes of the Earth.
PAP/RAC, 1999	Sustainable development is development given by the carrying capacity of an ecosystem.
Vander-Merwe & Van-der-Merwe, 1999	Sustainable development is a programme that changes the economic development process to ensure the basic quality of life, protecting valuable ecosystems and other communities at the same time.
Beck & Wilms, 2004	Sustainable development is a powerful global contradiction to the contemporary western culture and lifestyle.
Vare & Scott, 2007	Sustainable development is a process of changes, where resources are raised, the direction of investments is determined, the development of technology is focused and the work of different institutions is harmonized, thus the potential for achieving human needs and desires is increased as well.
Sterling, 2010	Sustainable development is a reconciliation of the economy and the environment on a new path of development that will enable the long-term sustainable development of humankind.
Marin et al., 2012	Sustainable development gives a possibility of time unlimited interaction between society, ecosystems and other living systems without impoverishing the key resources.
Duran et al., 2015	Sustainable development is a development that protects the environment, because a sustainable environment enables sustainable development.

Source: interpretation of author according to the sources

Since sustainable development is closely linked to ecological issues, given that nature provides fundamental opportunities and constraints to development, the understanding of the concept of sustainable development in theory is mostly related to *ecological sustainability* – a development that provides the necessary environmental conditions which enable life on a certain level of well-being for present and future generations (Lele, 1991). This is also a holistic (sustainable) approach which does not observe sustainable development separately from environmental protection and which is placed in a global ecological, socio-economic and political context (Ulhoi

& Madsen, 1999; Sharpley, 2000). However, in order to achieve the necessary ecological conditions, certain social conditions also have to be achieved considering their influence on ecological sustainability or unsustainability. From the aspect of *social sustainability*, sustainable development represents an opportunity for achieving certain human needs derived from quantitative economic values (Ulhoi & Madsen, 1999), but also an opportunity for achieving certain social needs, tradition, culture and other social values and characteristics. The generally accepted *mainstream theory* of sustainable development includes both mentioned aspects of sustainability, with a fundamental understanding of sustainable development as social changes that achieve traditional development goals in accordance with the limits of ecological sustainability (Lele, 1991). This theory respects current state of humanity, such as the negative consequences of continuous environmental destruction and pollution, and poverty and hunger in the Third World Countries, therefore it recognises the need of assurance of the basic human needs of present and future generations. Hence, this approach highlights the intergenerational perspective of equality, but in accordance with ecological constraints. Accordingly, this theory includes perspective of future-oriented development, unlike the previous approaches that were largely focused on the present development (Ulhoi & Madsen, 1999).

Changes in producer and consumer behaviour involve rational use and renewal of natural resources, otherwise pressure of economic development gradually impoverishes these resources. Since economic development cannot be achieved without the resources, further discussion about sustainable development goes to defining the direction of sustainable development and the use of resources. This discussion is crucial to the concept of sustainable development, as there are different perceptions of sustainability – between *weak and strong sustainability* as extremes in that range, where natural and produced capital are opposed (Turner, 1993; Črnjar & Črnjar, 2009; Pelenc et al., 2015). Similarly, Weaver and Lawton (1999: 10) associate sustainable development to *spending versus saving*, and accordingly they see it in the range from unsustainable development through stationary sustainable development to renewable and improved sustainable development. Turner (1993) defines *weak sustainability* as a *techno-optimistic* or *techno-centric* perspective and *strong sustainability* as a *distinct ecological* or *ecocentric* perspective of sustainable development. *Weak sustainability* implies a constant amount of total capital assets (resources) over the time, while natural and manufactured (produced) capital is interchangeable, whereby some resources may be reduced because of the increase of other ones, i.e. the reduction of natural resources must always be replenished by increase of the natural or manufactured resources (Turner, 1993; Neumayer, 2003; Črnjar & Črnjar, 2009). This approach represents neoclassical concept of sustainability which seeks the optimal extraction of non-renewable natural resources (Črnjar & Črnjar, 2009: 87). It also refers to the use of innovative technologies which have certainly increased the capacity of the environment and which should compensate the negative impact

on environment. Such sustainability also supports the free market, exploitation of resources and growth focused on manufactured capital, because it is more important than the natural one (Davies, 2013).

On the other hand, *strong sustainability* is geared to the green economy and strict environmental protection (Davies, 2013), and stresses how protection of total capital is insufficient, yet the protection of natural resources is particularly important. This claim comes from the fact that certain critical natural resources can never be complemented or replaced by other forms of resources because they are irreversible, and consequently their loss reflects on all other forms of capital (Turner, 1993; Neumayer, 2003; Črnjar & Črnjar, 2009). This is the concept of ecological economics (Črnjar & Črnjar, 2009: 87).

In this context Solow (1974) used max-min principle to intergenerational problem of the optimal capital accumulation suggesting the constant consumption per capita over time. Hartwick (1977) determined weak sustainability and defined the investment savings rule, known as "Hartwick's rule". Namely, Hartwick's rule for sustainability includes reinvesting resources rents, keeping the value of net investments equal to zero. Also, if the resources are optimally allocated, reinvestments can compensate the losses, so the stock of total capital will not be reduced over time. From this view natural capital and capital produced can be replaced by one another. However, the rent achieved by the exhausting of natural resources should be saved and invested in manufactured capital production. Overall, the weak sustainability paradigm assumes that technological advances can improve human wellbeing despite the environmental damage.

More radical concept gave Naess (1973) opposing deep ecological worldview to the dominant shallow paradigm of sustainability. Accordingly, the shallow ecology is typical mainstream environmentalism, concerned mostly by the various environmental issues (pollution, overpopulation, conservation etc.) and human negative impact on the environment. In contrast, deep ecology assumes radical change of human behaviour to the nature and deeper connection with life, where humans are integral part of the environment and have to find a role in protecting the earth. This also stands as an environmental philosophy or social movement considering the religious and mystical undertones. Based on a platform of eight organizing principles, deep ecology differs from other types of environmentalism, especially in fields of metaphysics, epistemology, and social justice (Naess, 1986). However, too much philosophical descriptiveness and highlighted biocentric egalitarianism stand as a basic criticisms of the deep ecology (Baird Callicot & Frodeman, 2009).

Similarly, Boulding (1966) saw the earth as closed or open system with total stock of capital where matter, energy, and information represent three important segments. In that relationship, the accumulation of knowledge is the key to human development, especially to economic development. Open earth system Boulding called "cowboy economy" where "consumption is regarded as a good thing and production likewise",

and where the economy's success is measured fully "by the amount of the throughput from the 'factors of production'" (Boulding, 1966: 2). A part of this throughput is "extracted from the reservoirs of raw materials and noneconomic objects" and another part consists of "output into the reservoirs of pollution". Considering the increasing human demands, Boulding also introduced the metaphor of the closed earth system as a "spaceship" without "unlimited reservoirs of anything, either for extraction or for pollution". He used "spaceship" to emphasize the limits of the Earth's natural resources. In such "spaceman economy", "throughput is by no means a desideratum, and is indeed to be regarded as something to be minimized rather than maximized". The aim is less production and consumption and the measures of success are "the nature, extent, quality, and complexity of the total capital stock", contrary to the measures of success of production and consumption.

Boulding's "spaceship economy" relates to the "linear economy" based on the concept "take-make-dispose" or "take, make, consume, discard" which assumes unrestricted and easy access to material resources (Drljača, 2015). In transition process and the domination of neo-classical doctrine, in past years linear economy has been transformed in "circular economy" with roots in the concept of sustainable development. Circular economy represent an "economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes" (Kirchherr et al., 2017: 224). The key of the circular economy is the return of collected and recycled waste in the production cycle as a valuable raw material. Despite the positive effects of the circular economy, findings given by Kirchherr & Associates (2017) indicate how circular economy was mostly focused on the economic prosperity then the environmental quality, while the social equity and future generations was hardly mentioned. Overall, a necessity of systematic changes was rather neglected. Some constraints were also linked to the lack of coordination, lack of government oversight and enforcement and lack of adaptability to a dynamic nature shadowed by mainstream neo-classical economic discourse (Kammer & Christopherson, 2018). At the same time, these failures were also part of the uncertainty of public investment decisions (preservation and development) and the cost of risk-bearing (Arrow & Lind, 1970; Arrow & Fisher, 2000), and externalities and the focal system (Foldes & Rees, 1977).

Accordingly, it is necessary to observe human development in relation to global carrying capacity, and when human development reaches the Earth's carrying capacity, exhausted natural resources cannot be changed either with natural or produced resources; in other words there is an absolute natural restraint of human development (Holden et al., 2014). The existence of a qualitative difference between natural and produced resources stands as additional argument for strong sustainability. Certain natural resources are irreversible and cannot be changed, while humans need natural resources to produce other resources and not vice versa. Ultimately, each replace-

ment of resources at present time will have consequences in the future (Črnjar & Črnjar, 2009; Pelenc et al., 2015). Since the destruction of the environment has not been stopped, over the last few years the concept of sustainable development has been heavily focused on strong sustainability, more and more approaching to the *strong environmental sustainability*, because of the critical natural resources and negative consequences (Davies, 2013), i.e. in some areas it moved closely to ecological sustainability fully respecting natural carrying capacity (Bell & Morse, 2008). Here it also important to note how initially the concept of sustainable development in the Brundtland report was geared towards socio-economic growth and was characterized by weak sustainability (Hunter, 1997).

The International Institute for Sustainable Development (IISD) defined five fundamental conceptual models of sustainable development: (1) models with roots in economics, (2) stress and stress-response models, (3) multiple capital models, (4) various forms of the three-part or theme "social, economic, environment" model, and (5) the linked human-ecosystem well-being model, where the first two models are partial and the other ones are complete models, considering they include humans and the environment (Hardi & Zdan, 1997: 10). Aware of the complexity of these models, in 1997 within the Bellagio project, researchers of the IISD and the Rockefeller Foundation Bellagio Center set 10 basic principles of sustainable development, so called The Bellagio Principles for Assessment. These principles served as guidance in the process of assessing sustainable development, defining indicators for measuring and monitoring sustainable development and interpretation of results, and were dedicated to governmental and non-governmental organizations, international organizations, corporations and local communities (Hardi & Zdan, 1997). Given the global concern about the problems of implementation and measurement progress of the concept of sustainable development, these principles should help in the whole process of using indicators, thus, they are considered as the first significant attempt of practical use of the concept, influencing the future period as well (Hardi & Zdan, 1997; Pintér et al., 2012).

According to Hardi & Zdan (1997) monitoring and measuring sustainable development based on indicators are crucial, because they enable the understanding of the complexity of environment and provide timely corrective actions and measures aimed to achieve development goals (UNCSD, 2001; White et al., 2006). Indicators represent certain norms and standards, therefore they are determining the direction in the decision-making process and indicating the success of development goals (Meadows, 1998; Bossel, 1999: 25; OECD, 2000; UNDESA, 2007). Accordingly, the indicators show the degree of implementation of the concept of sustainable development. In the past 30 years, various international organizations, government agencies, academic institutions and authors have developed methodological frameworks and systems of sustainable development indicators (SDIs) with purpose of measuring, monitoring and evaluating the sustainable development (EEA, 1999, 2003, 2005; European

Commission, 2001ab, 2005, 2007, 2009, 2012; Eurostat, 2012, 2013, 2014, 2015a; OECD, 2000, 2001; UNCSD, 1996, 2001; UNDESA, 2007). The global initiative for the development of SDIs is presented by the Compendium of Initiatives Indicators of Sustainable Development (CIISD), as the largest base with 669 sustainable development indicators in 2005 and 836 in 2007 (IISD, 2005ab; Mineur, 2007). These indicators systems should assure an indicator system uniquely and universally applicable and comparable at international, regional and national levels. However, a globally unique indicator system is not yet defined, because it is not simple to cover all areas of sustainability and meet the criteria of optimal indicators. As the fundamental issue of the above-mentioned, but also the use of indicators in general and the inability of monitoring and controlling the sustainable development goals, the inaccessibility of data for the calculation of indicators is found. Different degree of socio-economic development of individual countries influences the data availability and despite the intentions (for example EU and OECD) to provide relevant and comparable data on a continual basis, this has not yet been fully realized. Accordingly, the use of indicators has not fully achieved its purpose (OECD, 2000; European Commission, 2005, 2007; Eurostat, 2015b).

From the very beginning, the paradigm of sustainable development has faced certain criticisms. The main criticism of Brundtland report relates to its expressed western techno-centric development based on economic growth, opposite to environmental sustainability and human development advocated by the International Union for Conservation of Nature (IUCN, UNDP & WWF, 1991; Sharpley, 2000). Lele (1991) noted certain shortcomings of the concept in the beginning, although some of these obscurities are still standing. First of all, cause-effect relationship between poverty and environmental degradation is superficially described in theory, while in reality this relation is very complex and linked to certain historical socio-economic and political situation. Further on, the operationalisation of goals is not clearly exposed, such as the goal of achieving economic growth and eradication of poverty. The eradication of poverty certainly requires economic development, but at the same time it has to be sustainable and must not have negative impact on the environment. Initially, the concept was set generally and broadly and did not focus on specific areas and objects, nor did it set any deadlines, therefore its perfection enabled this concept to become an insignificant cliché. Finally, the concept of sustainable development requires the participation of governmental and non-governmental organizations and all other stakeholders, however, this requirement is descriptively elaborated and put on the local level, with no concrete facts about the way of participation through decision-making process, its implementation, achieved results and process evaluation (Lele, 1991).

Another paradox of the concept arises from the market liberalization and globalization as a tool of ensuring equality between developed countries and sustainable development, promoted by the World Bank and the International Monetary Fund

(Lele, 1991). However, it turned out the opposite, because the process of globalization had more negative consequences, especially in terms of equality, considering the increased difference between the underdeveloped and developed countries (MacDonald & Tariq Majeed, 2010). The paradox was also presented in the part of agricultural production which, due to population growth, has to be increased, and the concept initially stated it was necessary to use chemical fertilizers and pesticides for the purpose of increasing yields, which was certainly not in accordance with environmental conservation. Since this was the beginning of concept development, the concept required a more powerful conceptual background and a more flexible and diverse approach in setting up strategies that will enable a harmonious human development and the environment.

The Rio Conference in 1992 was very successful from a political standpoint, attracting world attention and inciting engagement of developed countries. However, in the following years certain negotiations and implementation of the goals set in Agenda 21 failed, in particular in co-operation and aid to underdeveloped countries (Drexhage & Murphy, 2010: 8). Two significant conferences were held in this period – conference Earth Summit +5 was held in New York in 1997, and the World Summit on Sustainable Development or Rio +10 in 2002 (UN, 1997; UN, 2002; Drexhage & Murphy, 2010). These conferences revised the past period from the Rio Conference in 1992. Certain positive results have been shown, but the problem of implementation of the concept of sustainable development at the international and national level has remained. At a New York conference in 1997 it was emphasized how the overall global situation was worse than it was in 1992, so the conference participants committed themselves to take additional efforts to achieve the goals set out in Agenda 21 by the year 2002, when a new audit at a conference in Johannesburg was followed (UN, 1997). Also, at the Rio +5 conference the obligation of reduction of greenhouse gases was adopted by Kyoto Protocol, with commencement in 2005 (UN, 1998).

Unfortunately, the Rio +10 conference in Johannesburg highlighted the problems of further degradation of the environment, ecosystem losses and natural disasters, deepening the gap between developed and underdeveloped countries, and the negative consequences of the globalization process as well (UN, 2002). This conference and report reaffirmed Agenda 21 Action Plan and made a new sustainable development implementation plan which included the UN Millennium Development Goals (MDGs) set in year 2000 (UN, 2010). The implementation plan was focused on reducing poverty and providing food in underdeveloped countries, the usage of sophisticated technology, health care improvements, water resource conservation and protection, rational use of energy resources and the use of renewable energy sources, and environmental protection, especially biodiversity and ecosystems. Finally, the conference has once again highlighted the multi-stakeholder approach of the implementation of sustainable development and the role of governments of the UN member states, committed to undertake the measures and actions in reducing disparities of

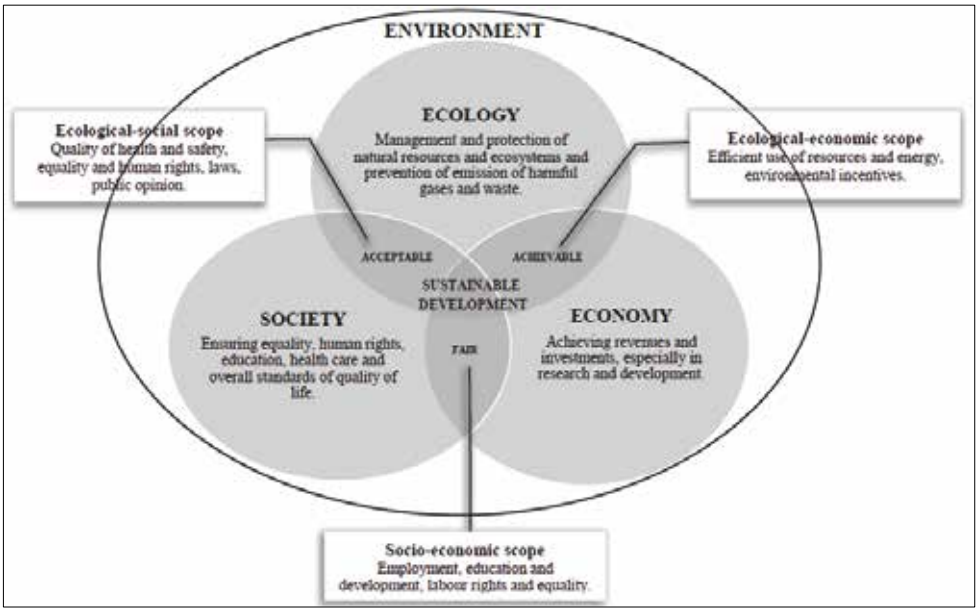
the global development (UN, 2002). The Johannesburg Conference accomplished plans of the Rio Conference; in particular it encouraged the MDGs, focusing on their practical application and the principles of sustainable development. However, the political moment was not appropriate because the global political leadership was focused on terrorism, nuclear-related policy and socio-political situation in the Middle East, so the sustainable development implementation plan had no significant success (Drexhage & Murphy, 2010: 9).

In recent history, two events were significant for sustainable development. Marking the 20th anniversary of the World Summit in Rio, in 2012 a conference *From Rio to Rio +20* was held in Rio and finished by adopting the resolution *The future we want* (UN, 2012; UNEP, 2012). Results of the past period were presented at the conference, as well as the progress and problems in the implementation of sustainable development. Past commitments of the member states were updated, but also new goals were set moving towards the Green Economy, poverty eradication and the establishment of an institutional framework for sustainable development (UNEP, 2012). Initiative for the Green Economy was launched in 2008 as a low-emission economy, rational and efficient use of resources and social inclusion, with a purpose to significantly reduce the risk of environmental damage and to improve social welfare and equity (UNEP, 2015ab). The conference followed a publication which provided statistical data and indicators of dynamic and turbulent geopolitical, socio-economic and ecological changes over the last 20 years, dominated by the development of technology and the process of globalization. While some positive improvements are visible in the use of renewable energy sources, reduced emissions and the recovery of ozone layer, once again it has been emphasized how environmental degradation has been continuing, with the loss of biodiversity, natural ecosystems, habitats and species, and further pollution of space and water (UNEP, 2012). The Rio +20 Conference was rather successful and set a path for sustainable future. This fact confirms various editions published by different organizations, such as World Trade Organization (2012), the OECD (2012), the European Sustainable Development Network (ESDN, 2012, 2013), International Institute of Sustainable Development (IISD, 2013), the United Kingdom Parliament (UK, 2013), the World Wildlife Fund of New Zealand (WWF, 2012) and many others, referring to adopted resolution with a certain criticism, but also thinking about possible implications of settled future plans and actions.

In its evolution, the concept of sustainable development has been popularized as a concept based on three dimensions or pillars of sustainability settled in balance: ecological, social and economic pillar of sustainability (Elkington, 1994; Rogers at al., 2008). Accordingly, sustainable development requires the achievement of: 1) ecological sustainability – maintaining the quality of the environment needed for economic activities and quality of life (environmental protection, reduced emissions of pollutants, rational use of resources, etc.), 2) social sustainability – preservation of society and cultural identity, respect of cultural diversity, race and religion, preserva-

tion of social values, rules and norms, protection of human rights and equality, etc.), and 3) economic sustainability – maintaining the natural, social and human capital needed to achieve income and living standard. The relationship between these pillars is set in the equilibrium sustainability framework or concept called *Triple bottom line concept* set by John Elkington (1994). It represents the inseparable interaction and correlation of the three basic pillars of sustainability, whose relationship must be in balance. An illustrative scheme is given in *Figure 1* showing the complex relationship between the pillars of sustainable development. In order to achieve complete sustainable development, all pillars have to be sustainable, i.e. they have to be in mutual balance. The balance between individual pillars of sustainable development is not easy to achieve, because in the process of achieving its goals each pillar must respect the interests of other pillars in order not to cause imbalance. This relationship is particularly complex if involving the perspective of *strong or rigorous sustainability* without possibility of substitution of natural capital with other forms of capital. The Triple bottom line concept is well known and suitably adapted in different fields of human activities.

Figure 1: Triple bottom line concept of sustainable development



Source: interpretation of author according to Elkington, 1994; OECD, 2000; Dréo, 2006; Brooks, 2013.

Contemporary challenges of the concept of sustainable development were reviewed in 2015 at the UN Conference on Sustainable Development in New York and the resolution *Transforming our world: the 2030 Agenda for Sustainable De-*

velopment with new 17 Millennium Development Goals aimed to be achieved by the year 2030 (UN, 2015c; UNDP, 2015b). Comparing the report on MDGs set in year 2000 and the new 2030 Agenda, it is evident how some of the previous goals were reformulated and reinstated in Agenda 2030, because they were partially realized (UN, 2015d; UNDP, 2015b). However, apart from these failures, new goals indicated increasing demands and challenges and the complexity of situation on Earth. Thus, beside the standing development goals previously set, the new development goals include: assurance of clean water and clean energy, development of infrastructure, industry and innovation to enable employment, assurance of economic development and inequalities between countries, sustainable cities and communities, responsible production and consumption, preservation of the ecosystem on the ground and in the waters, assurance of the world peace, etc. (UNDP, 2015b).

After thirty years from setting the concept of sustainable development in the Brundtland report, the underlying principles and aims of the concept are still questionable. The United Nations also clarifies the paradigm of the concept of sustainable development, from its original idea to today. Despite the adoption of numerous strategies and plans for sustainable development management, various regulatory and incentive policies, standards and indicators for measurement and other instruments, the current problem of its implementation still remains. The implementation of the concept depends significantly on the degree of socio-economic development, the lack of financial resources and technology, but also on the diversity of the global political and socio-economic goals and interests (Drexhage & Murphy, 2010). The research of Holden & Associates (2014) refers to the underlying pillars of sustainable development (preserving long-term ecological sustainability, meeting the basic human needs and achieving equality of current and future generations) and on a sample of 167 countries shows that most countries have failed to achieve sustainable development, and some countries are far from it. The authors point out how some of the underlying pillars of sustainable development can only be achieved on the cost of the second pillar; in other words, while single pillar of sustainable development becomes sustainable, others can become unsustainable, especially if it directly influences ecological sustainability. Here, economic growth is particularly emphasized as a fundamental pillar of sustainable development in the function of achieving human needs, which can no longer be a priority, as it has major negative consequences. In this paper partial criticism goes to the concept of sustainable development, as it became comprehensive and complex, and is no longer usable in politics. The concept has certainly found positive application at a local level, but at a global level it has not yielded significant results. On the contrary, the research shows that the gap between developed and underdeveloped countries has further deepened, so the question of equality set in the concept is very debatable (Holden et al., 2014). At the same time, standing challenges to the concept of sustainable development are more demanding and complex, confirming statement set in the Brundtland report 30 years ago how

sustainable development "proved to be one of the more difficult concerns with which we had to struggle" (WCED, 1987: XIII).

Conclusion

Sustainable development should provide a solution in terms of meeting basic human needs, integrating environmental development and protection, achieving equality, ensuring social self-determination and cultural diversity, and maintaining ecological integrity. Although the concept of sustainable development has undergone certain changes during the past, its fundamental principles and goals have contributed to a more conscious behaviour adapted to the limitations of the environment. This is the reason of adopting the concept in different areas of human activities. Numerous international organizations have been involved in implementation of the concept, while it has found positive implementation locally, but it did not produce significant results on a global scale. This fact proves environmental problems which, 30 years after the introduction of the concept, are still ongoing. Contemporary understanding of the concept of sustainable development is considered through the United Nations Millennium Development Goals focused on a complex global situation, such as population growth, hunger and poverty, wars and political instability, and further degradation of the environment. Many countries are not even close to sustainable development and the gap between developed and underdeveloped countries has deepened. Fundamental constraints of the implementation of the concept of sustainable development are the degree of socio-economic development that many countries have not yet achieved, associated with a lack of financial resources and technology, but also the diversity of political and economic goals on a global scale.

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