

Sustainable Packaging as Part of Sustainable Social Development

Veljanovski Darko¹, Najdovski Blagojche²

¹(Faculty of Biotechnical science/ University "St. Kliment Ohridski, North Macedonia)

²(Faculty of Biotechnical science/ University "St. Kliment Ohridski, North Macedonia)

ABSTRACT: *The global concepts of social responsibility, sustainable development and circular economy are increasingly being taken into account by companies from the packaging industry, so in view of this, we are increasingly encountering the term "sustainable packaging", which appears as a result of the aforementioned concepts, and that alone opens up new opportunities from a social, environmental, economic, ethical and aspect. The purpose of this scientific paper is to show and highlight sustainable packaging. Based on numerous researches by world authors, sustainable packaging has been defined, at the same time emphasizing that this definition shows how to improve the packaging present in the global market and how it should be constantly improved and adapted to the daily changes in the demands of the market, in society or in addition of the environment, taking into account the state, but also the development of the packaging industry.*

KEYWORDS - sustainability, globalization, sustainable packaging, environmental protection

Date of Submission: 01-05-2024

Date of Acceptance: 12-05-2024

I. INTRODUCTION

The development of society and the discovery of novelties and solutions are in constant flux, which, among other things, leads to a major breakthrough in general sustainability, but also in terms of packaging, thanks to globalization and economic development. All of this is accompanied by certain changes that are in any case inevitable and occur both locally and in the global environment, and they are not always positive. Parallel to that is the degradation of the environment, which is increasingly becoming a global problem, and also, one of the reasons for the general processes of globalization is consumerism.

In view of the above-mentioned facts, environmental globalization, the impact of the economy on the environment and its users is increasingly being discussed, and this is taken into account in the researches that are carried out for the needs of science, environmental and economic practice. A large number of enterprises include environmental and social criteria in management and strive to reduce the degrading impact and negative effects of their own activities, which are determined by various administrative and legal instruments and solutions, which are undertaken at the level of international economic policy, as well as the expectations and growing demands of various groups of stakeholders of which consumers are the most important group. There are currently changes in their behavior.

They increasingly perceive the connection between their activities and the impact on the environment and society in general. They themselves realize that shopping is not only an economic activity, but also causes certain effects for other participants in the economy, and this leads to a growing disappearance of egoistic motivations in favor of socio-ecological behaviors. This is a consequence, among other things, of the greater awareness of consumers, which is the result of the growing and more appropriate education of the people in society itself, as well as the rapid development of the information society, which transmits opinions and attitudes at high speed.

Interest is growing and the so-called economy of sustainable development is becoming more and more relevant, so it is turning into a global trend that is partly a result of globalization. Global pollution knows no geographical boundaries, while the depletion of resources and the daily face of the energy crisis affect all of humanity. On the other hand, without it, sustainable development would be significantly hindered, as it enables technical and technological progress as well as international cooperation on a global level, which contributes to balanced economic and social development. The main goal of development is to produce appropriate economic-ecological and socio-cultural standards for current and future generations, taking into account the tolerant limits of nature and the realization of the principle of intergenerational justice. The paradigm of sustainable development assumes that this strategy should accelerate economic growth in particular, taking into account security, justice and the quality of the environment as a daily good. To achieve the Sustainable Development Goals, impact must be achieved through sustainable production and consumption. Taking actions related to its

implementation should be constantly modified and have a more dynamic and open character, they should be adapted to the state of the economy and the changing needs of its participants, as well as to the state of the environment. A circular economy and its concepts of social responsibility perfectly correspond to these priorities and without them sustainable development would not be possible. Currently they determine the development directions of many industries which undoubtedly includes the packaging industry.

II. SUSTAINABILITY IN THE PACKAGING INDUSTRY

Packaging is produced in order to fulfill many functions important for its consumers, but also for the manufacturers of packaged products themselves. Globalization promotes the development of international corporations, which allows the free flow of goods and the opening of world borders, all of which favors the development of packaging. The packaging market, except with the help of exports, is also driven by the consumption and trends of society and the development of other industries that need to use the services of the packaging industry. Modern society cannot survive without the packaging industry, as the world's population is constantly increasing, but food supply chains are becoming more complex. Packaging has a major role in reducing the loss of goods and products, thus ensuring that consumers receive safe and quality products. In addition, packaging is also an excellent marketing tool with which entrepreneurs can influence the consumer's choice.

Packaging, after use, becomes waste that can have a significant impact on the environment, especially single-use packaging and those made from different packaging materials that are not degradable or useful in the recycling process. The impact of globalization and its economic and social consequences in this field have had a strong impact in recent years on the economy, technological growth as well as the growing needs and demands of society. Given such reasons, they are used to improve the market position of enterprises and create a brand that cares and respects the natural environment and its users. Such reasons are aimed at adapting production to the implementation of the principles of the above concepts and recognizing them as an integral part of the management strategy of companies from the packaging industry, which is part of the developed economic sectors, as well as packaging design, which during the cycle of existence will be in accordance with the assumptions of sustainable development, thus meeting the expectations and needs of the users.

"Sustainable packaging" as a concept is increasingly used in international literature. Defining it is really difficult, due to the multitude of criteria that need to be taken into account, the wide range of packaging materials to choose from, as well as the rapid development of the industry. From a theoretical point of view, this is about packaging that, compared to everyday packaging, can meet higher standards in every respect, but also have better performance and quality characteristics, and at the same time bring new opportunities in the field of utilization, recycling and waste management. The established standards should be valid for the entire period of existence of the packaging itself, from the moment of production, to the processes of packaging, distribution, transportation of already packaged products, and finally to the moment of their use and placement in the waste section. (Valentina Siracusa, Marco Dalla Rosa, 2018)

Scientific activities and scientists who try to define sustainable packaging, in principle refer to the attitudes developed by certain organizations. Such organizations define sustainable packaging as packaging that throughout its life cycle is useful, safe and harmless to individuals and society as a whole, while simultaneously meeting market criteria for efficiency and cost, and when such packaging is obtained, produced, transports and recycles using renewable energy, it further optimizes the use of renewable or recycled material sources, is produced using cleaner production technologies and best practices and is made of materials that are safe for health, for the most part it is designed to optimize materials and energy and is efficiently recovered and used in biological or industrial closed loops.-

Other world authors define the fact that packaging has an important role in global social and economic systems and the need to achieve the intended environmental goals. Packaging, with its efficiency throughout its life cycle, has a strong impact with its environmental performance, on society and the environment, as well as the environmental toxicity of the packaging components and their interaction with the product.

The packaging should be: effective, in order to add economic and social value to the product, and therefore efficient, i.e. it should minimize the use of materials and energy and at the same time be cyclical, and this actually means that the packaging itself should optimize the recovery of materials and minimize their degradation. In addition, the packaging must be safe and should not pose a threat to the life and health of users and ecosystems.

Certain organizations that deal with the concept and topic of product packaging and environmental protection, do not use the concept of "sustainable packaging", they encourage packaging design that contributes to sustainable development. According to them, such packaging should be holistically designed with the product, in order to optimize the overall environmental performance, and for this to be used from responsibly sourced materials, to be designed to be effective and safe throughout the entire life cycle in order to protect the

product, while meeting the efficiency and cost criteria and meeting the expectations and needs of the consumers themselves, and they can be easily and inexpensively recycled or renewed after their use.

Professionals in this field recognize the major contribution to global sustainable production and consumption of packaging, helping to reduce product waste and conserve resources, but at the same time to record the fact that each package draws resources at every stage of the supply chain. In formulating the definition, analogies that appear in the definitions developed by various authors and organizations can be used. All definitions - despite being developed by organizations and authors working in different geographical areas - place packaging in several basic areas that actually form the basis of sustainable packaging:

- society - satisfied consumers,
- economy - reduction of production costs,
- environment – minimal harmful impact on the environment by the packaging during the entire life cycle,
- time – how packaging affects future generations
- development – contributing to the development of companies that participate in the very process of production of packaging and packaging materials,
- in any case, sustainable packaging must perform and satisfy all its functions.

The information presented so far clearly shows the need to improve the packaging already present on the market, but also shows the fact that it is necessary to constantly improve and adapt to the changing demands of the market and the environment, as well as to the development of the packaging industry itself. The improvement of packaging is undoubtedly a process of continuous, dynamic changes and the creation of new solutions. Advances in technologies and innovations developed in this area support smart growth, the use of, for example, renewable resources supports sustainable growth, and taking into account the needs of society supports inclusive growth. As can be seen from the above, the packaging industry takes action in all three priority areas of sustainable development, and packaging is one of its important tools. More and more, they are produced in accordance with their principles and are the optimal solution for the environment, thus bringing benefits to society while generating profits for the company. At the same time, they are its consequence, but also a factor that causes further changes due to the size of the industry and the important role of these products.

III. SUSTAINABLE PACKAGING – TODAY AND IN THE FUTURE THE MOST ACCEPTABLE PACKAGING

Innovative biodegradable packaging materials and the use of new renewable raw materials by manufacturers who want to adapt the industry to new demands and changes, do so by finding new solutions by creating innovative biodegradable packaging materials or using renewable raw materials (Cutter, 2006). Only packaging made from conventional materials such as plastic, paper, glass and metal can in any case meet the requirements of sustainable packaging. It is enough just to analyze their life cycle and improve certain areas related to their production, use or disposal, which may sometimes require investing more effort and longer time, but certainly not impossible. Certain types of packaging made from conventional materials can also be described as sustainable.

Packaging production highlights plastic as one of the most used materials worldwide, primarily due to the large range of choices and their variety. In principle, such packaging is used for food and beverages, cosmetics, pharmaceuticals and in any case for industrial products. Parallel to popular opinion, they are largely suitable for the production of sustainable packaging, as they provide protection, are durable and, thanks to the light weight of the packaging, reduce transport costs and associated greenhouse gas emissions. At the same time, they can be easily formed into any shape, but unfortunately, these coins are often not properly selected after use. (Cvetkovic D., 2010)

Plastic products are the most common waste in natural waters, about 80-85% of the total waste, mostly bottles made of PET. Therefore, organizations and manufacturers are looking for new methods for recycling the used plastic obtained in this way. Certain companies are developing technology to utilize all the waste made from PET, which makes it possible to obtain high purity plastic. Such a process relies on the depolymerization of PET waste, while the process itself does not consume energy and creates a material that is made of 100% recycled content, and it can be reused in the food industry because it is of high quality and meets the requirements of FDA for Food Contact Materials. The result that global companies are planning for the water bottle market is to have 95% of them made from recycled plastic by 2026.

Not only plastic, but also paper products are widely used in the production of packaging, and they are used for the production of wrappers, labels, single packaging, but above all, for transport packaging. As a packaging material, they rank high in their rating, primarily because of their biodegradability. But in uncontrolled conditions, this process produces greenhouse gas - methane, so for that reason, these packages should be recycled in an appropriate way, which will reduce the emissions of methane, which will be emitted uncontrolled into the environment, as well as the amounts of packaging waste. Just recycling 1 ton of this

material allows for a reduction in greenhouse gases by 1 metric ton of carbon equivalent, and accordingly saves 26,500 liters of water and enough energy to power an average family with all their household needs for several months. Despite everything, recycled paper is rarely used in the production of packaging that is in direct contact with food due to the impurities present in the material, which negatively affect the hygienic properties of the material itself, as well as the aesthetic moment. In practice, to satisfy this moment, it is additionally coated with plastic, as is the everyday example in the production of disposable cups.

Another raw material for packaging production is glass. It is often used for packaging for drinks, alcohol or pharmaceutical products, and such packaging is valued primarily for its aesthetic appearance, but also for its chemical safety. However, the very process of their production is expensive, and at the same time forms greenhouse gases, while glass itself is not biodegradable. Considering that the term sustainable glass packaging can be used when the manufacturer uses a minimum of 40% of the total raw materials for the production of glass packaging recycled raw materials. This reduces energy consumption by more than 12%, and also reduces the number of greenhouse gases by about 1 ton of CO₂ for every 6 tons of garbage, and for every 15% of garbage in the product, the amount of solid particles is reduced by 10% , nitrogen oxide for 5% and sulfur oxide for 15%.

The other packaging material is metal, namely steel and aluminum, and they are mostly used for the production of cans, lids and foils. Aluminum as a material is chemically inert, resistant to corrosion, but not only that but also at low and high temperatures. For these and similar reasons, aluminum foil is easily used in households. In nature, aluminum is the most common metal in the earth's crust, its processing is a complex process because it does not exist in its pure form, and it is extracted and melted from bauxite ore at high temperatures, however, this is one of the most commonly used packaging materials, and all this does not apply to foils made from this material with the exception of certain foil manufacturers that offer a product made from 100% recycled raw material – a mixture of aluminum processed from post-industrial and post-consumer waste. This material is completely food safe and can be recycled again, and an additional advantage is the lower raw material consumption of the whole process - the production of aluminum from recycling requires 95% less energy, since it does not need to be extracted and re-used. melts, and greenhouse gas emissions are 95% lower than during the primary production of aluminum, and thus the production of the film itself is also less energy intensive - by 80%. The concepts and solutions presented above meet all the requirements and characteristics of sustainable packaging, and are environmentally friendly in themselves, using materials that can be recycled, while trying to optimize the consumption of resources and taking into account the life cycle of the products thereby reduce the negative effects on the environment. Sustainable packaging is intended for the packaging of consumer goods, so it is easily accessible to consumers and meets their needs and expectations (Brennan, J.G. and Day B.P.F, 2006).

Sustainable packaging has standard construction forms and is made of traditional materials, so there is a high probability that it will be well received by potential buyers, while also meeting legal requirements in the field of safety. As a result of the above, they will not only meet the needs of the current generations, but also will not limit the opportunities of future generations in this regard.

Such packaging is an instrument that supports the concept of sustainable development.

IV. CONCLUSION

Modernization and globalization bring many negative and positive aspects. First of all in the packaging industry, which undergoes constant dynamic changes. Globalization and trends are part of the factors that determine the dynamics and determine the development of the packaging industry. The free flow of goods in the packaging itself as part of everyday life plays a significant role in today's competitive economy and in every industry and supply chain. That is why it is important to design packaging that, throughout the entire life cycle, will be in accordance with the concepts that guide the development of the industry, that is, sustainable development, from an economic and social point of view.

A large number of companies are taking steps to create an environmentally and socially based industry from the basic packaging industry. In fact, packaging is considered and monitored not only from an economic point of view, but also from an ecological, social and ethical point of view. Every day they look for new solutions aimed at improving the packaging present on the market and adapting them to the situation and the changing demands of the market and society. In addition to that, there are also innovative materials and technologies that enable adaptation of the basic – conventional materials, to transformations and new standards.

Sustainable packaging is the result of a different approach, in which certain attributes are added to the standard product, which increases the economic, social and environmental value of the same throughout its life cycle.

The basis of sustainable development of any society is economic and social development, as well as environmental protection, and in that area packaging occupies a special place as a separate area, but also as part of everyday life.

REFERENCES

- [1]. Valentina Siracusa, Marco Dalla Rosa. (2018). Sustainable packing. *Sustainable Food Systems from Agriculture to Industry*, 275-307.
- [2]. 2. Cutter, N. C. (2006). Opportunities for bio-based packaging technologies to improve the quality and safety of fresh and further processed muscle foods. *Meat Sci.*, 131-142.
- [3]. Cvetkovic D., i. M. (2010). *Dizajn pakovanja*. Beograd : Univerzitet Singidunum.
- [4]. Brennan, J.G. and Day B.P.F. (2006). *Packaging in food processing* . WILEY-VCH Verlag GmbH & Co. KGA.