

ISSN 2560-421X

UDK 33+502/504

ECONOMICS

of Sustainable Development

1



Vol. IV

Niš, 2020

ECONOMICS OF SUSTAINABLE DEVELOPMENT
ЕКОНОМИКА ОДРЖИВОГ РАЗВОЈА



ДРУШТВО ЕКОНОМИСТА “ЕКОНОМИКА” НИШ
SOCIETY OF ECONOMISTS “ЕКОНОМИКА”, NIS

ECONOMICS

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Address:

“EKONOMIKA”, Society of Economists
18000 Nis, Maksima Gorkog 5/36

Phone: +381 (0)18 4245 763; 211 443

e-mail: zoki@medianis.net; ekonomika@sbb.rs

WEB: <http://www.ekonomika.org.rs>

Bank Account: 160-19452-17

Printed by:

“MEDIVEST”

18000 Niš

Copies: 200

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Milan Marković¹*University of Niš, Innovation Center***Bojan Krstić²****Tamara Rađenović³***University of Niš, Faculty of Economics*

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ORIGINAL SCIENTIFIC ARTICLE

doi: 10.5937/ESD2001001M

Received: January, 01. 2020.

Accepted: March, 03. 2020.

CIRCULAR ECONOMY AND SUSTAINABLE DEVELOPMENT⁴

Abstract

The waste increase and the environmental damage risk are important causes for the emergence of a new economic model that replaces the linear economy. The aim of the research is to point out the importance of the circular economy in a globalized society in which the sustainable development is a highly positioned goal. The importance of the issue stems from the fact that social welfare, apart from the development of production, must also be based on the preservation of health and living environment. The paper demonstrates many economic and social benefits from the implementation of the circular economy principles, as well as, the basic elements of this concept. The main objective is to reduce waste from the existing production cycle through the recycling process.

Key words: *circular economy, linear economy, sustainable development, environmental protection, waste, recycling.*

JEL classification: *Q01, Q56, Q57.*

ЦИРКУЛАРНА ЕКОНОМИЈА И ОДРЖИВИ РАЗВОЈ

Апстракт

Повећање отпада и ризика од нарушавања животне средине јесу битни узрочници настанка новог економског модела који замењује линеарну економију. Циљ истраживања јесте указивање на значај циркуларне економије у глобализованом друштву у коме одрживи развој представља високопозициониран циљ. Важност теме произилази из чињенице да се друштвено благостање, осим развоја производње, мора заснивати и на очувању здравља и животне околине. Рад показује многе економске и друштвене користи од спровођења начела циркуларне економије, као и основне елементе овог концепта. Основни циљ је смањити отпад из постојећег циклуса производње кроз процес рециклирања.

Кључне речи: *циркуларна економија, линеарна економија, одрживи развој, заштита животне средине, отпад, рециклирање.*

¹ markovicmilan89@gmail.com, ORCID ID 0000-0002-9617-6697

² bojan.krstic@eknfak.ni.ac.rs, ORCID ID 0000-0003-4597-6819

³ tamara.radjenovic@eknfak.ni.ac.rs, ORCID ID 0000-0003-1632-7772

⁴ The paper is a part of the research financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia

Introduction

The unsustainable use of natural resources, combined with the continuous waste increase, has risen concerns about the survival of the humanity, and the appropriateness of the existing model of linear economy (Stipić, 2017). Industrial development (with growing waste, especially in big cities) and climate change are the key factors that have led to the expansion of a sustainable development paradigm, and the concept of a circular economy within it. Especially, environmental factors (such as, agriculture and transport (Sagić, 2016)) support the sustainable implementation of a circular economy (Busu & Trica, 2019).

Sustainable development paradigm involves incorporation of the three dimensions: economic, environmental and social, in all community domains (Rađenović & Krstić, 2020). Namely, it involves the commitment of an enterprise to perform its operations and activities in a way to be accountable to all its stakeholders. Consequently, the concept of circular economy emerged as a combined effort of different school of thought (Hernandez, 2019). "The notion of circular economy means a model that changes the paradigm so far and enables resource management in an efficient way, based on eco-innovation, eco-design and the use of renewable energy" (Stipić, 2017, p. 723). That is why this concept enables the planned and sustainable use of resources.

The circular economy paradigm is as an extension of the sustainable development paradigm, and hence it entails many economic, social and environmental benefits (Prokić, 2019). Namely, it is based on the principles of sustainable development, and it is created to replace an unsustainable linear economy model in all prospects. The circular economy is present in all segments of economic activity, but it is especially worth noting its application in the field of agriculture and industry. The need to increase agricultural production is being highlighted by ensuring the food security for the growing population, so the concept of a circular economy must ensure that the stated objective is achieved, without disrupting the environmental objective. That is why a sustainable agricultural production strategy is essential, and will allow better resources utilization and waste reduction (Zečević et al., 2019).

Bearing all this in mind, the aim of this paper is to stress the importance of circular economy in the globalized environment, and emphasize its benefits for the society. Hence, besides the introduction, the paper is divided into 3 segments. The first section discusses the link between circular economy and sustainable development and highlights the basic similarities and differences between these concepts. The second part deals with the theoretical consideration of the evolution of the circular economy concept, as well as, the importance of innovation given the subject of the study. Finally, the concluding considerations and recommendations are given based on the theoretical research.

1. The relationship between circular economy and sustainable development

The key elements of the strategic commitment of almost all modern countries are building the innovative potential of the economy and implementing the principles of sustainable development. With the process of globalization and integration of the world economy, the need for sustainable development has been increasingly emphasized, so this goal is high on the agenda of many governments. Especially, the environmental sustainability has gained the attention. "Environmental sustainability typically refers

to issues associated with challenges ranging from climate change to biodiversity loss to pollution” (Kopnina, 2017, p. 28). In this regard, various documents are being created with the aim to put into practice some of the environmental solutions. Thus, there are many documents in the EU that enable the implementation of the “Sustainable Development Strategy” (Andrijašević et al., 2019):

Strategy for EU environmental policies integration (energy, sustainable agriculture, internal market, fisheries policy, economic policy, transport, foreign policy, coastal zone development and management, urban environment, etc.) (<https://ec.europa.eu/environment/integration/integration.htm>),

“Strategy on the sustainable use of natural resources” (<https://ec.europa.eu/environment/archives/natres/index.htm>),

Strategy for waste prevention and recycling.

Sustainable development has emerged as a need to align the goals of technological progress and economic growth and development, with the goal of preserving the quality of the living environment. It recognizes that economic growth must not be viewed in isolation in the realization of overall socioeconomic development. Namely, the uncontrolled production can lead to the enormous environmental degradation, such as to question the future development and survival of life on the planet. The goal of the sustainable development concept is to preserve and maintain the current well-being. Accordingly, sustainable development is based on the principles of maintaining the living capacity of at least the same quality for generations to come.

Unlike sustainable development, the circular economy is a relatively new concept. Although theoretical considerations were present in the last century, the practical application of concrete solutions has been increasingly discussed nowadays. Hence, the circular economy is becoming the subject matter of many experts and scholars in the fields of economics, environmental protection and biotechnology. The circular economy paradigm is based on a production model which supports the sustainable economic development without damaging the environment (Krysovaty et al., 2018a). This is the reason for underlining its greatest connection with the concept of sustainable development, since it promotes the responsible use of material and other resources.

Although the concept of sustainable development is considerably wider than the concept of circular economy, it is necessary to point out the key similarities between them (Geissdoerfer et al., 2017, p. 772):

- Intra and intergenerational commitments,
- More agency for the multiple and coexisting pathways of development,
- Global models,
- Integrating non-economic aspects into development,
- System change/design and innovation at the core,
- Multi-/interdisciplinary research field,
- Potential cost, risk, diversification, value co-creation opportunities,
- Cooperation of different stakeholders necessary,
- Regulation and incentives as core implementation tools,
- Vital role of private business in the sense of resources and capabilities,
- Innovation business model,
- Technological solutions often pose implementation problems.

Generally, these are global development models which encompass the non-economic (environmental) goals in order to achieve the overall socioeconomic development. Moreover, both models are based on innovation, and due to the multidisciplinary issues they require the involvement of various stakeholders, including policy makers.

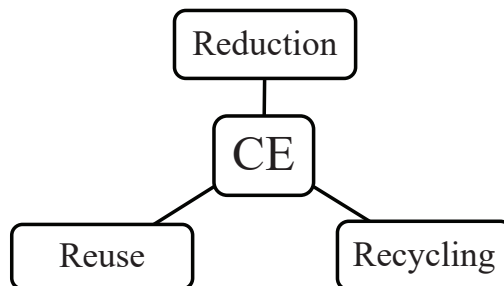
Contrarily, the basic differences between sustainability and circular economy given certain criteria (origins, goals, main occupation, system prioritisations, type of institutionalization, beneficiaries, timeframe of changes, and perceptions of responsibilities) are (Geissdoerfer et al., 2017):

- Circular economy is a newer concept,
- The concept of sustainable development has many more goals,
- As the circular economy is a narrower concept, it is mainly motivated by resource efficiency, waste reduction and harmful emissions,
- The primary objective of the circular economy is the realization of environmental benefits, which does not directly imply social benefits,
- Circular economy emphasizes economic and environmental benefits compared to linear economy, while sustainability provides a broader framework,
- Governments and companies are the dominant agents of the circular economy,
- The time dimension of sustainability is open,
- Responsibilities for the transition to a linear economy are shared between businesses, regulatory agencies and policy makers, while sustainability does not have clearly defined responsibilities of entities.

The basic principles of circular economy can be described by the abbreviation “3R” (*Reduction, Reuse and Recycling* of materials and energy)(Figure 1), and these are often cited as the three possible approaches in practice (Feng, 2004; Yuan et al, 2006).

These principles are based on the fact that waste is recycled and returned to the production process. Recycling means the re-use of resources that result from a production cycle, while reducing the use of new inputs in a re-production cycle within a circular economy.

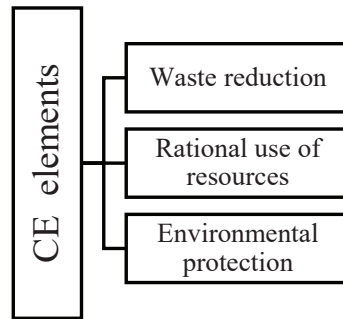
Figure 1: The principles of circular economy (CE)



Source: Authors' presentation based on Feng (2004) and Yuan et al. (2006)

The key principles of circular economy are based on the elements presented in Figure 2. The products based on these elements are intended to protect the ecosystem as well as to ensure their sustainable use through the recycling process. An alternative to waste reduction is to increase the possibility of reusing waste as input to new production, while the element of rational and efficient use of resources is primarily related to non-renewable resources.

Figure 2: Circular economy concept elements



Source: Authors' presentation.

In order to sustain the quality of living environment and prevent its further damaging, it is necessary to achieve ecological optimization of existing production processes, plants and waste streams, as well as, the future production development (Sagić, 2016). In addition, it is imperative that scientific, professional, R&D and innovation organizations offer technological solutions that are consistent with environmental efforts. Moreover, the goal is to achieve the economic growth without substantial increase of the new resources needed.

Since, almost all production processes are coupled with waste generation (Sagić, 2016), recycling is the key element of the circular economy. Hence, it is necessary to develop technological processes that will correspond to the goals of circular economy and sustainable development. The ability to recycle materials is the key to sustainability, while the other essential element is the use of cleaner technological solutions, which is significantly linked to the so-called industrial ecology. The industrial ecology points toward the beneficial effects of circular economy to the society and whole economy (Anderson, 2007). Production processes should be based on biofuels (bio diesel and bio gas) instead of oil. Additionally, the reuse of products generated in the previous production processes would allow water savings and energy preservation from non-renewable sources. Eventually, this significantly reduces the need for non-renewable and exhaustible energy sources.

The narrower interpretation of the circular economy concept is primarily related to the environmental effects. However, the recycling industry, for example, can create jobs, a plethora of innovations and an entire industry that provides even higher economic growth for the country, but also competition and profit for businesses. There are many other economic effects as well, since the implementation of circular economy goals also leads to efficient use or use of scarce resources and maximizing the value of the product/service (Radivojević, 2018, p. 35). Krysovaty et al. (2018a) point out that the circular economy must provide economic benefits in the form of jobs and increased incomes, but also health, environmental quality and a secure future. Thus, the application of the circular economy concept has many social benefits associated with the well-being and the survival of humanity.

2. Development of the circular economy concept

Linear economy, a dominant concept in the past, involves only economically efficient (rational) use of resources and often leads to the accumulation of (as a rule non-recyclable) waste. The basic principle of this concept of economics is based on a matrix: *take–use–throw*, and production proceeds only in one direction. Such use of resources and disposal of waste causes degradation of the environment, as well as an increased needs for food, material and energy. This economic model is highly inefficient and unsustainable in the long run, since consumables are limited and population is growing.

On the other hand, the basis of the circular economy concept is the most efficient utilization (i.e. minimization) of waste, so that in addition to rational use of resources, the focus is on saving input elements of production (raw materials, materials), as well as the recycling process. Circular economy is, by definition, regenerative, based on the *production–consumption–reuse* model (Busu, 2017). Basically, the circular economy model is a completely different model which put emphasis on the resource efficiency, implement new approaches to production and consumption, and highlight waste conversion into resources (Avdiushchenko & Zajac, 2019).

Between linear and circular economy is a concept based on the economy of resource reuse in the manufacturing process, without using these recycled products as raw material, which results in less waste than linear, but more waste than the application of the circular economy concept. On this basis, it is concluded that production within the circular economy must be able to take over products (which are often thought to have ended their useful lives) and put them into reuse, thereby obtaining a new purpose (Turner et al., 2019).

“A circular economy describes 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, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations” (Kirchherr et al., 2017).

At the micro level, circular economy is often viewed as part of the concept of corporate social responsibility (Berber et al., 2019). The goals of this model can be achieved “through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling” (Geissdoerfer et al., 2017, p. 763). In addition to the reuse of materials, the circular economy also involves the creation of added value through services and intelligent solutions (Krysovaty et al., 2018b).

Apart from the circular economy, innovations, closely linked to this concept, can also contribute to sustainable development. Moreover, innovations of different types are a key driving force behind the concept of circular economy. These are innovations of products, processes, while the most striking innovations are in the field of information and communication technologies. “Until decades ago, the concept of a circular economy would not be applicable due to the fact that technology could not support its ideas” (Radivojević, 2018, p. 38). Therefore, the circular economy requires greater investment in R&D.

Innovation must meet two basic socioeconomic goals:

- Improvement of the living standards of the population, and
- Addressing environmental pollution.

Innovations that promote recycling, waste reduction and material use must be the focus as part of safeguarding the principles of circular economy and sustainable development (Cainelli et al., 2020). Some of the goals of innovation related to the circular economy may be the introduction of regenerative circular systems, as well as, reducing the dependence of economic growth on increased use of non-renewable materials and environmental degradation (Brown et al., 2019).

Firms have a significant role in these processes. In order to meet the circular economy goals, firms are adapting their processes and products, and these often require new or significantly improved production methods or new or substantially redesigned products (Horbach & Rammer, 2019). Such innovations can lead to the improved competitiveness of the innovating firms. Additionally, the consumers may be willing to pay extra money for the added ecological value of the products enhanced following the circular economy principles.

Conclusion

Like the circular economy concept, the sustainable development concept is a widely studied issue among theorists and practitioners. The danger of significant environmental damage is the basic motive for the emergence of both concepts. The implementation of the principles of circular economy and sustainable development should result in the maintenance of environmental quality, as well as, in the stable economic growth, which is based on preservation of non-renewable resources.

Circular economy is a new economic model that radically changes the current paradigm of linear economy. It represents a narrower concept than the concept of sustainable development. As there exists a growing interest of the academic community and the scientific and professional public regarding this issue, the aim of the research was to look at the theoretical aspects of the concept of circular economy and sustainable development, their connection and basic determinants.

A narrower interpretation of the circular economy boils down to an increased opportunity for resource reuse. In addition to recycling and energy efficiency, this concept also enables the application of some advanced technologies and innovations. However, the sustainable (economic) development is a much broader concept, because it also has a positive impact on slowing down the negative effects of climate change. Nonetheless, the circular economy is still in its early stages of development. It focuses mainly on the recycling and not on reusing (Mas-Tur et al., 2019). For this reason, in the Sustainable Development Strategy, this concept must take a special place, and the action plan should be based on the reuse of raw materials in the next production cycles.

But then again, the prerequisite for the implementation of the circular economy model is the change in the mentality of firms and consumers. As regards firms, they need to adjust product and process design to take into account the circular economy principles, by using waste as raw materials and reducing non-reusable products. The circular economy model proposes the usage of environmentally friendly materials in the production processes of products, which will reduce the environmental damage once their useful lives are over.

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Violeta Domanović¹

Jasmina Bogičević²

University of Kragujevac, Faculty of Economics

Bojan Krstić³

University of Niš, Faculty of Economics

P. 11-23

ORIGINAL SCIENTIFIC ARTICLE

doi: 10.5937/ESD2001011D

Received: January, 27, 2020.

Accepted: March, 03, 2020.

EFFECTS OF ENTERPRISE SUSTAINABILITY ON PERFORMANCE⁴

Abstract

Contemporary business environment imposes new business rules. The maximization of profit and shareholder value cannot be the only aim of an enterprise. Instead, enterprises are forced to maximize value of all stakeholders in order to survive in the long run. The issue of sustainability has become of crucial significance, and especially measurement and reporting on sustainability, as well as, its effects on financial performances, as still dominant ones in the contemporary business performance measurement models. Hence, the subject of the research is the enterprise sustainability in the contemporary business environment. The aim of the research is to stress the role and the significance of the sustainability in the process of improving the enterprise efficiency. The research results show that the enterprise sustainability has the positive implications on the business performances in the long run, as well as on the welfare of all stakeholders. In order to be more transparent, it is desirable for enterprises to create the sustainability report, in the integration with the traditional business report, which would give the complete overview of enterprise efficiency.

Key words: *sustainability, corporate sustainability, enterprise sustainability, sustainability measurement, performance.*

JEL classification: *M21, L25, M41.*

ЕФЕКТИ ОДРЖИВОСТИ НА ПЕРФОРМАНСЕ ПРЕДУЗЕЋА

Анстракт

Савремено пословно окружење намеће нова правила пословања предузећа. Максимирање профита и максимирање вредности за акционаре не може више бити једини циљ предузећа. Уместо тога, предузећа су, у циљу одржања у дугом року, принуђена да максимирају вредност за све стејхолдере.

¹ vterzic@kg.ac.rs, ORCID ID <https://orcid.org/0000-0002-9753-6260>

² jasminab@kg.ac.rs, ORCID ID <https://orcid.org/0000-0003-4559-4394>

³ bojan.krstic@eknfak.ni.ac.rs, ORCID ID <https://orcid.org/0000-0003-4597-6819>

⁴ This paper is funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

Питање одржања предузећа постаје од круцијалног значаја, а посебно мерење и извештавање о одрживости и како се исто одражава на финансијске перформансе предузећа, као доминантних и у савременим моделима мерења перформанси предузећа. Отуда је предмет истраживања одрживост предузећа у савременом пословном окружењу. Циљ истраживања је да се истакне улога и значај одрживости у процесу унапређења ефикасности предузећа. Резултати истраживања указују да одрживост предузећа има позитивне импликације на перформансе предузећа у дугом року и благостање свих стејхолдера. У циљу боље транспарентности, пожељно је да предузећа састављају посебан извештај о одрживости, који би у интеграцији са традиционалним извештајем о пословању дао комплетну слику о ефикасности предузећа.

Кључне речи: одрживост, корпоративна одрживост, одрживост предузећа, мерење одрживости, перформансе.

Introduction

The issue of sustainability has become more and more popular both in academic and professional public, and it is an integral part of the decision-making process and shareholder value creation. As the world faces with the serious sustainability challenges, the threat of the resource degradation, the impact of the increasing population of climate changes and environment, the business community is simply forced to include the sustainability issue into its long-term aims (Nigam, Benetti & Mbarek, 2017, 571).

Non-financial performance measures are gaining more and more importance in the process of enterprise's efficiency evaluation (Stevanović, Ivanović-Đukić, Rađenović, & Radović, 2018). The maximization of the short-term profit has become a thing of the past in the modern business conditions (Ivanović-Đukić, Stevanović, & Rađenović, 2019). The stakeholder theory is becoming dominant in the contemporary business environment, which is characterized by the remarkable heterogeneity, complexity, dynamism and unpredictability. Thus, in today's business environment, the economic, social and environmental dimension of corporate excellence should be equally considered (Rađenović & Krstić, 2020, 85). In terms of global warming and environmental condition degradation, the corporations must determine the executive compensations according to the stakeholder approach. The environmental protection might require the significant investments and thus short-term profit reduction. Some of the corporate sustainability motives are better image and reputation, cost savings, improved employee motivation, enhanced competitiveness, risk reduction, etc.

However, despite the undeniable importance of sustainability, the problem with measuring and reporting on enterprise sustainability exists. The question is whether the sustainability issue can be incorporated into existing traditional enterprise performance measurement models, or whether it is necessary to design a new stand-alone one, or create an integrative model that incorporates both the elements of traditional model and enterprise sustainability dimensions. Hence, the *subject of research* is the sustainability of enterprises in the contemporary business environment; sustainability measurement

and reporting mechanisms, as well as, the relationship between enterprise sustainability and performance. The *aim of the research* is to highlight the role and importance of enterprise sustainability in the process of managing enterprise performance over the long term, as well as, to highlight the potential models of sustainability measurement and reporting, with particular reference to the impact of sustainability on enterprise performance. Starting from the defined subject and objective of the research, the basic scientific hypothesis is that enterprise sustainability leads to improved enterprise performance in the long run.

In order to test the starting hypothesis, a qualitative methodology, based on a descriptive study, comparison and interpretation of relevant results, will be applied, with the aim of synthesizing different attitudes, on the basis of which general conclusions will be drawn about the impact of sustainability on company performance. Theoretical verification is achieved by applying methods of analysis and synthesis, deduction and induction, with the aim of reaching sufficient general conclusions by abstraction and generalization.

In addition to the introduction and the conclusion, the paper contains three parts. The first part provides the conceptual basis and elaborates on the sustainability measurement issues. The second part is dedicated to the reporting on enterprise sustainability. The third part analyzes the effects of sustainability on enterprise performance. Finally, conclusions are drawn, limitations are given, and future directions of research are defined.

1. Enterprise sustainability: conceptual foundations and measurement

Corporate sustainability implies a balance between economic profit, environmental and social responsibility and the demands of all stakeholders (Jiang, Liu, Liu, Cong, Zhang, & Shi, 2018, 625). This means that business performance has multiple dimensions - economic, environmental and social. Searcy (2012) points out that corporate sustainability is a complex problem and that there is no one universal approach to sustainability. Searcy (2012, 240) points out that stakeholder theory is one of the most widely accepted theoretical models for research on corporate sustainability. Budsaratagoon & Jitmaneeroj (2019, 293) under corporate sustainability mean integrating “environmental, social, governance and economic performance, so-called quadruple bottom line sustainability”. Kang, Chiang, Huangthanapan, & Downing (2015) highlight different sustainability deficits. Most popular is that a company is sustainable when it achieves economic prosperity, the quality of its business environment and social justice. This definition can be further clarified as economic, environmental and social responsibility.

Enterprise sustainability is a broader concept than corporate sustainability, and includes: corporate sustainability, supply chain sustainability and sustainability context. Enterprise sustainability can be understood as “creating intra- and inter-organizational stakeholder-focused business systems dedicated to integrated economic, environmental and social aspects of performance in the short and long term within the boundaries imposed by society and nature” (Searcy, 2016, 121).

Corporate sustainability motives are improved image and reputation, cost savings, improved employee motivation, enhanced competitiveness and reduced risk. Yet, in many corporations, employees are simply not prepared and trained enough to commit to corporate sustainability. This is mainly due to the lack of education and training and the inability to see what sustainability and other corporate initiatives are all about, as well as, to the lack of authority. Corporate sustainability is a complex problem characterized by a plurality of goals, ambiguity, uncertainty, emergence and context dominance (Searcy 2009).

Given the importance of enterprise sustainability in today's business environment, it is understandable to elaborate on the issue of sustainability measurement. Of particular importance is how to measure sustainability and which index or composite indicator would most accurately reflect the essence of enterprise sustainability. The problem here is about defining, first, individual indicators for each dimension, and only then integrating individual indicators into one comprehensive indicator. Environmental performance indicators include: consumption of materials/energy, environmental protection, air/water pollution, solid waste, land use; Social performance indicators are: security, justice, diversity, workforce, services, education; Economic performance indicators include: profit, tax burden, research and development, internal controls, investments (Jiang, Liu, Liu, Cong, Zhang, & Shi, 2018, 628). The Sustainability Performance Measurement System (SPMS) differs from the performance measurement system in that it measures the ability of the system to adapt to change and to continue to function for an extended period of time. The SPMS is an indicator system that provides information to assist in the short and long-term management, control, planning and performance of economic, environmental and social activities undertaken by the corporation.

Today, all kinds of pollution, human and labor rights, child labor, political disruption and changing global climate are just some examples of factors that managers need to think about. El-Khalil & El-Kassar (2018) highlight six major categories for measuring sustainability: education, health, employee compensation, employee well-being, resource management, and energy management. In addition, the four main performance outputs are: productivity, efficiency, quality and well-being of employees. Pryshlakivsky & Searcy (2017) point out that sustainability measurement systems are subsystems of performance measurement systems that have taken different forms for several decades.

Searcy (2012) points out that corporations need to develop sustainability measurement models that are tailored to the situation. Corporate sustainability performance measurement systems must fit the existing organizational infrastructure and evolve over time in accordance with the internal and external requirements that are imposed. Hence, the Dow Jones Sustainability Index, 2008; Global Reporting Initiative - GRI, 2006 and international standard guidelines appeared (Social Accountability - SA 8000; ISO 14000 and 26000). Such approaches have been criticized for being merely recommendations, superficial but ineffective.

Searcy (2016) defines the enterprise sustainability performance measurement system as an integrated system of indicators and indices that provide information on the progress of goals to facilitate the management of local, regional and social impacts of the firm as well as its forward and reverse supply chains in the short and long term. Searcy (2016) points out that measuring the sustainability of a business requires consideration of

the entire value chain, including the following: supply network, focal firm, distribution network, consumers and end-of-life network.

Enterprise sustainability performance measurement systems must meet the following requirements (Searcy, 2016):

1. The system must reflect the internal structure of the enterprise;
2. The choice of partner must be connected to the system;
3. The system must measure performance in the forward supply chain;
4. The system must measure performance in the reverse supply chain;
5. The system must consider the sustainability context in which the business operates;
6. The system must comply with key stakeholder requirements;
7. The system must be dedicated to managing the sustainability of the enterprise in the short and long term.

Morioka & Carvalho (2016) investigated the measurement of sustainability in practice on the example of companies in Brazil. The authors further clarified the notion of sustainability and make a distinction. The data study highlights three main aspects of the concept of sustainability: timeframe, integrating the needs and requirements of the stakeholders, and integrating sustainability into the core of the business. The authors explore the possibilities of integrating sustainability into existing corporate performance measurement systems. The authors conclude that there are four performance measurement systems that contain sustainability indicators, namely: a periodic performance measurement system for a particular part/department; individual performance appraisal, sustainability reporting and project evaluation. The authors point out that the triple-bottom concept implies that managers should consider three pillars when deciding economically, environmentally and socially. The causal consequence of these pillars has been the topic of research by many authors.

Kang, Chiang, Huangthanapan & Downing (2015) examine the possibilities of measuring sustainability performance according to the most sophisticated modern model of measuring and managing enterprise performance - the Balanced Scorecard (BSC) model, using the example of family-owned hotels. The BSC model is the foremost instrument of strategic management and management accounting, which originally measures enterprise efficiency from four perspectives - finance, customers, internal business processes, and employee learning and development (Kaplan & Norton, 1992). The authors show that corporate sustainability performance can be evaluated according to the BSC model. Figge, Hahn, Schaltegger, & Wagner (2002) proposed to introduce another non-market perspective into the BSC model, incorporating environmental and social aspects into the enterprise strategy and called this Sustainability Balanced Scorecard.

Hansen & Schaltegger (2016, 194) analyze the sustainability balanced scorecard (SBSC). The SBSC goes one step further than the ordinary BSC by integrating strategically relevant environmental goals, social and ethical goals. Environmental strategic goals and social strategic goals can be integrated into existing BSC model perspectives or incorporated as a separate perspective. An Australian report states that in practice, BSCs often contain non-traditional perspectives, such as the environment (50%) and community (53%) (Bedford, Brown, Malmi & Sivabalan, 2008, 27). Hansen & Schaltegger (2016)

examine how it is possible to adapt the architecture of BSC models in order to integrate corporate sustainability, thus creating SBSCs. Although controversial, the BSC model is one of the most popular models for measuring and managing performance and in the context of corporate sustainability. Corporate sustainability involves systematic management efforts to voluntarily integrate environmental and social issues into general management issues. The SBSC differs from the BSC in explicitly recognizing the importance of goals and performance measures related to enterprise sustainability.

Nigam, Benetti & Mabarek (2018) examine the extent to which the correlation of manager fees with sustainability performance can lead to a viable business model. The authors conducted a survey on a sample of 16 companies from 4 continents in which executive compensation is linked to sustainability goals. Integrating sustainability into decision-making, strategy and planning allows for better management and risk avoidance. The corporate governance model has implications for incorporating sustainability into enterprise goals. In the Anglo-Saxon model, there is less correlation, indirectly between the goals and strategy of the enterprise and sustainability, while in the European model, there is a significant direct link between the strategies and the goals of enterprise sustainability (Nigam, Benetti, & Mabarek, 2018, 578). This is understandable given the fact that the Anglo-Saxon countries adopt a shareholder model of corporate governance, while in the countries of Europe, Brazil, South Africa and Japan there is a stakeholder model of corporate governance. Krstić & Sekulić (2018, 123) point out that "stakeholder theory tries to balance the goals of all stakeholders for the business of the enterprise and their optimal structure in the set of corporate goals". The shareholder model implies that managers should strive to maximize shareholder value, while the stakeholder model implies that managers should strive to maximize value for all enterprise stakeholders.

2. Enterprise Sustainability Reporting

In its International Corporate Responsibility Reporting Survey 2011, KPMG points out a significant increase in sustainability reporting, "95 percent of the 250 largest companies in the world in 2011 from 80 percent in 2008 ... 80 percent of these businesses report on sustainability according to GRI guidelines" (GRI Annual Report 2011/12, 3). The GRI publishes guidelines globally to maximize transparency in the sustainable development reporting system. The GRI standards are based on three pillars: strategy, corporate governance and company profile reporting; managerial approach to sustainable development issues; performance measures in the field of sustainable development (GRI, 2011; Knežević, Pavlović, & Stevanović, 2017, 88). The Global Reporting Initiative (2015) states that a business sustainability report should include the positive and negative aspects of a firm's performance by items classified in three dimensions - economic, environmental and social. The economic dimension is measured by nine items classified into three sub-dimensions: direct economic performance, market presence and indirect impact on society. The environmental dimension has three sub-dimensions: inputs (material, energy and water), outputs (emissions, wastewater and waste) and compliance (environmental compliance, etc., environmental expenditures and impacts of products and services). The social dimension is divided into: work practices and decent work, human rights, society and product responsibility.

In the European milieu, the problem of reporting on sustainable development has been addressed by the adoption of a new Directive of amendment 2014/95/EU. This Directive obliges all companies in the EU with more than 500 employees to produce a report on sustainable development (Knežević, Pavlović, Stevanović, 2017, 85; 2014/95/EU). The non-financial report of the companies would also include the environmental, social and human resources effects of business activities, then the effects of business activities on respect for human rights, the fight against corruption and bribery issues (Knežević, Pavlović, & Stevanović, 2017, 89). The European Commission published non-mandatory guidance in 2017 to increase the consistency and comparability of non-financial reporting (<http://bit.ly/2FHJuQU>). Key principles in the guidelines include the materiality of information; fair, balanced and understandable characteristics of information; the comprehensive but concise nature of the publication. The European Commission recently published “Guidelines on Reporting Climate-Related Information,” available in a 44-page guidebook (<http://bit.ly/2Xi8U2w>) and a two-page summary (<http://bit.ly/2KQ5TQk>).

Knežević, Pavlović, & Stevanović (2017, 85-86) point out that “The Republic of Serbia has the task, in accordance with its strategic commitment to accession to the European Union, to harmonize the Companies Act and the Accounting Law with the newly added Directive and to oblige companies with more than five hundred employees to disclose the non-financial information required by the Directive in the (consolidated) business report or in the form of a separate report”. The results of the research conducted by the aforementioned authors show that companies listed on the Belgrade Stock Exchange generally report on sustainable development, paying more attention to the form rather than the content and usefulness of information within the business reports. Conversely, on a global scale, the need for sustainability reporting is superfluous, it is only a question of how to improve the same in terms of comparability, materiality of information and external verification of them (Knežević, Pavlović, & Stevanović, 2017, 98).

Integrated reporting is important because it enables the true value of the enterprise to be determined now and in the future. Such reporting involves the publication of financial and business sustainability information and the like. Sustainability reporting provides information for a number of stakeholders, mainly taking into account environmental and social factors. Integrated reporting, therefore, is “much more than a transition from purely periodic annual or semi-annual static one-way reporting to reporting as a continuous activity that ensures the integration of financial and non-financial business information and dialogue with all stakeholders” (Prošić, 2015, 66). Prošić (2015, 82) also points out that in the Republic of Serbia, “reporting on non-financial indicators, economic, social and environmental impacts in Serbia are peculiar to those companies that use the Global Reporting Initiative (GRI)”.

3. The impact of sustainability on enterprise performance

The effects of sustainability on business performance have been the subject of research by numerous authors (Epstein & Roy, 2001; Maron, 2006; Wu, 2006; Li, Choi, & Chow, 2015; Morioka & Carvalho, 2016; Hussain, Rigoni & Cavezzali, 2018; Ahmad & Wong, 2018; Nizamuddin, 2018; Jung, Nam, Jang & Kim, 2018; El-Khalil & El-Kassar, 2018; Budsaratagoon & Jitmaneeroj, 2019).

Epstein & Roy (2001) point out that a formal sustainability program can lead to cost reductions through better material management, lower energy consumption, waste reduction and the like. Maron (2006) and Wu (2006) find the positive impact of enterprise sustainability and business performance programs. Of course, such conclusions are valid for normal economic circumstances. The question is: What is the relationship between sustainability and business performance in volatile market opportunities? In these circumstances, sustainability and business performance programs may be negatively correlated (Li, Choi, & Chow, 2015). Morioka & Carvalho (2016) show that there is not always a positive correlation between environmental and social and economic performance. On the contrary, corporate sustainability can have a negative impact on economic performance. It is important to emphasize that this is valid in the short term, while in the long run, corporate sustainability leads to improved economic performance - profitability and market value of the company.

Hussain, Rigoni & Cavezzali (2018) point out that the uneven application of sustainability performance measures is one of the main causes for the ambiguity of research findings on whether it pays to be sustainable. The existing literature has so far neglected the multifaceted nature of sustainability measurement. In general, it can be said that there is confusion over what the measurement of sustainability performance and financial performance of the company is. To avoid this confusion, the aforementioned authors conducted an in-depth analysis of the relationship between sustainability disclosure, sustainability performance and financial performance. The measurement is based on the Global Reporting Initiative - GRI model. The empirical results point to several things: first, sustainability disclosure shows no significant relationship with any financial performance measure, while sustainability performance measures show a significant correlation with financial performance. The authors also conclude that not all dimensions of sustainability performance are equally related to financial performance. In addition, some sub-dimensions are negatively related within and among indicators. Second, environmental performance and social performance remain consistently positive and significant across all financial performance benchmarks. Third, the authors conclude that implementing a stable and comprehensive measurement of sustainability performance can yield definitive results.

Ahmad & Wong (2018) analyze studies addressing sustainability in the manufacturing industry from a triple-bottom line perspective, that is, economic, environmental and social. Today, manufacturing companies need to produce products with minimal environmental impact, conserve energy and natural resources, and provide security for employees and the community while achieving good economic performance. According to the TBL concept, all three aspects of sustainability are equally relevant and should not be neglected. Based on the analysis of past studies on sustainability, the authors conclude that economic and social indicators of sustainability should be more mainstreamed, while environmental indicators are rather included in the assessment of enterprise sustainability.

Nizamuddin (2018) points out that there is no one perfect benchmark for assessing corporate sustainability performance and corporate financial performance. The literature mentions more approaches for measuring corporate sustainability performance: reputation indices, content analysis, survey method and one-dimensional measurement, as well as more approaches for measuring financial performance, namely: market

method (stock returns, changes in stock returns, the market value of the company), the accounting method (ROA, ROE, ROS, net profit, net operating profit) and the accounting and market method (Tobin’s Q and market value added). Table 1 shows the advantages and disadvantages of different methods.

Table 1. Comparative analysis of approaches for measuring enterprise sustainability and financial performance

<i>An approach for measuring sustainability</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Reputation indices</i>	<ul style="list-style-type: none"> • Data availability • Performance comparability • Multidimensionality 	<ul style="list-style-type: none"> • Non-scientific approach • Defined by private agencies • Limited coverage • Differences in geographical location, size of business, branches and the like
<i>Content analysis</i>	<ul style="list-style-type: none"> • Flexibility of choice • Arbitrarily selected dimensions 	<ul style="list-style-type: none"> • Subjectivity • Data are not published
<i>Questionnaire method</i>	<ul style="list-style-type: none"> • Flexibility of choice • Arbitrarily selected dimensions 	<ul style="list-style-type: none"> • Subjectivity • Measurement error • Inappropriate answers • Respondents may hide meaningful information
<i>One-dimensional measurement</i>	<ul style="list-style-type: none"> • Data availability <ul style="list-style-type: none"> • Comparing businesses 	<ul style="list-style-type: none"> • Theoretical invalidity • Bias
<i>Corporate financial performance measurement</i>		
<i>Accounting measures</i>	<ul style="list-style-type: none"> • Data availability • Data comparison 	<ul style="list-style-type: none"> • Historical data
<i>Market based measures</i>	<ul style="list-style-type: none"> • Actuality of data 	<ul style="list-style-type: none"> • Availability of data only from large listed companies • Coverage of systemic factors

Source: adapted from Nizamuddin, M. (2018). Corporate social responsibility and corporate financial performance: an exploratory study of measurement-approach selection issues. Retrieved January, 10, 2020, from <http://irjrr.com/irjrr/January2018/2.pdf>.

Jung, Nam, Jang & Kim (2018) conclude that corporate sustainability performance is positively correlated with financial performance, especially in the ICT industry, and especially in small, less-indebted firms.

El-Khalil & El-Kassar (2018) investigate the effects of corporate sustainability practices on performance, as exemplified by companies in the Middle East and North Africa (MENA region). Insights into the importance of sustainability vary from nation to nation. Research findings show the strong positive impact of each sustainability category on each performance category. Specifically, investing in every aspect of sustainability will increase productivity, quality and overall performance.

Budsaratragoon & Jitmaneroj (2019) find that companies in the European developed markets show the highest ranking of corporate sustainability. Environmental, social and governance performances have a positive impact on economic performance. There is a causal link and synergy between the 4 pillars of corporate sustainability. This depends on the level of market development and geographic region. Social and environmental pillars are the most critical drivers of corporate sustainability.

In general, it can be concluded that there are the traditional and revisionist theories about the effects of sustainability on firm performance differ. According to revisionists, sustainability leads to better competitiveness, better relationships with stakeholders and compliance (Sekulić & Pavlović, 2018), higher rates of return on investment and lower financing costs, greater shareholder value and better stock performance. Traditionalists, by contrast, find that sustainability adversely affects financial performance. In addition, individual authors do not see at all the significant link between sustainability and financial performance.

Conclusion

In today's business environment, the issue of enterprise sustainability is gaining in importance. According to traditional economic theory, profit maximization is the sole objective of the enterprise. Traditional and revisionist theory are distinguished. According to auditors, sustainability leads to better competitiveness, better stakeholder relationships and compliance, higher rates of return on investment and lower financing costs, greater shareholder value and better stock performance. In contrast, traditionalists find that sustainability adversely affects financial performance. In addition, individual authors do not see at all the significant link between sustainability and financial performance.

Starting from the characteristics of the modern business environment, it can be definitely concluded that the performance of an enterprise can no longer have only an economic dimension, but also the environmental and social ones. This means that managers should take into account the effects of their managerial and business activities on economic, environmental and social performances. This is inevitable for the purpose of survival, growth and development of the enterprise in the long run. Enterprise sustainability is in itself a very complex phenomenon because it depends not only on the entity (focal firm), but also on all other entities in the supply chain and characteristics of the general and business environment in which the enterprise operates.

However, despite the undoubted importance of enterprise sustainability for the enterprise itself and the well-being of the entire society, in the Republic of Serbia it is still only declarative and formal in nature. It will take a long time for the sustainability issue to penetrate the minds of managers and for them to genuinely and fundamentally commit to it. This means also when the issue of sustainability is incorporated into legal frameworks into the Companies Act and the Accounting Act. The issue of measuring and reporting sustainability is particularly important. In truth, it is difficult to find a comprehensive indicator that measures and expresses economic, environmental and social effects. In addition, sustainability reporting could take the form of a separate report or as an adjunct to the traditional business report. It is possible to integrate sustainability elements into modern performance measurement models, such as the most prominent Balanced Scorecard model.

The given research has some limitations, which is the application of a purely qualitative methodology. Therefore, future research may focus on quantitatively expressing and measuring sustainability on a specific enterprise example, as well as on a comparative analysis of sustainability effects on firm performance over a period of time.

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Milica Jovanović¹

 Aleksandar Đorđević²

Innovation Center, University of Nish

P. 25-33

SCIENTIFIC REVIEW ARTICLE

doi: 10.5937/ESD2001025J

Received: January, 27, 2020.

Accepted: March, 03, 2020.

MARKET SIZE AND FOREIGN TRADE AS DETERMINANTS OF NATIONAL COMPETITIVENESS SUSTAINABILITY³

Abstract

Market size in many ways determines the national competitiveness of an economy. If there is a large national market, it is a source of demand for manufacturing companies. There are cases where the national economy has a large market and a weak industry, e.g. Russia, while on the other hand, Switzerland, which has a small market size, compensates that with productivity and exports to other markets. Market size and foreign trade complement each other in influencing the sustainability of national competitiveness. If there is a large market and insufficient industry to meet the demand in that market, it is necessary to import the products and satisfy the needs of the domestic market. However, the small national market and the production of a large quantity of products that it cannot absorb requires export to other markets. The paper presents a comparative analysis of the competitiveness of Serbia and countries in the region, and their indices of market sizes, which include, but are not limited to, foreign market percentages and exports. Certainly, both determinants significantly affect national competitiveness and its sustainability.

Keywords: sustainability, national competitiveness, market size, foreign trade

JEL classification: O57

ВЕЛИЧИНА ТРЖИШТА И СПОЉНА ТРГОВИНА КАО ДЕТЕРМИНАНТЕ ОДРЖИВОСТИ НАЦИОНАЛНЕ КОНКУРЕНТНОСТИ

Апстракт

Величина тржишта умногоме одређује националну конкурентност једне привреде. Уколико постоји велико национално тржиште, то представља извор тражње за производна предузећа. Постоје случајеви где национална привреда има велико тржиште а слабу индустрију, нпр. Русија, док са друге стране, Швајцарска, која има мало тржиште, то надомешта продуктивношћу, производима високог степена обраде и извозом на друга тржишта. Величина тржишта и спољна трговина међусобно се допуњују у утицају на одрживост

¹ jovanovicmilicaa90@gmail.com, ORCID-ID 0000-0002-6410-0938

² djaleksandar91@gmail.com, ORCID-ID 0000-0002-9683-8582

³ The paper is funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia

националне конкурентности. Уколико постоји велико тржиште а недовољна индустрија да подмири тражњу на том тржишту, неопходно је увозити производе и задовољити потребе домаћег тржишта. Међутим, мало национално тржиште и продукција великог броја производа које оно не може да апсорбује, захтева извоз на друга тржишта. У раду је приказана упоредна анализа конкурентности Србије и земаља у окружењу, и њихови индекси величине тржишта који између осталог обухватају и проценат страног тржишта и извоз. Реч је о факторима који значајно утичу на националну конкурентност и њену одрживост.

Кључне речи: одрживост, национална конкурентност, величина тржишта, спољна трговина

Introduction

Traditionally, the size of an economy coincides with its domestic market. However, in the world of globalization, a country's market may but may not coincide with its borders. This is why market size is defined as a combination of country size and foreign markets (Schwab, 2015). Since globalization has become an inevitable reality, firms and thus many countries have oriented beyond their traditional domestic markets, focusing on high-growth export markets, in order to expand and to strengthen their positioning in the world trade arena. Trade is positively associated with growth performance (Park et al., 2010). Given that market size affects productivity, this indicator plays an important role within the global competitiveness index. First of all, market size has a significant impact on innovation in a particular country. Larger markets create greater incentives to generate new ideas and encourage the transfer of knowledge. The reason is that the same innovation will generate more profit if sold in a larger market. Also, the size of the market enables economies of scale and leads to greater specialization. Export performance has been gaining increasing attention from policy makers, business managers and marketing researchers due to the fact that foreign markets tend to be more diverse than domestic ones and, in many cases, more competitive. Particularly, in terms of policy making, a better understanding of export performance is important as it allows the accumulation of foreign exchange reserves, increased employment levels, improved productivity, and enhanced prosperity (Sousa, 2004).

1. Comparative analysis of competitiveness of Serbia and countries in the region (tenth pillar of competitiveness)

The competitiveness pillar "Market Size" is estimated on the basis of secondary data from international statistical databases. The rise or fall of the value of this pillar practically means that there has been an increase or decrease in domestic and / or foreign demand. Therefore, it is logical for this index to fall after 2008 as a consequence of a marked decrease in domestic demand (Ristic, Tanaskovic, p. 73, 2011).

Table 1: Comparative presentation of the market size index of Serbia and the countries in the region

Year	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018
No. of countries	142	144	148	144	140	138	137
Country ⁴	S*/R**	S/R	S/R	S/R	S/R	S/R	S/R
SRB	3,6/70	3,6/67	3,7/69	3,7/71	3,7/75	3,6/74	3,7/74
ALB	2,9/101	2,9/98	2,9/107	2,9/105	3,0/104	2,9/109	3,0/105
BIH	3,0/97	3,1/93	3,1/98	-/-	3,1/97	3,1/98	3,1/97
BGR	3,8/64	3,8/62	3,9/63	3,9/63	3,9/65	3,9/65	3,9/65
HRV	3,6/72	3,6/71	3,6/74	3,6/79	3,6/79	3,5/78	3,6/77
HUN	4,2/52	4,3/52	4,3/52	4,3/53	4,3/51	4,3/53	4,3/55
MKD	2,8/107	2,8/104	2,9/109	2,9/108	2,9/108	2,9/110	-/-
MNE	2,0/130	2,1/130	2,1/135	2,2/134	2,2/131	2,1/130	2,3/128
ROU	4,4/44	4,4/43	4,4/46	4,4/45	4,6/43	4,5/42	4,6/41
SVN	3,4/80	3,5/78	3,5/83	3,5/81	3,4/85	3,3/84	3,4/82

Source: WEF (2011, 2012, 2013, 2014, 2015, 2016, 2017)

*S – Score

**R – Rank

Table 1 provides an overview of our country's position in terms of market size, as a separate pillar of competitiveness, with respect to the surrounding countries, over the last seven years.

Considering the market size index, Serbia, with 74th position in the Global Competitiveness Index in 2017, was better ranked than even 5 countries in the region - Albania, BiH, Croatia, Montenegro and Slovenia, although in the observed period her position worsened. Of the observed countries, Romania has the highest rating (4.6) according to the data for the last analyzed year and this trend is present throughout the analyzed period.

2. Comparative analysis of the competitiveness of Serbia and countries in the region by factors (tenth pillar of competitiveness)

The market size index is taken from the domestic market size index (75%) and the foreign market size index (25%). The score based on the domestic market size index has been at a solid level in the last seven years for our country (Table 2), while the rating based on the foreign market size index has increased over the observed period for our country. According to the domestic market size index, Serbia ranks 74th, while according to the foreign market size index it ranks 67th in 2017.

Our country is characterized by an imbalance between production and consumption, which is covered by imports of consumer goods and energy, rather than imports of machinery

⁴ SRB-Serbia; ALB-Albania; BIH-Bosnia and Herzegovina; BGR-Bulgaria; HRV-Croatia; HUN-Hungary; MKD-North Macedonia; MNE- Montenegro; ROU-Romania; SVN-Slovenia.

and equipment. However, this discrepancy is not sustainable in the long run as expenditures on equipment and machinery are low and without investments it is impossible to increase exports.

According to the domestic market size index, Montenegro was the worst ranked country in comparison to the countries in our region, while it also held the position of worst ranked country in the seven year period, while Romania was the best ranked in the entire period (currently 39th out of 137 countries). Behind us, according to this index, are Albania, BiH, Croatia, Montenegro and Slovenia (for 2017). Also, Montenegro is ranked worst on the basis of the foreign market size index (124th position in the most recent Report).

Table 2: Market size index by factors for Serbia (2011-2017)

Year	2011/ 2012		2012/ 2013		2013/ 2014		2014/ 2015		2015/ 2016		2016/ 2017		2017/ 2018	
	S*	R**	S	R	S	R	S	R	S	R	S	R	S	R
A. DOMESTIC MARKET SIZE - 75%														
1. Domestic market size index	3,5	70	3,5	67	3,5	68	3,4	73	3,5	77	3,4	74	3,4	74
B. FOREIGN MARKET SIZE - 25 %														
2. Foreign market size index	3,9	77	4,1	74	4,3	76	4,4	74	4,4	74	4,4	72	4,5	67
GDP (PPP) PPP \$ billions	-	-	-	-	78,7	73	81,1	74	95,5	75	97,5	74	101,8	74
Exports % GDP	-	-	-	-	41,0	71	44,9	55	45,3	50	48,2	38	52,7	29

Source: WEF (2011, 2012, 2013, 2014, 2015, 2016, 2017)

Export risks are very likely without raising the level of productivity in the production of goods and services, greater product specialization, increased exports of processed products with a higher degree of finalization, but also a decrease in wheat and maize exports, given the high demand for food in the world (Bayoumi, Harmsen, Turunen, 2011). Export activity, among other things, is affected by the change in the value of the euro against other currencies, the weakening of the dinar against the euro, but also the inability to collect customer receivables for exported goods. It is necessary not only to increase exports, but also to make a qualitative change in the export structure, in order to ultimately reduce the trade deficit.

R&D activities are assigned to determine long-term resource allocations that can change the production structure, from the traditional to the production of high-tech goods and services. Private investment in scientific research requires, among other things, incentives, abundant human capital, and a moderate relationship between consumption and investment in physical and human capital (Martellato, p. 5, 2012).

With exports as a % of GDP, Serbia occupies the 29th position, which is better than 4 countries in the region - Albania, BiH, Montenegro and Romania, while Hungary is the most favorable in terms of this indicator, followed by Slovenia and Bulgaria, according to data for the last observed year (Hungary - 6th out of 137 countries).

Albania, BiH, Montenegro and Macedonia are the countries with which Serbia has a trade surplus, while the EU countries are our most important foreign trade partners. However, in terms of geographical proximity, the volume of exports to the EU market is not nearly as large as it could be. One reason is that in 1998, these countries ranked Serbia as one of the high risk countries, which is a significant constraint on business cooperation (Stanojević, Jovancai, p. 286, 2015).

Table 3: Comparative presentation of market size index by factors for countries in the region (2011-2017)

	ALB	BIH	BGR	HRV	HUN	MKD	MNE	ROU	SVN
	S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R
A. DOMESTIC MARKET SIZE – 75%									
1. Domestic market size index									
2011	2,7/ 99	2,9/ 94	3,6/ 67	3,4/ 72	3,9/ 54	2,6/ 107	1,9/ 130	4,2/ 42	3,1/ 82
2012	2,7/ 97	2,9/ 91	3,6/ 66	3,4/ 72	3,9/ 55	2,6/ 102	1,9/ 131	4,3/ 44	3,1/ 82
2013	2,7/ 105	2,9/ 96	3,6/ 64	3,3/ 75	3,9/ 56	2,6/ 107	1,9/ 135	4,2/ 43	3,1/ 89
2014	2,7/ 103	-	3,6/ 66	3,3/ 76	3,9/ 56	2,6/ 109	1,9/ 134	4,2/ 44	3,1/ 91
2015	2,7/ 102	2,9/ 95	3,6/ 72	3,3/ 80	4,0/ 58	2,6/ 110	1,9/ 131	4,4/ 42	3,0/ 91
2016	2,6/ 106	2,8/ 97	3,5/ 71	3,2/ 80	3,9/ 58	2,5/ 113	1,8/ 131	4,3/ 42	2,9/ 93
2017	2,7/ 104	2,9/ 96	3,6/ 72	3,3/ 80	4,0/ 59	-	2,0/ 129	4,4/ 39	3,0/ 91
B. FOREIGN MARKET SIZE – 25%									
2. Foreign market size index									
2011	3,3/ 107	3,6/ 96	4,5/ 62	4,2/ 74	5,2/ 35	3,4/ 102	2,6/ 133	4,9/ 46	4,4/ 68
2012	3,3/ 109	3,6/ 94	4,6/ 59	4,1/ 72	5,2/ 34	3,5/ 98	2,7/ 132	4,9/ 48	4,4/ 66
2013	3,5/ 113	3,7/ 102	4,8/ 59	4,3/ 75	5,3/ 34	3,7/ 103	2,9/ 137	5,0/ 47	4,6/ 68
2014	3,6/ 110	-	4,8/ 60	4,3/ 75	5,3/ 33	3,7/ 102	3,0/ 133	5,1/ 43	4,6/ 68
2015	3,7/ 106	3,9/ 98	4,8/ 61	4,4/ 76	5,4/ 31	3,9/ 100	3,0/ 128	5,2/ 43	4,5/ 68
2016	3,7/ 107	3,9/ 97	4,8/ 56	4,4/ 69	5,4/ 31	3,9/ 95	3,1/ 128	5,2/ 39	4,6/ 66
2017	3,7/ 101	3,9/ 94	4,9/ 55	4,5/ 69	5,4/ 32	-	3,1/ 124	5,3/ 38	4,6/ 65
GDP (PPP) PPP \$ billions									
2011	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-

2013	26,1/ 108	31,9/ 100	103,8/ 66	78,4/ 75	195,6/ 55	21,9/ 114	7,3/ 136	273,4/ 47	58,0/ 84
2014	26,5/ 109	-	105,0/ 68	77,9/ 77	198,2/ 55	22,6/ 113	7,4/ 134	285,1/ 46	57,4/ 85
2015	31,6/ 107	38,1/ 98	128,6/ 70	88,5/ 76	246,4/ 57	27,6/ 111	9,4/ 131	392,8/ 45	61,1/ 89
2016	32,6/ 111	40,5/ 99	136,9/ 70	91,1/ 75	258,4/ 57	29,0/ 114	10,0/ 130	413,8/ 44	64,0/ 89
2017	34,2/ 107	42,2/ 97	144,6/ 70	95,1/ 75	270,3/ 58	-	10,4/ 130	441,6/ 41	66,2/ 87
Exports % GDP									
2011	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-
2013	31,8/ 92	36,2/ 82	66,4/ 28	42,2/ 67	97,3/ 10	52,6/ 45	38,3/ 79	39,8/ 74	84,7/ 17
2014	33,7/ 85	-	69,8/ 27	42,4/ 63	97,6/ 8	53,0/ 42	43,6/ 58	41,9/ 65	88,1/ 14
2015	38,3/ 72	42,7/ 58	70,4/ 22	48,0/ 46	98,4/ 8	58,4/ 30	40,7/ 63	44,8/ 52	87,8/ 14
2016	35,8/ 62	42,7/ 50	68,7/ 19	52,0/ 32	99,5/ 9	60,5/ 23	42,1/ 52	44,6/ 44	90,1/ 12
2017	37,7/ 62	42,3/ 46	65,7/ 20	54,0/ 27	99,4/ 6	-	42,6/ 45	44,5/ 43	91,0/ 13

Source: WEF (2011, 2012, 2013, 2014, 2015, 2016, 2017)

One of the indicators of Serbia's low competitiveness is its very low exports, whether in absolute terms, either in terms of population or as a ratio of exports to GDP. Based on the GDP and population figures from the 2011 WEF report (8 million inhabitants in Serbia, 4.4 million in Croatia, 2.0 million in Slovenia) and the value of exports of the analyzed countries, it is concluded that Serbia made only US \$ 1752 in export per capita, Croatia US \$ 5183, Slovenia US \$ 14983 (Maksimović, p. 106, 2012).

3. International trade impact on sustainable development

Trade impacts different aspects of sustainability in various ways, both positively and negatively. It has a rich context in the real world, so the full scope of the effects of trade must be understood when talking about it as an engine or impediment for sustainability. But trade is not the only tool we have. Sustainable development depends on thoughtful use of the whole toolbox and tailoring it to achieve all three pillars of the goals. In most international organizations, including the United Nations (UN) and the World Trade Organization (WTO), conventional wisdom is that international trade supports sustainable development. "Trade growth enhances a country's income generating capacity, which is one of the essential prerequisites for achieving sustainable development," the WTO noted in the 2016 UN High-Level Political Forum on Sustainable Development. This belief is usually based on the relationship between trade and only one or, at most, two of the three pillars of sustainability. These pillars are the economy, social interests and the environment.

International trade has a fundamental role to play as an enabler for generating inclusive economic growth and sustainable development, and in turn contribute to eradicating poverty.

Thus, trade should be integrated into the future development framework in accordance with the appropriate goals, targets and indicators as a key enabler of poverty eradication and sustainable development (Galmes, 2015).

Recognizing international trade as a means for achieving socioeconomic development is not a new phenomenon. At the establishment of the United Nations Conference on Trade and Development (UNCTAD) in 1964, the international community acknowledged that: "Economic and social progress throughout the world depends in large measure on a steady expansion in international trade. The extensive development of equitable and mutually advantageous international trade creates a good basis for the establishment of neighbourly relations between States, helps to strengthen peace and an atmosphere of mutual confidence and understanding among nations, and promotes higher living standards and more rapid economic progress in all countries of the world" (UNCTAD, 1964).

In practice, however, it remains a considerable challenge to trade policymakers to map out interlinkages between trade policy and sustainable development, let alone to ensure that trade policy outcome positively influence sustainable development. In this increasingly globalized world, achieving the SDGs (Sustainable development goals) as a universal agenda requires policy coherence at all (national, regional and global) levels, where trade policy and its policy and institutional interfaces with all the SDGs is one part of the jigsaw.

Let us first examine how trade may function as a means of implementation for attaining the SDGs. As a financial means, international trade can be an important source of finance to both the private sector and the public sector in developing countries. In many low-income countries, exports of goods and services account for 50 per cent or more of their gross domestic product (GDP) (UNCTAD, 2015). In 2013, for instance, the total merchandise export earning of least developed countries (LDCs) (at US\$ 213 billion) was twice as great as the combined amount of foreign direct investment (FDI) inflow (US\$ 28 billion), remittances (US\$ 31 billion) and official development assistance, (US\$ 43 billion) received by LDCs in the same year (UNCTAD, 2014). As regards the public sector, trade policy could be used to raise the public revenue. A government can raise revenues, for instance, via:

- imposing tax on imported goods and services (i.e. tariff revenues);
- imposing tax on exported goods and services (e.g. export tax); and
- claiming certain proceeds from commodity exports.

Such trade-related taxes can carry a significant weight in the public revenue of low-income countries that face limited capacity of the public revenue collection (Alouis & Gideon, 2013). The revenue raised by trade-related measures can constitute around 10–25 per cent of the total public revenue of low-income countries (Cagé & Gadenne, 2014). Using trade policy for raising public revenue however comes with the risk of causing trade distortion to the domestic market, which reduces the welfare of different segments of people in the society. Trade policy can also act as a non-financial means in the implementation of the SDGs by interacting with various factors that influence social and environmental sustainability.

Conclusion

Market size and international trade mutually affect national competitiveness and its sustainability. National economy size determines the effectiveness of companies, whether private or public and to a certain level the profitability and success of a country as a

whole. Nevertheless, there are cases when small market size countries have high ranked competitiveness scores. The main channel through which this is achieved is international trade. When national market is not enough productive countries export. On the other side of the blade there are countries with big national markets and insufficient production who need to import from the aforementioned countries.

Due to its low competitiveness, the Serbian economy is not sufficiently integrated into world trade and inadequately represented on the EU market, since primary products and reproductive material are dominant in trade with these countries, which represent our most important foreign trade partners. Also, Serbia is lagging behind other countries in the EU market in terms of product quality and competitiveness due to inadequate technology and equipment.

The uncompetitiveness of domestic products and services on the world market is evident through the degree of coverage of imports by export products that are more or less intense. Domestic products do not have competitive technological content, modern features, required quality, which leads to small exports of these products and low revenues from technology exports. This shows that Serbia is technologically straggling the developed countries and that it is largely dependent on foreign countries, with a negative balance of payments for technology (Mitrović, p. 16, 2008). In order to overcome the weaknesses of domestic foreign trade, small exports and few export partners⁵, it is crucial to find new markets through new trade routes or to identify existing export markets that have additional free space for domestic products.

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⁵ First of all, they are Germany, Italy and BiH, while the EU accounts for more than half of Serbia's total imports and exports.

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Dragica Stojanović¹
 Megatrend University,
 Faculty of Management Zaječar

P. 35-44
 SCIENTIFIC REVIEW ARTICLE
 doi: 10.5937/ESD2001035S
 Received: February, 13, 2020.
 Accepted: March, 17, 2020.

SUSTAINABLE ECONOMIC DEVELOPMENT THROUGH GREEN INNOVATIVE BANKING AND FINANCING

Abstract

The essence of the paper is a new concept of finance, which is synchronized with the environmental processes of the planet development – green finance. Green finance is positioned between the financial industry, sustainable economic development, and environmental protection. Banks can play a relevant role in promoting environmental sustainability by financing environmentally and socially responsible projects. To fulfill this role, the banking sector in certain countries has adopted the concept of Green Banking which promotes environmentally responsible financing and sustainable internal processes. The paper aims to study the role of banks in sustainable economic development through green banking activities. Building on the theoretical concept of green finance and green banking activities, it is ultimately suggested that developing green banking products are is a proactive idea that might enable eco-friendly business practices for present and future generations.

Keywords: green finance, green banking, environmental protection, sustainable economic development

JEL classification: G21, Q01

ОДРЖИВИ ЕКОНОМСКИ РАЗВОЈ КРОЗ ЗЕЛЕНО ИНОВАТИВНО БАНКАРСТВО И ФИНАНСИРАЊЕ

Апстракт

Суштина рада је нови концепт финансија који је усклађен са еколошким процесима развоја планете - зелене финансије. Зелене финансије се позиционирају између финансијске индустрије, одрживог економског развоја и заштите животне средине. Банке, такође, могу имати важну улогу у промоцији одрживости животне средине финансирањем еколошки и друштвено одговорних пројеката. Да би испунио ову улогу, банкарски сектор је у појединим земљама усвојио концепт Зеленог банкарства, који подстиче еколошки одговорно финансирање и одрживе унутрашње процесе. Циљ рада је да проучи улогу банака у одрживом економском развоју кроз активности зеленог банкарства. Надовезујући се на теоријски концепт зелених финансија и активности зеленог банкарства на крају се указује да развој зелених банкарских производа је проактивна идеја која би можда омогућила еколошку пословну

¹ dragica.stojanovic@fmz.edu.rs, ORCID ID 0000-0001-5689-9818

праксу садашњим и будућим генерацијама.

Кључне речи: *зелене финансије, зелена банка, заштита животне средине, одрживи економски развој*

Introduction

In the contemporary environment, there is overwhelming scientific evidence that global warming has a significant impact on economies both regionally and globally. Also, there is increasing evidence to suggest that climate change and environmental risks also have important implications for the financial stability of countries in the world. In this context, the financial sector plays a key role in directing economic growth towards the sustainability concept. In practice, this entails radical decarbonization of economies and fundamental changes in the financial sector, according to what has been called "green financing" (Stojanović, Đorđević, 2018).

Depending on the number of participants, green financing can be expressed in different ways. On the one hand, it may be due to financial incentives or it may be the wish to save the planet. On the other hand, it may be a combination of these two.

Green financing and sustainability of financing are broad terms that cover different financial products, and thus the banking sector has a mediating role between economic development and environmental protection. For the promotion of environmentally sustainable and socially responsible investments, banking of this kind can be called green banking. When looking at the banking sector operations, green banking offers a new approach that can be summarized and presented as a reorientation from the profit as the primary goal of banking activities to a new group of goals, which can be found uniting profit, environment, and people (Setijawan, 2011).

Since the introduction of the concept of "green" in finance is a relatively new field, the paper first defines the concept of green finance. The idea of green finance and green banking is based on the fact that it is necessary to embed "green" in the business strategies of the financial sector; the paper continues to point to the need for "greening" financial institutions. Starting from the fact that the "green" concept in banking primarily refers to the environmental aspect, a special emphasis is given to the concept, goals, and activities of green banking as well as to the most important green banking products. Based on the review of the existing literature, the paper concludes with a statement that in the context of the greater application of green finance and development of the green banking concept, there is a lack of consumer awareness and education.

1. Green Finance Concept

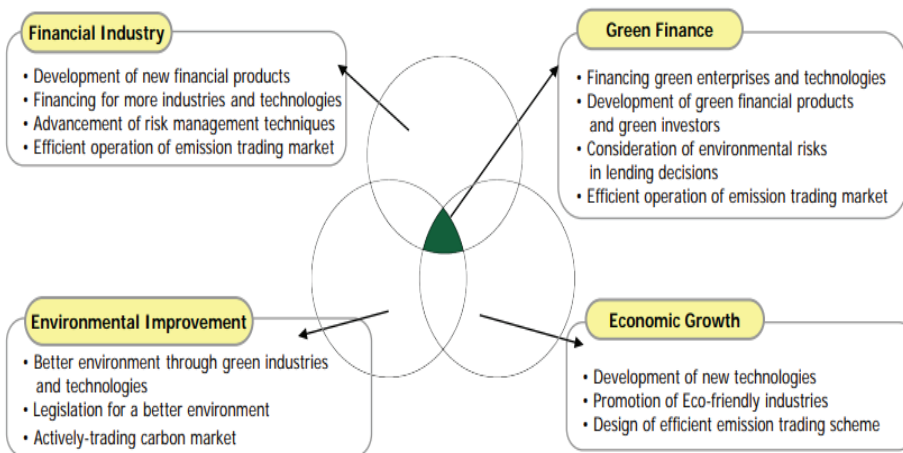
In recent years, on the global level, there is wide public recognition that the global financial system should actively contribute to the system of sustainable development. In line with the volume and urgency of the needs of financing sustainable development in recent years, the concept of green finance has become more pronounced all over the world. To solve the urgent environmental problems, such as climate change, the private

sector has a key role in solving the problems, while at the same time the green financial sector helps to transfer financial flows in green investments.

While the term „green finance” is increasingly used globally, it does not have a universally agreed definition (Stojanović, Ilić, 2018). In 2016, the G20 Green Finance Study Group described green finance as the “financing of investments that offer environmental benefits in the broader context of environmentally sustainable development” (G20 Green Finance Study Group, 2016). Considering that fact, the market for green finance includes market-based mechanisms, but also the financial products that can control pollution emission. Emissions trading is a market-based approach for controlling pollution, such as the number of greenhouse gases emitted to the atmosphere.

One of the first authors to deal with green finance infrastructure is Hee Jin Noh. (Figure 1). To support green economic development, green finance should include new technologies, financial products, industries and services which take into account the environment, energy efficiency, and pollutant emission reduction (Rakić, Mitić 2012).

Figure 1: Green finance



Source: Noh, 2010

The growing interest in green finance is a significant signal to the scientific community, whose task is to find, systematize and present the current situation in practice. As seen in Figure 1, green finance is a concept that combines finance and business with environmental behavior. More specifically, the intersection between the financial sector, the environment and economic development is driving financial institutions’ operations towards creating green products and services. As the awareness of people, with the help of media and various other campaigns grows, so does the need of these people to be more responsible towards the environment.

The most significant factors leading to the development of green finance are banks, institutional investors and international financial institutions, as well as central banks and financial regulators. Table 1 presents other factors that initiate and drive the

development of green finance, i.e. financial products and services.

Table 1: Drivers of demand for green financial products and services

<i>Environmental Knowledge and Media Coverage</i>	<i>Environmental Awareness and Public Opinion</i>	<i>Environmental Regulations and Legislation</i>
The age of information technology has provided a better understanding of the severity, sources and implications of various environmental changes. Also, greater media coverage, together with multinational eco campaigns, has much contributed to a better understanding of the importance of environmental protection and raised the demand for green products and services.	Raising environmental awareness of the public is a direct result of the knowledge of the environment and media coverage. It is this public awareness that, with the support of the government for environmental sustainability, it has lead to a significant increase in demand for green products and services.	Implementing government strategies, laws and other regulations that promote environmental protection programs, with particular regard to those that enable price security of green finance products and services, is one of the main drivers of demand growth.

Source: Noh, 2018

The tendency of the emergence and development of green finance is a trend that follows the development of the sustainable development concept and corporate social responsibility. Sustainable development is therefore imposed as a hypothesis of modern business operations and strategic commitment of all business participants that need joint action. In this context, the potential response to the growing demand for a socially responsible relationship with the planet Earth lies in implementing the “green” concept in financial institutions (Jones et al., 2017).

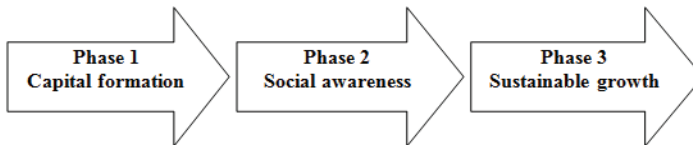
2. Greening of the financial sector

The financial sector is the result of a long-term evolution that relates to global economic growth and is based on macroeconomic choices defined by legal, technology and government rules. However, nothing is irreversible. In this changing context, the financial sector is playing a key role in directing economic growth towards sustainability values based on promoting greater responsibility towards the environment, climate change, and sustainable economic development. Thus, sustainable finance can play a key role in transforming traditional economies towards a sustainable industry with clean energy and low-carbon industry. To embrace an integrated and holistic approach to sustainable development, the tendency of “greening” the financial sector is increasingly taking hold in developed market economies as well as in the developing countries (OECD Development matters, 2019).

Green financial institutions are financial institutions whose external and internal operations – strategic goals, day-to-day activities, products and services, investment policies, and risk management have respect for the components and the environment, and the society’s interests (Tarkhanova, 2018). The following Figure 3 illustrates the path of financial institutions’ transformation (state banks, commercial banks, insurance

companies, etc.) from the initial “greedy” state of capital generation and accumulation to gaining social awareness and sustainable development. Therefore, this transformation is an essential part of the modern strategy of how to attract more customers and stimulate their economic and financial growth.

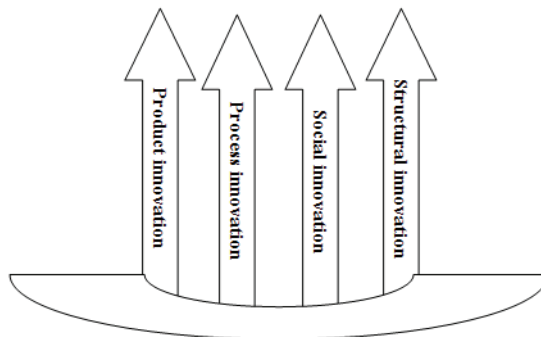
Figure 2: Transformation to sustainable green growth in financial institutions



Source: Tarkhanova, 2018

The “green” concept in finance refers primarily to the environmental protection aspect. It implies developing new financial products and services that are particularly relevant to environmental protection. Also, it implies developing new methods and techniques for enhancing traditional products and services that should merge environmental impact. Green innovation in the financial sector includes four categories (Figure 3).

Figure 3: Green innovation categories in the financial sector



Source: Author

Product innovation – in addition to the fact that products and services from financial institutions do not have a direct impact on environmental pollution, it is generally recognized that the indirect impact is on the financing of projects that must be controlled (investments in renewable energy sources).

Process innovation – involves innovative business processes and execution of services through transforming internal activities following the concept of sustainability. Social innovation – means organizing innovations in a unit in the processes of production and providing services (introduction of environmental management systems).

Structural innovation – involves establishing business relations in the international market, according to the principles of sustainable development (Tarkhanova 2018).

In recent years, there has been a widespread public recognition in the world

that the global financial system should actively contribute to sustainable development. Banking, as one of the main engines of each economic system, should naturally follow the trend. Namely, most banks and financial companies are quick in realizing that without adopting the principles of “green” sustainable development, their prestige and reputation in the society can be disrupted. Accordingly, driven by the scale and urgency of the need for sustainable development financing, the concept of green banking is increasingly expressed worldwide.

3. Green banking - Concepts, aims and activities

The concept of green banking mainly refers to the banking practices that encourage environmentally-responsible finance and environmentally sustainable internal processes. The main mission of the Green Bank is to combine its activities and ecology for the benefit of clients. Access to green banking varies from bank to bank (Rahman, Barua, 2016). By reviewing more literature, we come to several different definitions of the term green banking.

Table 1: Definitions of Green banking

Author(s)	Definition
Schultz (2010)	This means promoting environmentally friendly practices and reducing the carbon footprint from banking activities.
Goyal and Joshi (2011)	Ethical bank – environmentally responsible bank.
Azman 2012	Eco-friendly or environmentally-friendly banking to stop environmental degradation to make this planet more habitable
Bai (2011)	Banks’ environmental accountability and environmental performances in business operation
Bahl (2012)	Green banking is a kind of banking conducted in selected areas and techniques that helps to reduce internal carbon footprint and external carbon emissions.
Rahman and Barua (2016)	Green banking is a concept of shifting banks’ objectives from “profit only” to “profit with responsibility”

Source: Author elaboration based on Paluszak, 2016

As banks are one of the professional institutions that interact with a large number of people (clients), they can play a vital role in sustainable development. Sustainable green banking activities refer to the activities to enhance external and internal sustainability.

External sustainability enhancement activities include (Rudawska, Renko, 2012): offering preferential interest rates to the borrowers who intend to use solar energy; affinity cards that encourage borrowers to start eco-friendly management systems. These are credit cards from which a certain amount of money (part of the fee the bank charges) is donated to a charity each time the holder uses them; sponsorships and charity events, meeting the clients’ needs and complying with the law and ethics.

Sustainable business activities also refer to the internal activities that improve

sustainability: energy savings, reduced paper use, use of paper money, use of natural light where possible, use of natural ventilation instead of air conditioning, installation of modern thermal windows, control of tap dripping, rewards program for good performance, implementation of sick leave and/or maternity leave policies, staff training and training update, implementation of internal communication system, implementation of preventive health insurance for employees and proper employee salaries (Amin, Maran, 2015). To transform its business into a "green" business, Setijawan (2011) cites the necessary parameters:

- Integration of environmental aspects into banking risk management,
- Delegation of employees (of adequate quality and number) and jobs related to green investment and environmental protection,
- Equal treatment and consistency in law enforcement,
- Adequate regulations and controls,
- Sufficient incentives for green investment and green finance,
- Gradual implementation, and
- Coordination and cooperation between green banking interest groups and stakeholders.

Having in mind the above, green banking presupposes the environmental approach of banks in their external activities and the environmental responsibility in their internal operations. As banks are the main source of financing in the industrial sector, they must check that their financing is not being used for or is leading to any activity that causes environmental damage (Rahman, Barua, 2016). More precisely, the green bank wants to make a profit only in financing pro-environmental business ventures. The goals that such a bank should promote are poverty reduction, raising the education level of the population, promoting investments in cleaner, cheaper and safer energy, efficient use of public finances, saving natural resources, etc. Considering the products and services in green finance, the most important green banking operations are (Rakić, 2016):

Retail banking – among the first products offered in the form of green products are green credit and debit cards. They function by giving donations between 0.1% and 0.5% of the value of each purchase or transaction made by their holders. These amounts are forwarded to environmental NGO's or a special environmental fund set up by the bank itself. One of the best examples of a green card is the HSBC Visa Card. In addition to credit and debit cards, green car loans are becoming increasingly important. The fact that hybrid cars are powered by alternative drive or the combined one, and they have a much lower negative environmental impact, they have a lower interest rate than ordinary car loans. In addition to the above, retailing involves granting green mortgage loans in the situation when buying a house that is more energy-efficient than the average one, or if you want to borrow money to renovate your house into a more energy-efficient – "green" residential unit. Similar to green mortgages, but with an important difference, are green secondary mortgages that are most commonly used for real estate reconstruction and renovation (e.g. Energy efficiency loans). These loans involve taking out an extra loan on an existing mortgage for the same property and thus helping the clients to create a more energy-efficient house or apartment.

Corporate and investment banking – the first deals with financing business projects of business entities, while investment banking deals with the emission and sale of securities of the bank's clients in the domestic and international markets. In addition

to these activities, financial institutions are also involved in the management of capital, leasing and insurance services. Also, banks engage in providing services in corporate mergers and acquisitions, as well as in the process of securitization of credits and other forms of assets. The most important corporate and investment banking products and services are (Rakić, Mitić 2012):

- *Financing green projects* – relates to the loans to corporate and investment banking clients to finance large infrastructure projects;
- *Securitization of green loans and creating green bonds* – as a risk diversification mechanism, it applies to green loans for infrastructure projects where the bank appears as a guarantor of the securities emission. This allows clients to transfer some of the risks to the bank. This procedure is commonly called the eco-securitization scheme. There are many examples of securitization in the environmental field, with green bonds being the most adequate. Green bonds support the financing of projects that have a positive environmental impact. This signifies the obligation for the funds to be solely used to finance or refinance “green projects”, funds or business activities;
- *Financial weather derivatives* – created to protect against adverse weather. The use of weather derivatives aims at reducing generated revenue volatility, covering excess costs, cost reimbursement, opportunity to stimulate sales and diversify investment portfolios (Djordjević, Djordjević, 2014).

The fact that banks are one of the institutions that interact with the masses of people can stimulate the greening process with some internal and external driving forces. The internal driving forces come from the employees, shareholders and directors motivated to create green products and services, develop environmentally-friendly policies and thus contribute to sustainability. The external forces come from competitors and clients with the consciousness that only green loans can contribute to the sustainable growth development (Goel et al., 2017). In general, green banking refers to the efforts of the banking sector to keep the environment green and to minimize greenhouse gas effects through operational activities and green finance. Accordingly, the two main approaches to green banking are the green transformation of internal operations and environmentally responsible finance (Rajesh & Dileep, 2014).

Conclusion

The growing awareness that the global financial system should contribute to sustainable development is leading to developing a “green” concept in finance and banking. Green finance is a concept that combines finance and business with environmental behavior. The intersection between the financial sector, the environment, and economic development is driving the operations of financial institutions towards creating green products and services. The banking sector is a major economic agent influencing economic growth and development in terms of quality and quantity, changing the nature of economic growth, and therefore, green banking is a good way to meet sustainable growth and development. The main mission of the green bank is to combine business and ecology for the benefit of clients. Also, the concept of green banking is

mutually beneficial for banks, industry and the economy and the review of existing literature reveals that what lacks in the context of greater implementation is the level of consumer awareness and education. The fact that in an era of globalization aspects of business activities focus not only on profits, but also on people and the environment, most banks have realized that without adopting the principle of sustainable "green" development, their reputation and image in the society can be damaged. Therefore, this transformation of banks around the world is becoming an essential part of the modern strategy of how to attract more customers and stimulate their sustainable economic and financial growth. The theoretical presentation of the concepts of green finance, green banking, and green banking products in the paper is the attempt by the author to open new horizons for developing such a financial system in Serbia.

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Andrija Popović¹

The University of Niš, Innovation Center

P. 45-60

SCIENTIFIC REVIEW ARTICLE

doi: 10.5937/ESD2001045P

Received: October, 15. 2019.

Accepted: February, 14. 2020.

IMPLICATIONS OF THE FOURTH INDUSTRIAL REVOLUTION ON SUSTAINABLE DEVELOPMENT²

Abstract

We are at the cusp of the Fourth Industrial Revolution, and its implications on the society are far-reaching. The purpose of this paper is to give a comprehensive overview of the implications that Industry 4.0 has on the Sustainable Development Goals from the UN Agenda 2030, based on the review and the analysis of the available literature. The paper is structured to give an insight into the basic concepts of Industry 4.0 and Sustainable Development, then moves through the implications of new technologies on the Sustainable Development Goals, and finally, points out the areas that need to be addressed by policymakers. This paper just tapped into the potentials and issues that the Fourth Industrial Revolution brings while leaving the room for in-depth research of any of the analyzed areas.

Keywords: Industry 4.0, The Fourth Industrial Revolution, Technological Innovations, Sustainability, Sustainable Development

JEL classification: O14, O33

ИМПЛИКАЦИЈЕ ЧЕТВРТЕ ИНДУСТРИЈСКЕ РЕВОЛУЦИЈЕ НА ОДРЖИВИ РАЗВОЈ

Апстракт

Налазимо се на рубу Четврте индустријске револуције, а њене последице на људско друштво су далекосежни. Сврха овог рада је да, на основу прегледа и анализе доступне литературе, да свеобухватни преглед импликација које Индустрија 4.0 има на циљеве одрживог развоја представљене УН Агендом 2030. Раd је структуриран тако да прво даје увид у основне концепте Индустрије 4.0 и одрживог развоја, затим наставља кроз импликације нових технологија на циљеве одрживог развоја и на крају истиче области којима се креатори политике требају позабавити. Овај рад је назрео потенцијале и проблеме које доноси Четврта индустријска револуција, док притом оставља простор за детаљно истраживање било које анализирани области.

Кључне речи: Индустрија 4.0, Четврта индустријска револуција, технолошке иновације, одрживост, одрживи развој

¹ andrija.m.popovic@gmail.com, ORCID ID 0000-0003-4558-8226

² The paper is funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia

Introduction

Ever since the agricultural revolution ten thousand years ago, new technologies have changed the way of living at increasing speed. Scientific discussions about current technological changes incurred by the Industry 4.0 and the consequences of their use on the economy, social dynamics, and the environment are ongoing. "The "Industry 4.0" concept was first published in an article by the German government in November 2011, as a high-tech strategy for 2020" (Zhou et al. 2015, p.1). While there are opinions that so-called Industry 4.0 cannot be regarded as an industrial revolution, there is a rising number of technological experts and economists who point out that character of the changes and impact of the new technology imply that we are at the cusp of the Fourth Industrial Revolution (Schwab, 2016). Every technological revolution had widespread effects on all aspects of human existence. Economic, social, political changes are usually noticeable, but the changes in the environment and the impact on future generations are the most overlooked ones in the early phases of technological transformation.

The world's interest in the environmental changes caused by the continually increasing growth started to swell at the start of the 1970s and resulted in the first United Nations Conference on Sustainable Development in Stockholm (Jovanović et al. 2011 p.39–45). Since then, all significant stakeholders have paid much attention to the impact of economic growth and technological innovations to the social and ecological elements. Considering that the effects of the second industrial revolution on the environment were registered more than half a century after the revolution, the question of the implications of the Fourth Industrial Revolution on the environment, society, and future generations is completely legitimate.

Current work regarding the impact of Industry 4.0 on sustainable development is scarce. However, some papers tackle this broad subject at different points. Klaus Schwab (2016) gave a comprehensive overview of the Industry 4.0 impacts on economic growth, responsible resource use, and labor market, basing it on active or concluded projects under the umbrella of the World Economic Forum. Stock and Selinger (2016) analyzed opportunities for sustainable production at a macro and micro perspective. At the macro level, they indicated positive implications of new business models and closed-loop product life cycles on the reduction of negative impacts on the environment and society, while micro perspective gave an insight into the potential of Industry 4.0 for the labor market and customer well-being. Lopez de Sousa Jabbour (2018) gave an example of benefits that can be drawn from the Industry 4.0 concept implementation in sustainable manufacturing. The contributions of Carvalho and his colleagues (2018) contributions are the most notable in the field of entrepreneurship. Through the introduction of the Industry 4.0 concept in the field of sustainable entrepreneurship. Maresova (2018) gave an overview of the papers which address possible implications of Industry 4.0 on business and economics, which included papers addressing the topics significant for sustainable development. Beier (2017) surveyed companies in China and Germany on the sustainability aspects of a digitalized economy. The complexity of this topic allowed other researchers to tackle individual elements such as sustainable value creation within the whole value chain (Kiel, 2017), early assessment of the impact on corporate social sustainability (McWilliams et al. 2014) and the new approaches in the macroeconomic management and policy creation in the light of technological changes (Đuričin et al. 2018). Despite multiple approaches to addressing the topic, there is currently a unanimous view that long-term impacts of Industry 4.0 on sustainable development are still unclear.

The ambition of this paper is to give a comprehensive insight into the potential impacts of the Fourth Industrial Revolution on the UN Agenda 2030 Sustainable Development Goals (UN, 2015). On the foundation of the Industry 4.0 technological drivers, we will build an overview of potential connections with sustainability goals and expected results of their implementation. Due to the volatility and everchanging nature of new technologies, this paper does not presume to give a definitive overview of impacts but only provides a starting point to new and more pervasive research.

1. Fundamental Concepts

Understanding of fundamental concepts that define complex subjects of the Fourth Industrial Revolution and sustainable development is essential in the analysis of the interaction of the tremendous technological advancement and the new goals of sustainable development established by the UN Agenda 2030.

1.1. Industry 4.0

The dominant understanding is that Industry 4.0 represents a new and powerful industrial wave with an orientation toward digital and virtual technologies and customer service (Lopez de Sousa Jabbour et al., 2018). The actual concept of Industry 4.0 originated in Germany, and that is not surprising if we take into consideration that Germany has one of the most competitive manufacturing industries in the world (Rojko, 2017). However, the impact of Industry 4.0 will far exceed the German and international industrial development and become the driving force which will change traditional industrial production and steer future manufacturing (Zhou et al. 2015).

Table 1: Technological Drivers of Industry 4.0 and Potential Areas of Application

<i>Technology driver</i>	<i>Fields</i>	<i>Potential Areas of Application</i>
Physical	Autonomous Vehicles	Logistics, Agriculture
	3D Printing	Automotive, Aerospace, Medical
	Advanced Robotics	Industry in General, Services
	New Materials	Industry in General
Digital	Internet of Things (IoT)	Industry in General (Smart Factory), Services, Security
	Artificial Intelligence (AI) and Machine Learning	Finance, Security, Services
	Big Data and Cloud Computing	Business in General
	Digital Platforms	Sales, Sharing Economy, Gig Economy
Biological	Genetic Engineering	Agriculture, Medicine
	Neurotechnology	Medicine, Marketing, Military

Source: Schwab, K. (2016). *The Fourth Industrial Revolution*. Switzerland. World Economic Forum, and Li, G. Hou, Y. Wu, A. (2017). *Fourth Industrial Revolution: technological drivers, impacts, and coping methods*. *Chinese Geographical Science*, 27(4): 626–637.

According to Anderl (2018), the backbone of the Fourth Industrial Revolution is Cyber-Physical Systems (CPS), which are the main generator of significant innovation push. Acatech in 2013 gave one of the definitions for Industry 4.0. In their publication, they perceive it as "the technical integration of CPS into manufacturing and logistics and the use of the Internet of Things and Services in industrial processes. This will have implications for value creation, business models, downstream services, and work organization" (Kagermann et al. 2013, p.14). Cyber-Physical Systems do not represent a closed circle of the technologies which define the fourth revolution. Many organizations have tried to list all the technologies that will drive the changes. Based on the available literature, we can differentiate physical, digital, and biological technology drivers (Schwab, 2016; Li et al. 2017).

Physical technology drivers might be the most comprehensible for the broader audience because of their tangible manifestation.

- Autonomous Vehicles (AV), in addition to cars, include trucks, aircraft, boats, and drones. Sensors and Artificial Intelligence speed up the progress of the implementation of this technology. "AVs have the potential to fundamentally alter transportation systems by averting deadly crashes, providing critical mobility to the elderly and disabled, increasing road capacity, saving fuel, and lowering emissions" (Fagnant et al. 2015, p.1). However, production costs at this point are limiting commercial use.
- 3D Printing is the technology which uses layer-based printing to transform loose-based charge to three-dimensional object from the digital template "Applications of 3D printing are emerging almost daily, and, as this technology continues to penetrate more widely and deeply across industrial, maker, and consumer sectors, this is only set to increase" (3D Printing Industry, 2019).
- Advanced Robotics is the field that combines multiple technologies from the Industry 4.0 complex. Robots were becoming more adaptive and flexible, connected to the cloud, and augmented with Artificial Intelligence. This will make human-robot interaction possible in many different areas, including house chores (Schwab, 2016).
- New materials are changing multiple aspects of human life. New materials are lighter, stronger, recyclable, and adaptive. Materials such as graphene and polyhexahydrotriazines (PHTs) will completely change multiple industries as soon as they become cost-efficient.

All new technological advancements are made possible or enhanced through the use of digital technology. Digital technology is the foundation of the Fourth Industrial Revolution, and connective tissue for Physical and Biological drivers.

- The Internet of Things is the technology that makes objects in our environment recognizable and, at the same makes it available for them to obtain intelligence, communicate information about themselves and access the information stored in the "cloud" (Bhuvanewari, 2014). The Internet of Things European Research Cluster (IERC) definition states that IoT is "a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual

personalities and use intelligent interfaces, and are seamlessly integrated into the information network” (Vermesan et al. 2012, p.10).

- “Artificial intelligence (AI) is concerned with the use of computers in tasks that are normally considered to require knowledge, perception, reasoning, learning, understanding, and similar cognitive abilities” (Saloky et al. 2019, p.135). AI is supposed to simulate the process of thinking and behaving, which are the inherent characteristics of human beings. Machine learning is a niche within the AI field, which has made an active contribution to the development of self-learning, self-improving systems. Through an algorithm, machine learning enables iterative learning to the computer, which can make a more reliable and repeatable decision when exposed to the new data (Li et al. 2017).
- The third aspect of digital technology is Big Data and Cloud Computing. Information age brought a vast amount of available data, and with further implementation of sensors, improvement in storage technology, and development of machine learning, that amount is only increasing. Processing power and storage capacity were limiting factors for further development and efficient use of available data, but with Cloud Computing, these two problems are overcome. Cloud Computing is making available other capabilities such as leasing of infrastructure, platform, or software, through the subscription-oriented services in a pay-as-you-go model (Buyya et al. 2011).
- Digital Platforms are a technological adaptation of an old concept. De Reuver and his colleagues (2017) categorized platforms into three main groups: internal platforms, supply chain platforms, and industry platforms. The key feature of all platforms is that they mediate between at least two groups of users. Digital platforms are online businesses that facilitate commercial interactions between them (ITIF, 2018). They have enabled sharing and gig economy and, through them, more efficient use of resources.

Advances in biotechnology make up some of the most significant advances that drive the Fourth Industrial Revolution. The cornerstone of biotechnological research is genetics and neurotechnology.

- The importance of the genetic study was recognized ever since its foundation, and since then, it became a vital part of biological research (Li et al. 2017). With advancements in the processing power of computers, costs of genome sequencing have dropped from approximately 100 million USD in 2001 to 1000 USD in 2019 (Wetterstrand, 2019). At the same time, ease and efficiency of genome sequencing, activation, and editing have been recorded. Possibilities in computer-determined therapy in medicine and sequencing in agriculture are just some of the possibilities of Genetic Engineering.
- Neurotechnology is a both fascinating and ethically challenging field because one of its primary goals is connecting the human brain to the machine. “Neurotechnology is defined as the assembly of methods and instruments that enable a direct connection of technical components with the nervous system” (Müller et al. 2017, p.1). Monitoring of the changes that happen in the brain as the reaction to the outside world is the crucial advantage that can be used

in many different areas of human society. However, there is an ethical factor that should lead the use and further research.

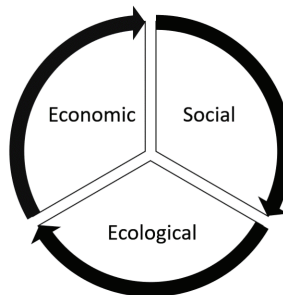
All previously discussed technologies are changing the whole pallet of instruments that we can use in different fields. However, when they are used together, these technologies are setting up the foundation for currently unimaginable future technologies and advancements.

1.2. Sustainable Development

The concept of Sustainable Development is the second important point that needs to be addressed before moving forward. There are different levels of sustainability analysis, moving from the standpoint of microeconomic subjects (Drakulevski et al. 2015) to the macroeconomic dynamics related to sustainability. The modern concept of Sustainable Development has three key dimensions: economic, ecological, and social.

IUCN³, UNEP⁴, and WWF⁵ representatives agree that the term Sustainable Development should mean the improvement of the quality of life while taking into consideration the ecosystem's regenerating capacity which is the maximal continuous load on the environment and the carrying capacity which is the highest number of population that can survive while the ecological balance is undisturbed (Ciegis et al. 2009).

Figure 1: Dimensions of Sustainable Development



Source: Jovanović, S. Radukić, S. Petrović-Randelović, M. (2011). *Teorijski i institucionalni okvir održivog razvoja*. Niš, Srbija, Ekonomski fakultet Univerziteta u Nišu

The first discussions about objective the limitations of growth can be found in the work of Thomas Malthus, where he challenged the ability of the earth resources to sustain the growth of population at the same rate over a long period. After him, the number of authors engaged in the analysis of the different aspects of sustainable resource utilization. However, the conceptualization of the contemporary model of development is strongly associated with the book *Limits to Growth* (1972) published by the Club of Rome. The point of the book was that exponential growth could not continue indefinitely

³ International Union for Conservation of Nature

⁴ United Nation Environment Programme

⁵ World Wildlife Fund

(Mitcham, 1995). The same year the book was published, the first UN Conference on Human Environment (Stockholm Conference) was held, and for the first time, the problems of Sustainable Development were addressed on the international and strategic level. However, the first time the trifecta of Sustainable Development Goals appeared five years later in the *Our Common Future* report by the World Commission on Environment and Development (Brundtland Commission).

Following these first steps, the number of conferences was held, and agreements and declarations signed, leading to the formulation of Sustainable Development goals as we know them today.

The first group of eight Sustainable Development Goals was published following the Millennium Summit of the United Nations (2000) and is known as the Millennium Development Goals by 2015. These goals were the foundation for the Development Agenda 2030, which was adopted on 25th September 2015, under the name *Transforming our world: the 2030 Agenda for Sustainable Development*. This new agenda contains 17 goals (SDGs) and 169 targets with 1 to 3 indicators, which are used to measure progress toward each target. These goals we will use for further analysis, and they are:

Goal 1. No Poverty

- Under Goal 1, the new agenda implies the eradication of poverty in all its forms all over the world.

Goal 2. Zero Hunger

- Goal 2 has broad implications, which include ending hunger, enabling food security, improving nutrition, and promoting sustainable agriculture.

Goal 3. Good Health and Well-Being

- Ensuring healthy living and promoting overall well-being without regard to the age or place is what is meant by the formulation of Goal 3.

Goal 4. Quality Education

- The promotion of lifelong learning and providing opportunities for it, together with ensuring inclusive and equitable education for all, are the critical elements of Goal 4.

Goal 5. Gender Equality

- Due to the existing gender gap, stepping toward gender equality and the empowerment of all women and girls is the main direction of Goal 5.

Goal 6. Clean Water and Sanitation

- Making sure that water and sanitation are available to all and ensuring sustainable management of it is the core of Goal 6.

Goal 7. Affordable and Clean Energy

- In the light of climate change, resource scarcity Goal 7 places priority on providing access to modern energy, which is affordable, reliable and comes from sustainable sources.

Goal 8. Decent Work and Economic Growth

- Sustainable economic growth, employment at full capacity, and high productivity and insurance of decent working conditions for all are the key elements for Goal 8.

Goal 9. Industry, Innovation, and Infrastructure

- Establishment of resilient and supportive infrastructure, promotion of sustainable and inclusive industrialization and support system for fostering innovation is the cornerstone of the Goal 9.

Goal 10. Reduced Inequalities

- Inequality is, and it will be a big problem for the world, both on the international and national levels. Reducing inequality is one of the most important goals among the SDG.

Goal 11. Sustainable Cities and Communities

- Adapting and creating more inclusive and safer cities and settlements and improving their resilience and sustainability is the foundation of Goal 11.

Goal 12. Responsible Consumption and Production

- Enabling and establishing the system for improving sustainability in production and consumption is the basis for Goal 12.

Goal 13. Climate Action

- The urgency to deal with climate change and its impacts are rising daily. Therefore, this is the primary concern for Goal 13.

Goal 14. Life Below Water

- Oceans, seas, and marine resources were highly disregarded in terms of their preservation. Through Goal 14 UN is aiming to improve its sustainability.

Goal 15. Life on Land

- Stopping the negative impact of human actions on the terrestrial ecosystems, reversing the process of deforestation, and halting biodiversity loss are the primary elements of the Goal 15 actions.

Goal 16. Peace, Justice and Strong Institutions

- Establishment and insurance of the competent, accountable, and inclusive institutions at all levels, promotion of peace and inclusive societies, and extending the access to justice for all are the main concerns for Goal 16.

Goal 17. Partnership for the Goals

- Improving the process and means for implementation of the Sustainability Agenda and revitalization of the global partnership, and higher participation in the realization of the SDG are essential segments for Goal 17. (UN, 2015).

2. Industry 4.0 and Agenda 2030 Sustainable Development Goals

Natural resources were the key determinant of industrial development, and they still are. However, the Fourth Industrial Revolution is threatening to change the whole approach to development. Technological breakthroughs happen at an ever-increasing speed, with an impact that is hard to anticipate or comprehend (Đuričin et al. 2018).

Within this chapter, we will discuss the impact of Industry 4.0 on the Agenda 2030 Goals starting from the research regarding several aspects of the Agenda and building upon it to give broader perspective and possible impacts on the broader spectrum of Goals. However, since the impact and the outcomes of the Fourth Industrial Revolution are yet to be perceived and fully understood, we will not discuss all of them, but we will try to give an insight into the possible interaction of Industry 4.0 technologies and Sustainable Development.

Two of the most analyzed impacts in the available literature are the impact on the work environment and ecological consequences of the implementation of the Industry 4.0 concept. However, different technologies in Industry 4.0 portfolio have the potential to disrupt many of SDGs through their targets.

Poverty (SDG 1) and world hunger (SDG 2) are the main problems that modern society has to tackle. The Fourth Industrial Revolution has different impacts on these two goals. While there are no foreseeable solutions for poverty in the spectrum of Industry 4.0 technologies, world hunger can be tackled in different ways. Unmanned Aerial Vehicles (UAV) are currently used in some parts of the world for technology-assisted farming (Tripicchio et al. 2015). The further development of AI and AV will enable farmers to use resources more efficiently and to increase future outputs (Schwab, 2016; Li, 2017). Genetic Engineering is another aspect of Industry 4.0 technologies that can be used to reduce world hunger. Genetically modified crops, plants, and animals used in agriculture can increase the resilience, yield, and even include healing properties in their genome (yourgenome, 2017).

Ensuring a healthy life and well-being (SDG 3) can be significantly pushed forwards through the means of new technologies. Steadily increasing computational power and advances in Genetic Engineering and AI can lead to genetically personalized medical treatments and their increased efficiency (Schwab, 2016). Further advancements in AV technology and infrastructure can reduce traffic accidents, which, as a part of SDG 3 (Bertoncello et al. 2015). Reduced pollution from production, as another aspect of this SDG, can be reduced through smart manufacturing and closed-loop product cycle. These two new business models are enabled through the Internet of Things, new recyclable materials, Big Data, and Cloud Technology (Gabriel et al. 2016; Kiel et al. 2017; Bonilla et al. 2018).

Quality education for all (SDG 4), with a particular focus on reducing the number of illiterates and making primary education available to all, is the foundation of future Sustainable Development. In this context, the contribution of Industry 4.0 is unknown and even though better connectivity and Digital Platforms can enable better quality and availability of education in already developed regions and schools, the contribution to the regions without infrastructure for Industry 4.0, where the main hotspots for SDG 4 are, is limited at best and nonexistent at worst. However, the technologies of the Fourth Industrial Revolution will progressively impact the future of education by raising the minimum standards of education and transforming curriculum in schools, to adapt to the new labor market demands.

Achieving gender equality (SDG 5) might get a setback through the Fourth Industrial Revolution. Technology does not discriminate, and experts suggest that the "destruction effect" on the jobs will hit both male and female workers. However, while the male workers will be displaced in the first phase due to automation in manufacturing,

construction, installation, and other labor-intensive jobs, female workers will be substituted further down the line by AI in the jobs which are dominantly female, such as jobs at call centers, retail, and administration. Therefore, the rising demand for computer-science, mathematical, and engineering, which are still dominant male fields, might exacerbate the gender inequalities (WEF, 2018).

Contribution of Industry 4.0 toward better water management and availability of clean water and sanitation (SDG 6) is highlighted by the additive manufacturing (3D printing) since this process does not use water for cooling or lubrication. Therefore, there is less water used in production, and consequently, less wastewater is produced. Additionally, the decentralized organization enables the implementation of resource-efficient and flexible digitalized smart solutions in water management (Stock et al. 2018).

Internet of Things and Smart Grids can significantly contribute to energy savings (SDG 7) in the production process. Real-time monitoring of the production and energy use enables matching energy consumption with production and information-based decision-making about the cost-efficient use of renewable energy sources. In combination with Big Data analytics, the previous two technologies enable implementation of life cycle assessment, which in turn can significantly increase the use of renewable energy sources (Bonilla et al. 2018).

There is a scientific debate about the impact of the Fourth Industrial Revolution on Economic Growth (SDG 8). On the one side, some authors point out that it can have profound effects on the Global Economy (Li et al. 2017), while others indicate that there the Global Economy is slowing down. Currently, the latter has more empirical evidence since the Global Economy before the crisis of 2008 was growing by 5% a year, while today, the growth is around 3%. Defenders of the slow-down hypothesis are emphasizing the deflationary impact, which Industry 4.0 will have due to structural unemployment, caused by the destruction effect on the current jobs (Schwab, 2016).

Cohesive force of the Internet of Things and Big Data analytics has an intensive impact on Sustainable industrialization (SDG 9). Smart factories as a product of these two technologies are the foundation for reducing the CO₂ emission. At the same time, the invention of the New Materials in combination with 3D printing and new business models is leading toward the full use of the power of recycling and renewables and their integration in the circular economy.

In the available research, it is noted that Industry 4.0 hurts the reduction of inequalities in the world, between and within countries (SDG 10). While the technologies of Industry 4.0 have the potential for wide-spread positive effects, there are some significant concerns and facts that limit the optimism of the Industry 4.0 proponents. Firstly, Industry 4.0 means transformation from labor-intensive toward capital intensive production. While capital-rich countries and individuals will profit from the implementation of new technologies, unadjusted countries and individuals will be left behind, and the gap will increase. Secondly, smart factories as the primary representative of Industry 4.0 will be located within smart cities, increasing their gravitational pull, leaving rural areas empty and increasing the gap between regions. Thirdly, according to Statista, there were approximately 3.89 billion users of the internet, whereas only 1.08 billion users have a fixed broadband connection. Internet connection is a prerequisite for the implementation and dissemination of the Industry 4.0 technologies. More than 6 billion people will not be able to use all the advantages it gives.

All previously discussed technologies will enable rational use of resources, smart waste and energy management, smart resource usage, and circular economy. All these segments are a step toward Smart and Sustainable Cities (SDG 11).

Responsible Consumption and Production (SDG 12) is probably the goal that Industry 4.0 puts closest to completion. Big Data, Cloud Computing, and Digital Platforms are enabling customers to have a completely customized product. Customers will have unlimited options, and at the same time, producers will have a continually growing data pool, real-time interaction, and automatized production, which will increase the efficiency of resource consumption, reduce waste, and increase customer satisfaction.

Climate action (SDG 13), preservation of the life below water (SDG 14) and life on land (SDG 15) will all have benefits from better water and waste management, reduced amount of CO₂, increased efficiency of resource usage, and implementation of circular economy principles, which are enabled through the use of all previously discussed Industry 4.0 technologies.

Sustainable Development Goals 16 and 17 have little to no reaction to the Fourth Industrial Revolution. The only segment of these two goals that can have significant benefits from Industry 4.0 is institutions. Stronger, independent, and transparent institutions can be enabled through the efficient use of Blockchain technology, which was not mentioned as an independent segment in this paper.

It is important to note that these effects are present in the current literature and research results. Since the Fourth Industrial Revolution is only at its inception, many of them may differ from the current situation, or completely change direction down the line. Therefore, it is essential to monitor them and take actions that will propel the benefits while mitigating the harm from new technologies.

3. Policy and Legislation Implications

Industrial revolutions have changed the state of the affairs and balance of power for centuries. With every discovery, adaptations need to be made in order to gain or maintain the advantage at the regional or global level. The Fourth Industrial Revolution is not much different in this aspect. However, the speed of change and the variety of results are staggering. Governments, traditionally slow in adaptation to change, will have to pick up the pace in both developing supportive policies and creating legislative frameworks which will contain negative consequences and allow undisturbed generation of innovations.

Governments of most developed countries around the world already have or are in the process of developing their strategy for the Industry 4.0 concept implementation. Half of EU countries have already created their strategic documents that are supposed to guide the transformation. At the same time, the USA, Japan, South Korea, and China are not lagging behind Germany, where this concept originated. Other countries will have to find their place in the new reality of the hyperconnected world, or they will become losers of the Fourth Industrial Revolution.

Policies and legislation will have to address many different segments affected by the transformation of economic, social, and ecological aspects of development.

Industrial development, labor market, monetary and fiscal system, security and privacy, education, and social welfare are just some elements where changes and adaptation will be necessary.

Industrial development will be changed from the core. Many countries will have to change their approach toward industrialization due to "reshoring effect"⁶ caused by the Industry 4.0. Countries that traditionally based their competitive advantages on the cheap and skilled workforce will have to reevaluate their approach and reposition themselves in the global economy completely.

Monetary policy will have to include and assess the effects of new technologies such as Blockchain, which "gave birth" to the cryptocurrencies, which caused turmoil in the international currency markets. At the same time, Fiscal policy will have to tackle the challenges caused by Digital platforms and new business models.

A globally significant topic of security and privacy will have to be addressed due to the increasing interconnection of the world. Data collection, processing, and reselling of personal data rules are not widely accepted, which in term leaves the world vulnerable to cybercrime, identity theft, and breach of human rights such as the right to privacy. Additionally, data available in the cloud, if properly unguarded, can cause a significant risk to real-world security due to terrorism threats.

Complete change toward education will be necessary due to changes in the labor market. Destruction of existing jobs, and the creation of new ones, in combination with entirely new skillsets required for the positions, will radically change the requirements and the approach toward this critical topic.

Structural unemployment caused by the Fourth Industrial Revolution and the demographic tendency of the aging population will force policymakers to reevaluate their approach toward social security and retirement, which are unsustainable under current conditions in the long run.

Here we have given a little insight into the potential implications on the policies and decision-making process within Government institutions. There is a lot more consideration to be made in the context of Industry 4.0, and its impact on public institutions and interest.

Conclusion

The Fourth Industrial Revolution is leading toward new technologies and innovations, which are changing the approach toward all aspects of human existence. These technologies are changing the way of doing business, through smart, informed, and sustainable solutions, which are increasing productivity, reducing costs while at the same time reducing waste and pollution. Impacts are spreading to human well-being as well. Better, personalized medical solutions will be available to every patient, increasing health and life expectancy, and reducing the mortality at the same time. Currently, the impact on the environment is the most discussed positive impact of the Fourth Industrial Revolution. Smart and data-driven solutions, real-time monitoring, and recyclable

⁶ Reshoring effect refers to the returning of labor-intensive industries to their origin countries, due to capitalization effect and substitution of cheap labor with sophisticated machines

materials are all leading toward a circular economy, which is the step forward to a better and healthier environment.

However, just like every revolution, the Fourth Industrial Revolution has its challenges. The destruction and capitalization effects are increasing the pressure on the labor market and policymakers to transform the regulation and organization of multiple segments, including education, social security, and retirement. In addition to previously mentioned, probably the most concerning problem that needs special attention in the light of the Industry 4.0. is the rising inequality.

Available literature offers segmented insights into different aspects of the Fourth Industrial Revolution. Since it is in the early phases, there is a lot more research to be done moving from the impacts on the labor market and environment to the broader spectrum of problems. The overview we gave in this paper is not based on empirical research and only gives an overview of available theoretical and empirical evidence in this field. Possible areas of future research include the impact on agriculture, regional development, inequality, education, development policies, and many others.

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ECONOMICS of Sustainable Development =
Економика одрживог развоја / editor-in-chief
Dragoljub Simonović. - Vol. 4, br. 1 (2020)- . - Niš
: Society of Economists "Ekonomika", 2020 - (Niš :
"Medinvest"). 58 стр. - 24 cm

Dva puta godišnje.

ISSN 2560-421X = Economics of Sustainable
Development

