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care se bazează pe:

A. Nota de constatare şi confirmare a indiciilor de plagiat prin fişa suspiciunii inclusă în decizie.

Fişa suspiciunii de plagiat / Sheet of plagiarism's suspicion		
Opera suspicionată (OS) **Suspicious work**		**Opera autentică (OA)** **Authentic work**
OS	MATEESCU Iris Maria, POPESCU Stefan, PĂUN Laura, ROATĂ George, BĂNCILĂ Andrei, OANCEA Anca. Bioeconomy. What is bioeconomy? How will bioeconomy develop the next two decades?. *Studia Universitatis "Vasile Goldiş". Seria Ştiințele Vieții*. 2011 Jun 15; **21**(2). pp.451-456.	
OA	ARUNDEL A, SAWAYA D. The bioeconomy to 2030: Designing a policy agenda. OECD Publishing. 2009. ISBN-978-92-64-03853-0.	
Incidența minimă a suspiciunii / Minimum incidence of suspicion		
P.01	p.452	p.00
P.02	p.452	p.19
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Fişa întocmită pentru includerea suspiciunii în Indexul Operelor Plagiate în România de la Sheet drawn up for including the suspicion in the Index of Plagiarized Works in Romania at www.plagiate.ro		

Notă: Prin „p.72:00" se înțelege paragraful care se termină la finele pag.72. Notația „p.00:00" semnifică până la ultima pagină a capitolului curent, în întregime de la punctul inițial al preluării.

Note: By „p.72:00" one understands the text ending with the end of the page 72. By „p.00:00" one understands the taking over from the initial point till the last page of the current chapter, entirely.

B. Fişa de argumentare a calificării de plagiat alăturată, fişă care la rândul său este parte a deciziei.

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Nr. crt.	Descrierea situaţiei care este încadrată drept plagiat	Se confirmă
1.	Preluarea identică a unor fragmente (piese de creaţie de tip text) dintr-o operă autentică publicată, fără precizarea întinderii şi menţionarea provenienţei şi însuşirea acestora într-o lucrare ulterioară celei autentice.	✓
2.	Preluarea unor fragmente (piese de creaţie de tip text) dintr-o operă autentică publicată, care sunt rezumate ale unor opere anterioare operei autentice, fără precizarea întinderii şi menţionarea provenienţei şi însuşirea acestora într-o lucrare ulterioară celei autentice.	
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6.	Republicarea unei opere anterioare publicate, prin excluderea unui autor sau a unor autori din lista iniţială de autori.	
7.	Preluarea identică de pasaje (piese de creaţie) dintr-o operă autentică publicată, fără precizarea întinderii şi menţionarea provenienţei, fără nici o intervenţie personală care să justifice exemplificarea sau critica prin aportul creator al autorului care preia şi însuşirea acestora într-o lucrare ulterioară celei autentice.	✓
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Alte argumente particulare: a) Preluările de poze nu indică sursa, locul unde se află, autorul real sau posibil.

Notă:

a) Prin „provenienţă" se înţelege informaţia din care se pot identifica cel puţin numele autorului / autorilor, titlul operei, anul apariţiei.

b) Plagiatul este definit prin textul legii[1].

> *„ …plagiatul – expunerea într-o operă scrisă sau o comunicare orală, inclusiv în format electronic, a unor texte, idei, demonstraţii, date, ipoteze, teorii, rezultate ori metode ştiinţifice extrase din opere scrise, inclusiv în format electronic, ale altor autori, fără a menţiona acest lucru şi fără a face trimitere la operele originale…".*

Tehnic, plagiatul are la bază conceptul de **piesă de creaţie** care[2]:

> *„…este un element de comunicare prezentat în formă scrisă, ca text, imagine sau combinat, care posedă un subiect, o organizare sau o construcţie logică şi de argumentare care presupune nişte premise, un raţionament şi o concluzie. Piesa de creaţie presupune în mod necesar o formă de exprimare specifică unei persoane. Piesa de creaţie se poate asocia cu întreaga operă autentică sau cu o parte a acesteia…"*

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> *„…O operă de creaţie se găseşte în poziţia de operă plagiată sau operă suspicionată de plagiat în raport cu o altă operă considerată autentică dacă:*
> *i) Cele două opere tratează acelaşi subiect sau subiecte înrudite.*
> *ii) Opera autentică a fost făcută publică anterior operei suspicionate.*
> *iii) Cele două opere conţin piese de creaţie identificabile comune care posedă, fiecare în parte, un subiect şi o formă de prezentare bine definită.*
> *iv) Pentru piesele de creaţie comune, adică prezente în opera autentică şi în opera suspicionată, nu există o menţionare explicită a provenienţei. Menţionarea provenienţei se face printr-o citare care permite identificarea piesei de creaţie preluate din opera autentică.*
> *v) Simpla menţionare a titlului unei opere autentice într-un capitol de bibliografie sau similar acestuia fără delimitarea întinderii preluării nu este de natură să evite punerea în discuţie a suspiciunii de plagiat.*
> *vi) Piesele de creaţie preluate din opera autentică se utilizează la construcţii realizate prin juxtapunere fără ca acestea să fie tratate de autorul operei suspicionate prin poziţia sa explicită.*
> *vii) In opera suspicionată se identifică un fir sau mai multe fire logice de argumentare şi tratare care leagă aceleaşi premise cu aceleaşi concluzii ca în opera autentică…"*

[1] Legea nr. 206/2004 privind buna conduită în cercetarea ştiinţifică, dezvoltarea tehnologică şi inovare, publicată în Monitorul Oficial al României, Partea I, nr. 505 din 4 iunie 2004
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BIOECONOMY. WHAT IS BIOECONOMY? HOW WILL BIOECONOMY DEVELOP THE NEXT TWO DECADES?

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Abstract. This article speaks about bioeconomy, what does this mean and its effect upon other sciences. We will also have a quick look upon biotechnology and find the boundary between bieconomics and biotechnology. How did this develop in OECD (Organization for economic co-operation and development) and non-OECD countries? How will agriculture, health and industry fields develop for the next two decades? An important factor in bioeconomy development will be the increase of population, countries policy and their state of development.
Bioeconomy will develop continually in the next years and will be a set of new opportunities and challenges.

Key words: bioeconomy, agriculture, OECD, biotechnology, business, emarge, health, industry, 2030.

INTRODUCTION TO BIOECONOMY

Bioeconomy is a progressive branch of social science that seeks to integrate the disciplines of economics and biology for the sole purpose of creating theories that do a better job explaining economic events using a biological basis and vice versa.

The proponents of bioeconomy believe that the same patterns that can be seen in biological evolution can be applied to stock market behavior, as many of the same "causal interactions" and "survival elements" can be found there as well as in nature.

In nature, we see groups of different organisms working together to best utilize the resources needed to sustain life, while still promoting as "survival of the fittest" framework. Like behavioral finance and other applied economic schools, bioeconomy is another example of economic theory branching out of classical boundaries and attempting to better explain the complex economies of today.

It studies the dynamics of living resources using economic models. Bioeconomy is an attempt to apply the methods of environmental economics and ecological economics to empirical biology.

Bioeconomy is the science determining the socioeconomics activity threshold for which a biological system can be effectively and efficiently used without destroying the conditions for its regeneration and therefore its sustainability.

BIOTECHNOLOGY AND BIOECONOMY

Over the past two decades, biotechnology has provided a motor for environmentally sustainable production and for the development of a diverse range of innovative products. The continued commercial application of biotechnology could lead to the development of a bioeconomy, where a substantial share of economic output is partly dependent on the development and use of biological materials. The potential economic and environmental benefits of biotechnology have created a growing strategic interest in the bioeconomy in both OECD (Organisation for economic co-operation and development) and non-OECD countries. But for the bioeconomy to succeed, considerable uncertainties and global challenges will need to be addressed.

Innovative policy frameworks, strategic thinking by both governments and firms, and citizen support will be required to meet these challenges.

Advances in biotechnology-related fields such as genomics, genetic engineering, chemical engineering and cell technology are transforming the industrial and environmental process and management landscapes. Microorganisms, enzymes or their products are replacing processes that depended heavily on chemicals, many of which are implicated in environmental damage. However, much discussion of biotechnology currently focuses on agricultural applications (and some extent biomedical uses).

The role biotechnology could play in addressing what are considered the most serious challenges to world economies and societies over the next decades. These challenges include *agriculture, healthcare, industry* and other resources and services to a world that will see its population increase by a third in the face of mounting environmental stresses over the next 20 years.

1. In *agriculture*, encourage the application of biotechnology to improve plant and animal varieties through improving access to technologies for use in a wider range of plants, expanding the number of firms and research institutes that can use biotechnology (particularly in developing countries), and fostering public dialogue.
2. In *health (bioinformatics)*, develop regulatory, research, and health record systems which can link prescribing histories, genetic and other

information, to support long-term follow-up research into health outcomes.

3. In *industry*, increase support for the adoption and use of internationally accepted standards for life cycle analysis, along with other incentives to reward environmentally sustainable technologies (*e.g.* boosting research into high energy density bio fuels).

The bioeconomy can have a major impact in many of these areas to ensure long term economic and environmental sustainability.

Since its emergence, modern biotechnology has been associated with debates concerning benefits and risks. The ability to transform life itself in order to generate new products and services has been classified as a revolutionary technology, with the same societal impacts as the information and communications revolution. With these high explications have also come fears and concerns, which have captured public and policy attention worldwide. Concealed in the narrower debates about the impacts of biotechnology on human health and the environment are wider concerns about socio-economic considerations, which can be translated into market dislocations.

Indeed, early concerns about agricultural biotechnology focused on the possible impacts of genetic engineering or shifting the locus of production of raw materials.

The adoption pace witnessed in the fields of biotechnology is consistent with previous trends in other generic technologies. The rate of diffusion will be fastest where biotechnology creates new products that do not complete with existing applications. In the field of health care, for example, new diagnostic methods for a wide range of biological and non-biological expressions could involve such products. The pace will be slow and possibly punctuated by controversy where biotechnology seeks to displace existing processes and products or enhances the competitiveness of certain products.

TECHNOLOGICAL INNOVATION

The last century saw the replacement of plant-derived products with petroleum derivatives.

These remarkable transformations helped humanity to overcome some of the natural limitations of relying on natural processes. The change was largely a result of advances in chemistry and allied fields. This century promises to open new avenues for increasing the use of renewable resources in the global economy. These trends will open up new opportunities for the participation of OECD and non OECD countries in the new bioeconomy. But, as in previous technological revolutions, the promise and reality are different. In the case of agricultural biotechnology, for example, only a handful of developing countries have so far managed to become players in the global economy. The rest have little hope of playing significant roles in the near future. As in other technological fields, participation in the new bioeconomy will be uneven and limited to those countries that make the necessary investments in technological development.

So far, much of the research on policy aspects of biotechnology has focused on agricultural and pharmaceutical biotechnology (*health*). The field of industrial and environmental biotechnology remains understudied. Industrial biotechnology covers two distinct areas. The first area is the use of renewable raw materials (biomass) to replace raw material derived from fossil fuels. The second is the use of biological systems such as cells or enzymes (used as reagents or catalysts) to replace conventional, non-biological methods.

Industrial applications of biotechnology are emerging as a spin-off from developments in other fields such as the pharmaceutical sector. This is largely because industrial biotechnology has not received the same level of public policy attention as has biotechnology in other sectors. There are other structural factors influencing the diffusion of industrial biotechnology. These include the dominance of physical and chemical technology as a source of concepts for the design of industrial plants, which limits the scope for introducing biological processes.

BIOECONOMY IN OECD AND NON-OECD COUNTRIES

The biological sciences are adding value to a host of products and services, producing what some have labeled the “bioeconomy”. The bioeconomy could make major socioeconomic contributions in OECD (Organization for economic co-operation and development) and non-OECD countries. These benefits are expected to improve health outcomes, boost the productivity of agriculture and industrial processes, and enhance environmental sustainability. The bioeconomy’s success is not, however, guaranteed: harnessing its potential will require coordinated policy action by governments to reap the benefits of the biotechnology revolution.

The Bioeconomy to 2030: Designing a Policy Agenda begins with an evidence-based technology approach, focusing on biotechnology applications in primary production, health, and industry. It describes the current status of biotechnologies and, using quantitative analyses of data on development pipelines and R&D expenditures from private and public databases, it estimates biotechnological developments to 2015. Moving to a broader institutional view, it also looks at the roles of R&D funding, human resources, intellectual property, and regulation in the bioeconomy, as well as at possible developments that could influence emerging business models.

Both OECD and developing countries face a range of environmental, social, and economic challenges over the next two decades. Rising incomes, particularly in

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developing countries, will increase demand for healthcare and for agricultural, forestry, and fishing products. At the same time, many of the world's ecosystems that support human societies are overexploited and unsustainable. Climate change could exacerbate these environmental problems by adversely affecting water supplies and increasing the frequency of drought.

Biotechnology offers technological solutions for many of the health and resource-based problems facing the world. The application of biotechnology to primary production, health and industry could result in an emerging "bioeconomy" where biotechnology contributes to a significant share of economic output. The bioeconomy in 2030 is likely to involve three elements: advanced knowledge of genes and complex cell processes, renewable biomass, and the integration of biotechnology applications across sectors.

WHAT EXTERNAL FACTORS WILL EMARGE THE BIOECONOMY TO 2030?

Several factors will drive the emerging bioeconomy by creating opportunities for investment. A major factor is increasing population and per capita income, particularly in developing countries. The global population is expected to reach 8.3 billion in 2030, with 97% of the growth occurring in developing countries. GDP is expected to grow by 4.6% per year in developing countries and by 2.3% in OECD countries. These trends in population and income, combined with rapid increases in educational achievement in China and India, indicate not only that the bioeconomy will be global but that the main markets for biotechnology in primary production (agriculture, forestry and fishing) and industry could be in developing countries. Increases in energy demand, especially if combined with measures to reduce greenhouse gases, could create large markets for biofuels.

An expected increase in elderly populations, both in China and in OECD countries, will increase the need for therapies to treat chronic and neurodegenerative diseases, some of which will be based on biotechnology. Many countries and healthcare providers will try to reverse rapidly increasing healthcare costs. Biotechnology provides possible solutions to reduce the cost of pharmaceutical and manufacturing. Alternatively, biotechnology could improve the cost-effectiveness of health therapy, so that expensive treatments provide commensurate and significant improvements to health and the quality of life.

BIOECONOMY TODAY

Biotechnology today is used in primary production, health and industry. Platform technologies such as genetic modification, DNA sequencing, bioinformatics and metabolic pathway engineering have commercial uses in several application fields. The main current uses of biotechnology in primary production are for plant and animal breeding and diagnostics, with a few applications in veterinary medicine. Human health applications include therapeutics, diagnostics, pharmaco-genetics to improve prescribing practices, functional foods and nutraceuticals, and some medical devices.

Industrial applications include the use of biotechnological processes to produce chemicals, plastics, and enzymes, environmental applications such as bioremediation and biosensors, methods to reduce the environmental effects or costs of resource extraction, and the production of bio fuels. Several applications, such as biopharmaceuticals, in vitro diagnostics, some types of genetically modified crops, and enzymes are comparatively "mature" technologies. Many other applications have limited commercial viability without government support (e.g. bio fuels and biomining) or are still in the experimental stage, such as regenerative medicine and health therapies based on RNA interference.

BYOECONOMY OF 2030. CHALLENGES AND OPPORTUNITIES.

Bioeconomy builds on the types of products that are likely to reach the market in the next future. Within the OECD region, biotechnology could contribute to 2.7% in 2030, with the largest economic contribution of biotechnology in industry and in primary production. The economic contribution of biotechnology could be even greater in developing countries, because of the importance of these sectors to their economies.

The scenarios assume an increasingly multi-polar world, with no single country or region dominating world affairs. They include plausible events that could influence the emerging bioeconomy. The results highlight the importance of good governance, including international cooperation, and technological competitiveness in influencing the future. Complex scientific challenges and poorly designed regulations could reduce the ability of industrial biotechnologies to compete with other alternatives.

Social, economic and technological factors will create new business opportunities for biotechnology, requiring new types of business models.

The main business models to date have been the small, dedicated biotechnology firm that specializes in research and sells knowledge to large firms, and the large integrated firm that performs pharmaceutical and manufactures and distributes products.

Agriculture	**Health**	**Industry**
Widespread use of marker assisted selection (MAS) in plant, livestock, fish and shellfish breeding.	Many new pharmaceuticals and vaccines, based in part on biotechnological knowledge, receiving marketing approval each year.	Improved enzymes for a growing range of applications in the chemical sector.
Genetically modified (GM) varieties of major crops and trees with improved starch, oil, and lignin content to improve industrial processing and conversion yields.	Greater use of pharmacogenetics in clinical trials and in prescribing practice, with a fall in the percentage of patients eligible for treatment with a given therapeutic.	Improved micro-organisms that can produce an increasing number of chemical products in one step, some of which build on genes identified through bioprospecting.
GM plants and animals for producing pharmaceuticals and other valuable compounds.	Improved safety and efficacy of therapeutic treatments due to linking pharmacogenetic data, prescribing data, and long-term health outcomes.	Biosensors for real-time monitoring of environmental pollutants and biometrics for identifying people.
Improved varieties of major food and feed crops with higher yield, pest resistance and stress tolerance developed through GM, MAS, intragenics or cisgenesis.	Extensive screening for multiple genetic risk factors for common diseases such as arthritis where genetics is a contributing cause.	High energy-density bio fuels produced from sugar cane and cellulosic sources of biomass.
More diagnostics for genetic traits and diseases of livestock, fish and shellfish.	Improved drug delivery systems from convergence between biotechnology and nanotechnology.	Greater market share for biomaterials such as bioplastics, especially in niche areas where they provide some advantage.
Cloning of high-value animal breeding stock.	New nutraceuticals, some of which will be produced by GM micro-organisms and others from plant or marine extracts.	
Major staple crops of developing countries enhanced with vitamins or trace nutrients, using GM technology.	Low-cost genetic testing of risk factors for chronic diseases such as arthritis, Type II diabetes, heart disease, and some cancers.	
	Regenerative medicine providing better management of diabetes and replacement or repair of some types of damaged tissue.	

Source: The Bioeconomy to 2030 “DESIGNING A POLICY AGENDA”
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POLICY OPTIONS FOR THE BIOECONOMY: THE WAY AHEAD

The social and economic benefits of the bioeconomy will depend on good policy decisions. The required mix of policies is linked to the potential economic impacts of biotechnological innovations on the wider economy. Each type of innovation can have incremental, disruptive or radical effects. In many cases incremental innovations fit well within existing economic and regulatory structures. Disruptive and radical innovations can lead to the demise of firms and industrial structures, creating greater policy challenges, but they can also result in large improvements in productivity. This chapter identifies policy options to address challenges in primary production, health and industrial biotechnology. It also looks at cross-cutting issues for intellectual property and for knowledge spillovers and integration, global challenges, and the need to develop policies over both the short and long term.

Primary production provides a diverse range of policy challenges. Examples include the need to simplify regulation, encourage the use of biotechnology to improve the nutritional content of staple crops in developing countries, ensure unhindered trade in agricultural commodities, and manage a decline in the economic viability of cool-climate forestry resources for low value commodities such as pulp and paper. The main challenges for health applications are to better align private incentives for developing health therapies with public health goals and to manage a transition to regenerative medicine and predictive and preventive medicine, both of which could disrupt current healthcare systems. Industrial biotechnology faces multiple futures due to competitive alternatives from both outside and within biotechnology. Policy needs to flexibly adapt to different outcomes and prevent "lock-in" to inferior technological solutions.

CONCLUSIONS: ON THE ROAD TO THE BIOECONOMY

Obtaining the full benefits of the bioeconomy will require purposive goal-oriented policy. This will require leadership, primarily by governments but also by leading firms, to establish goals for the application of biotechnology to primary production, industry and health; to put in place the structural conditions required to achieve success such as obtaining regional and international agreements; and to develop mechanisms to ensure that policy can flexibly adapt to new opportunities. There are nine main challenges, summarized in this chapter.

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