

## Trends in Packaging Sector

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### Abstract

*The packaging industry is one of the fastest growing sectors of the world economy. The new Covid reality has changed the conditions in which the business operates, including the packaging sector. In these circumstances, the packaging industry proves to be key to the successful implementation of activities and satisfying the changing consumer requirements. The aim of this research is to present the trends in packaging sector. In the study have been used the descriptive - analytical approach, the methods of comparison, analysis and synthesis.*

*Keywords: packaging trends, packaging materials, Covid-19, packaging sector*

*JEL Code: Q53, L70, L81*

### Introduction

According to a study by Smithers, between 2018 and 2028, the global packaging market is expected to grow by almost 3% per year, reaching over \$ 1.2 trillion (Four key trends that will shape the future of packaging to 2028, 2021). Many factors have a significant impact on the global packaging industry. The four key trends that will emerge over the next decade and affect the packaging sector are: **economic and demographic growth** (the global economy is expected to perform relatively well over the next decade, driven by growth in the emerging economy), **packaging technologies** (companies will deal with sustainability issues together with the increase in flexible packaging due to the demand for lighter, more convenient and portable products), **consumer trends** (global market will continue to grow as consumers shop more online, which will stimulate the demand for specific types of packaging and packaging products), **brand trends** (there will be a greater role for packaging in helping the trademark owner to prevent counterfeiting or counterfeit goods through increased use of technological innovation). The five areas in packaging that were expected to develop in 2020 are: **ecology in packaging, digital printing, packaging for e-commerce, flexible packaging and the so-called "smart packaging"** (Tendentsiite v opakovaneto prez 2021, 2021). **Sustainability, intelligent packaging, design and augmented reality (AR)** are the key trends in the packaging sector according to DS Smith (Strategii za opakovkite, 2021).

The packaging industry is one of the fastest growing sectors of the world economy. The new Covid-19 reality has changed the conditions in which the business operates, including the packaging sector. In these circumstances, the packaging industry proves to be key to the successful implementation of activities and satisfying the changing consumer requirements.

**The aim** of this research is to present the trends in packaging sector. In the study have been used the **descriptive - analytical approach, the methods of comparison, analysis and synthesis**.

### 1. COVID-19 and the packaging market

The global packaging market amounted to 926.43 billion dollars in 2019 and is expected to reach 1652.28 billion dollars by 2027, increasing at CAGR of 7.5% over the forecast period. While factors such as growing e-commerce sales and growing demand for FMCG (fast-moving consumer goods) and pharmaceutical packaging are stimulating market growth, the lack of raw materials is holding it back.

There are both advantages and disadvantages in the packaging industry as a result of COVID-19. But the global packaging sector has more significant benefits than other industries affected by the coronavirus pandemic. The closure of many countries leads to a reduction in stocks and an increase in demand for products such as: medicines, dairy products, food, detergents, face

masks, disinfectants and much more. All these products require packaging, and their production is higher than ever.

Smithers' analysis found that with the formation of the "new normal," long-term priorities re-emerged, combining new trends related to the virus. The world redefined by COVID-19 sees the return of many fiber-based alternatives for both flexible and hard plastics (fig. 1).

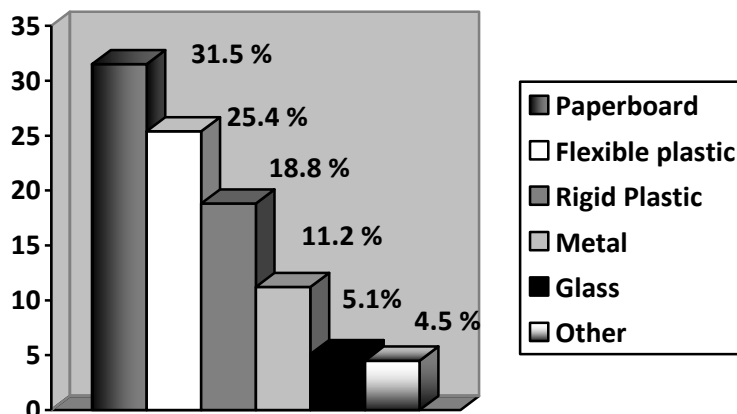


Figure 1. Market share of packaging types, %

Source: Opachovki I pechat, № 5/2021

Based on the type of material, the **plastics/polymers** segment is valued for profitable growth due to the need to feed and support waste management. The COVID-19 crisis has shown that as demand from many end-use industries grows mainly in the food and beverage segment, the use of plastic packaging will also increase significantly during this crisis. Geographically, the Asia-Pacific region will experience strong growth over the forecast period due to easy access to packaging raw materials such as fiber, plastic and glass and the emergence of production facilities of most packaging companies. (The "COVID-19 Impact on Packaging Market, 2020; COVID-19 Impact on Packaging, 2021). According to MarketsandMarkets, the size of the global market for **flexible plastic packaging** is expected to grow from \$ 160.8 billion in 2020 to \$ 200.5 billion by 2025 - an average growth of 4.5% over time. The **barrier film** market is expected to reach \$ 4.1 billion by 2025, with a CAGR of 5.3% between 2020 and 2025. Estimated at \$ 248.8 billion in 2019, the **rigid plastic packaging** market is expecting to reach \$ 372.42 billion by 2027, according to Verified Market Research. Driving the CAGR growth of 5.6% between 2020 and 2027 is, again, food and beverage.. Market Research Future also expects the same level of growth and continues to point out that the rigid packaging market as a whole is expected to grow with a CAGR of 6% between 2017-2023. MarketsandMarkets reports that the plastics market is expected to grow by 468 , \$ 3 billion in 2020 to \$ 596.1 billion by 2025 at a CAGR of 6.0% as plastics continue to replace metals on the market.

Mordor Intelligence reports that the **corrugated packaging** market is expected to grow with a CAGR of 8.1% between 2021 and 2026. Of course, e-commerce is the driving force behind this increase due to its properties: flexibility, profitability and other factors which make them attractive for e-commerce worldwide. The carton is expected to grow with a CAGR of 3.5% between 2020 and 2026, according to Global Market Insights (GMI). Growing consumption of packaged foods is a major factor in the increase, as food and beverages already account for 50% of the market in 2019. Again, sustainability plays a key role in its success.

The market for glass packaging is expected to increase, but this increase varies depending on

research. For example, Mordor Intelligence reports a 4.39% increase in CAGR between 2018 and 2026 to move from \$ 56.64 billion in 2020 to \$ 73.29 billion in 2026. According to Fortune Business Insights, the increase is from \$ 60.32 billion in 2019 to \$ 202 billion in 2019 to \$ 202 billion for a CAGR of 3.95% over the forecast period. Meanwhile, Technavio forecasts a CAGR growth rate of almost 4% between 2020 and 2024. The driving force behind the growth of this group of packaging is the ability of glass to be recycled and the increase in consumption led in this case by the beverage industry (which in turn is led by the alcoholic beverages segment).

The United States is the largest consumer of **metal packaging**, which combined with increased consumption of beverages at home are the reasons why Market Research Future expects the market to grow with a CAGR of 3.36% between 2019 and 2025. Mordor Intelligence expects a similar rate of CAGR growth of 4% from 2020 to 2026, which will result in an industry value of \$ 138.11 billion to \$ 193.24 billion. A report by Metabolic, commissioned by the Can Manufactures Institute, found that aluminum cans have the highest circular capacity compared to glass and PET bottles. In addition, the aluminum report has the highest potential for reducing carbon emissions. Despite these reported benefits of aluminum, the overall market is still stagnant. According to Market Research Future, "the growth of the market might be hindered by factors such as environment-related issues pertaining to steel mining and increased material cost." (Teal, 2021).

The global packaging market will reach \$ 1 trillion in 2024. Demand for packaging worldwide reached \$ 917.1 billion in 2019 and is expected to grow over the next four years, according to the latest data from industry analyst Smithers. In its study, the analysis in its comprehensive study "The Future of Global Packaging by 2024" forecasts market expansion in 2019-2024 by 2.8% CAGR to reach 1.05 trillion US dollars in 2024.

*Asia* is the largest market and accounts for 40.6% of global packaging consumption in 2018. North America is in second place with 22.6% of global packaging consumption, ahead of Western Europe with 20.3%. In *developing countries*, the market will benefit from growing real incomes, growing populations, growing urbanization and the further development of retail infrastructure in emerging and developing countries in Asia, Africa, the Middle East and Eastern Europe. This will lead to an increase in the consumption of packaging in all these regions, faster than the average pace of the world market in the three-year period until 2024. *Developed countries* - North America, Western Europe and Australasia - are expected to see slower growth, with a new focus on innovation and diversification for packaging suppliers. China is the world's largest consumer of packaging, consuming \$ 207 billion in 2018, ahead of the United States by \$ 173 billion and Japan by \$ 48.5 billion. In the last five years, the fastest growth came from India worth \$ 40.1 billion in 2019, it overtook France and Germany to become the world's fourth largest national market. *Australia* is the largest packaging market in Australasia and accounts for approximately 80.0% of sales in 2018. New Zealand is the second largest national market with almost 10% of sales. Both are fully developed packaging markets, with high packaging penetration (World packaging market, 2021).

The size of the global packaging market has the potential to grow by \$ 278.59 billion in 2019-2023, according to a report by Tecnavio. The market share of packaging is expected to increase by USD 170.61 billion from 2020 to 2025, and the market growth rate will accelerate with a CAGR of 4%. The document states that there is a growing demand for packaging due to a change in consumer behavior around the world as a result of the growing middle class as well as the growing adult population. Modern consumers are looking for three main qualities in their packaged products, especially when it comes to food packaging: convenience, ease of use and ease of transportation. Retailers are looking for similar qualities, in addition to packaging that provides a longer shelf life. With greater demand comes greater market opportunities and with a highly competitive landscape of suppliers, the global packaging market is ready to experience steady

growth over the next five years. The market is expected to accelerate steadily over the next few years with growing growth of nearly \$ 165 billion. (Top 20 Packaging Companies, 2020).

In the context of global trends, the Bulgarian packaging market is characterized by the same development trend (table 1).

Table 1. Production of packaging in Bulgaria, tons

<b>Type of packaging</b>	<b>2018</b>	<b>2019</b>
Plastic	131 359	162 921
Paper and board	168 840	138 797
Metal	37 625	31 233
Wood	65 011	79 649
Glass	90 950	124 017
Other	3 708	17 873
<b>Total</b>	<b>497 493</b>	<b>554 489</b>

Source: Natsionalen statisticheski institut, 2021

## 2. E-commerce and packaging sector

One of the most obvious consequences of the pandemic is the greater reliance on e-commerce purchases - physical shops are closed and the fear of infections is holding back shoppers. Difficulties in direct trade and in many periods from the pandemic even to the inability to visit retail outlets expanded e-commerce to areas that were not traditional for it, such as food and medicine. This has had a **positive effect on the packaging industry** (Nelsan, 2021; Stefanov, 2021).

Global e-commerce sales has reached \$ 4.28 trillion worldwide in 2020, and e-commerce revenue is expected to grow to \$ 5.4 trillion in 2022. Online shopping is one of the highest the most popular online activities worldwide and will continue to grow (fig. 2) (Chevalier, 2021).

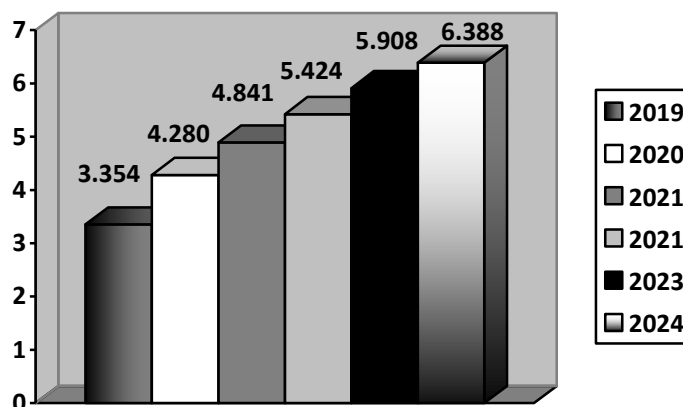


Figure 2. Retail e-commerce sales worldwide from 2014 to 2024, billion U.S. dollars

Source: Statista, 2021

Retailers are rapidly turning to e-commerce sales platforms and diversifying into alternative delivery options. Packaging is becoming more important in informing about brand values when selling in e-commerce (Nelsan, 2021). The possibilities of modern digital technologies and means for their implementation allow the processes in e-commerce to be well organized and managed. The use of the opportunities offered by Industry 4.0 creates conditions for easier meeting of modern legislative, market, technical and any other requirements. Many of the requirements for e-commerce packaging are similar to those for conventional commerce. But there are additional ones that are a serious challenge for their manufacturers. They are caused by trends in the field of public life -

*sustainable development (sustainable packaging), in the field of legislation (eg return of goods), in the field of production and packaging technologies (safe and durable food), in the field of marketing (design on the packaging), etc.*

The much more convenient way of trading with e-platforms and especially the opportunities offered by "multi-channel e-commerce", where customers can quickly change providers (without physically touring the outlets) requires a completely new behavior of traders in this relationship. The role of packaging in making this happen is essential. The packaging must be comfortable in all aspects. Observations are that in the first place the customer puts the ease of opening the package with which the product is delivered. Creating even the slightest inconvenience causes dissatisfaction, and even at this point, out of frustration, he may decide not to repeat his request to that provider.

The construction of a packaging system for goods offered through e-commerce faces some additional **problems**, in contrast to those in conventional commerce. The main ones are: *increased loads at different stages of the supply chain; increased risk of product counterfeiting; increasing the amount of packaging material; the efficiency of the transport-manipulation operations.*

The problems that arise in e-commerce are related to significantly higher mechanical loads on packaged products. In order to perform their functions related to the protection of the product (loss of a product or part of it, damage, etc.), the packaging must be significantly more resistant to external influences. Studies show that during its life cycle, packaging used in e-commerce is subjected to 20-30, and in some cases up to 50 physical collisions. This is many times more than in conventional trade. This serious challenge requires a detailed analysis of the interactions of the packaging with the environment and the selection of the appropriate material, shape and size of the packaging.

The increased risk of counterfeiting is caused by many factors. The multi-channel trade, which is applied in the modern way of communication of consumers with the product, the manufacturer and the trader, also presupposes the possibilities for fraud to increase. The average consumer finds it increasingly difficult to navigate the modern digital world and does not pay much attention to security when performing actions related to e-commerce.

The contradiction between sustainable packaging and the protective function of packaging is also at the heart of the problem of increasing packaging waste used in e-commerce. Reducing the amount of packaging material leads to a decrease in the mechanical stability of the packaging and an increase in the damage caused to the products and their packaging during transport and handling. Thus, the small environmental benefits of the reduced amount of material lead to great harm from the loss of a product or its return due to an unsightly appearance. The return of goods in e-commerce significantly increases their carbon footprint and erases the benefits of reducing the weight of packaging.

Changes in the supply chain in e-commerce raise the question of the effectiveness of operations. They are related to the structural design of packaging. The wide variety of shapes and sizes hinders or greatly complicates the process of automation of storage, transport and handling operations. The effectiveness of the packaging system greatly influences the customer's attitude towards the supplier.

In order to develop or select a package for e-commerce of goods, it is necessary to make an analysis of the entire life cycle of the product with the package and only then to determine the material from which it will be made and the shape and dimensions that will have (Stefanov, 2021). E-commerce **packaging design** issues reflect consumer attitudes towards this type of shopping. The biggest application in online trade are cardboard packaging, the design trends of which include: *environmental friendliness (naturalness), individuality, technology, minimalism.*

The share of e-commerce in the volume of consumer packaged goods has increased fivefold compared to conventional retail sales. E-commerce differs from the retail channel in structure and logistics, which is why e-commerce packages need functions according to their path to the end user. The main thing is the durability in transit in combination with the design, which must be a continuation of the brand (communication of the brand is shifted from the outside to the inside of the package). This requires changes in the production processes of packaging. The latter are in unison with the so-called personalization of packaging and recycling requirements - conditions to which corrugated cardboard meets (Henri, 2020). Most packaging for e-commerce products is made of corrugated cardboard. This sector is expanding at a rapid annual growth rate of 14.3% by 2022 compared to an annual rate of 2.9 for packaging as a whole (fig. 3) (Opakovki i pechat, 3/2020).

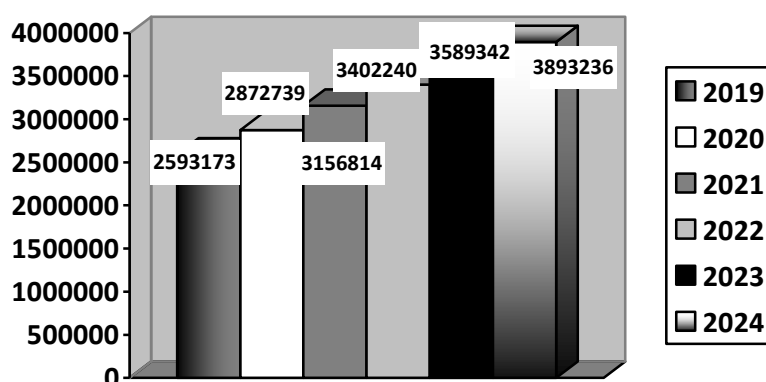


Figure 3. Estimated consumption of tertiary paper packaging induced by e-commerce in the EU from 2019 to 2024, metric tons

Source: Statista, 2021

The volume of tertiary packaging for e-commerce is estimated at about 2,593 thousand metric tons in 2019 and is expected to increase to 2,873 thousand metric tons in 2020. Forecasts for next year show that 4,222 thousand metric tons of paper packaging materials will be used in the e-commerce sector by 2025 (Coppola, 2021) Customization is reflected not only in printed custom boxes, but also in the use of custom labels as part of the packaging design. (Henri, 2020).

In proportion to the online shopping, the packaging industry will also develop. The influencing factors are summarized as follows: *ensuring efficient deliveries*, by automating the operations of sorting, selection, packaging, palletizing and sending orders as quickly as possible; *digitization* as a result of continuous growth in demand; *new thinking and behavior* in the context of resource security in the event of a subsequent situation and after returning to normalcy.

### 3. Digitalization in packaging sector

Digitalisation radically changes the status quo, sometimes even questioning it, while creating space for new ideas (Vaserman, 2020). Digital packaging is characterized by the advantages of digital printing in packaging. The number of digital printers focusing on packaging materials continues to grow every year (Gibson, 2020). To cope with the **new realities - the demand for flexible packaging, product segmentation, mass customization and supply chain connectivity (Industry 4.0)**, manufacturers of printing machines and packaging solutions are

transforming existing and introducing new technologies. In order to keep up with the changing requirements and to increase the quality, flexo printing is being digitized, and this digitalization has not changed the basic concepts related to it. Digital enhancements affect everything from transport to imaging and provide significantly improved automation and control. The use of visual and other sensor technologies, combined with digital power controls, allows less operator involvement and better control. Additional enhancements include sleeve technology for quick job changes, automatic print pressure adjustment, color monitoring, registration and automatic cleaning. Offset printing is also undergoing a restructuring with the digitalization of printing machines (Opakovki i pechat, 1/2021). A number of factors are important when adopting digital packaging printing. With a positive impact are: the ability to economically conduct short runs, to drastically reduce inventory and obsolescence and to make it possible to customize as an added value and profitable service, which is the differentiator of a very competitive market (Gibson, 2020).

Investing in digital printing is largely based on operational effectiveness and the unique graphics capabilities offered by digital technologies. In addition, variable data printing and customization options are provided. The role of digitalisation is directly related to **personalization in packaging**. Personalization of packaging is much more difficult than that of the retail segment, as it is almost impossible to know the exact buyer of the printed packaging. This requires brands to use creative tactics to apply personalization as a means of connecting with consumers. Brands are expanding their product lines, which means that the trend for the same design packaging with a different vision will remain a key factor for investment in digital printing. In addition, digital printing is the preferred method for producing smaller quantities than standard runs, according to consumer preferences. The ability of digital printing to enable printers and packaging converters to respond more flexibly to customer requirements is an incentive for investment (Opakovki i pechat, 1/2020).

Digitalization in the packaging sector is also reflected in the various **technological and finishing processes**. It creates an opportunity to customize the structure, optimize the size of the package, reducing excessive packaging and ensuring the production of packaging of appropriate size for the product. Digital cutting and creasing is a process without direct impact - the result is stronger packaging with resistant stratification edges and higher values when testing for packaging pressure. Digital cutting solutions use laser technology, eliminating the need for traditional cutting tools. Experts in the packaging industry say that the use of a good software solution allows you to see the big picture and effectively plan all the processes in the workflow for packaging from end to end. With the significant growth of e-commerce and the resulting packaging requirements that can deal with the dangers of direct delivery to the consumer, there is a rapidly growing need for packaging specifically designed for e-commerce, eliminating the need for boxes in boxes, reducing the cost of delivery. What is needed is a packaging that carries the brand's message, protects the product and provides a positive opening experience (Opakovki i pechat, 1/2020). One of the biggest challenges is the management of the different interfaces between different equipment and between the brand owner, the agency, the printers and the converters. Automation helps to fully optimize the operating time of the machines and allows for effective communication between the packaging customer, the manufacturer and those in the chain. The maximum printing or converting speed indicated for a given machine is theoretical if it is not well managed for the most efficient production of packaging at the right price (7 predizvikatelstva za proizvodstvoto na opakovki, 2020; Kop, 2021).

Digital innovation is not limited to online brands - virtually any product can be part of a connected and accessible online ecosystem: an internet of products. In its simplest form, custom barcoding can provide access to online content - user guides, product details, blogs, communities and customer support - which enhances the brand experience (Metars, 2020). An example in this

respect and a trend that will continue to develop in the packaging sector are **intelligent packaging**. The global smart packaging market is projected to reach just under \$ 20 billion in 2021. (fig. 4)

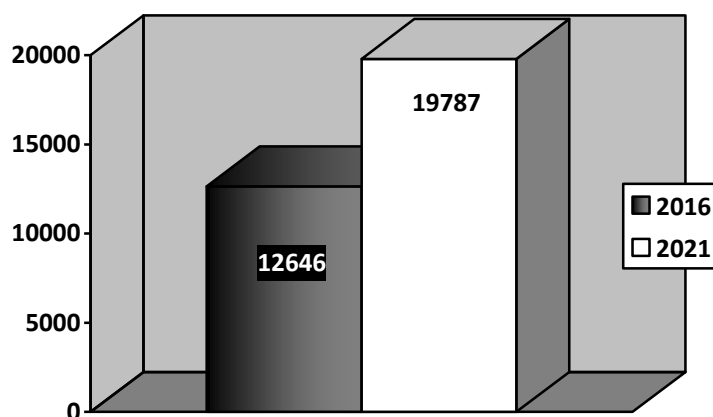


Figure 4. Size of the global smart packaging market 2016/2021, million U.S. dollars

Source: Statista, 2021

E-commerce and the globalization of international trade are also stimulating demand among brand owners for components such as **RFID tags and smart tags**, to protect against counterfeit goods and to better monitor their spread. Smart packaging is an expression of the entry and active entry of Industry 4.0 into the business, where through digital innovations they will reach their wider application in the economy to create a continuous and comprehensive connection between the real and digital world. Their application in the near and distant future will grow, driven by the mass production of the digital economy and the search for solutions to provide information to all participants in the trade cycle. (Stojanov, 2020).

The packaging is now multifunctional, providing more information about the product it contains and providing a user experience. In short, today's packaging is "smart". Some of them are intelligent because they use the latest digital technology. Others because they meet the growing customer demand for 24/7 connectivity. Thirds are smart because they follow broader trends of comprehensiveness and consumer appetite to know more about the products they buy. Intelligent packaging has a design and features that provide added value to consumers. However, this is not a novelty, but a focus on the benefits for people and contribution to their overall experience when making a purchase through convenience or information. Smart packaging is practical, engaging and/or interactive and represents the future of consumer goods and the e-commerce industry. The elements of smart packaging include: **indicators** showing useful information about the condition of the product within the package, such as temperature and freshness; **data carriers** storing and transmitting data from the package for route tracking and protection against counterfeiting; **sensors** that detect conditions such as temperature, humidity and light that may affect the product (Strategii za opakovkite, 2021).

Nowadays, intelligent packaging, which adds functionality to the goods inside, is ready for wider use, as the new embedded technology connects to better software and a renewed focus on minimizing waste in supply chains. In 2020, Smithers estimated that the smart packaging market was worth \$ 6.33 billion - with an active packaging market worth \$ 4.98 billion and smart packaging worth \$ 1.35 billion. A growth rate of 6.2% is now projected by 2025. According to research, there will be a much wider use of smart packaging, starting with conventional barcodes



and 2D matrix data codes, to RF antennas - using RFID or NFC protocols - for more complex applications. After 2025, more widespread use of sensor and logic circuits is expected, along with more sophisticated coding and embedded integrated circuits, allowing more real-time information sharing. The fastest growing end - use sectors are pharmacy and medicine, as a high - cost segment that can reap the benefits of this type of technology to ensure better health than pharmaceuticals. Benefits include: increased information, better adherence to patient instructions, dose control and secure authentication. Smart packaging can provide a smarter connection between the physician and the patient. (Nelsan, 2021).

Digitization is also reflected in the so-called "**connected packaging**". Linked packaging helps brands meet consumer demand for product information while providing a new channel through which they can tell their stories. The package effectively transmits the information that people are looking for by connecting via *Two-dimensional-Barcode (QR)*, *Contactless Communication (NFC)* and *Augmented Reality (AR)*. The trend to use packaging devices has really increased, as the demand for 24/7 connectivity and great digital experiences has increased among consumers, especially the younger ones. Leading companies are turning packaging into a portal to the world, the opportunities to establish a brand that creates a much deeper connection with customers. Linking to promotions and offers, as well as tracking capabilities, are increasingly making packaging a starting point for greater consumer engagement.

**Augmented Reality (AR)** is part of the "connected packaging" trend, which allows people to unite the digital and real worlds. In this way, the impossible becomes possible. Augmented reality can be used to make practical things easier to use by keeping users of their smartphones over groceries, for example, to read nutritional information. Technology really comes to life when it allows people to enter the world of the brand. Gamification is one such approach, using AR to superimpose digital games on the real world. When done well, AR adds a whole new dimension to the customer experience and can provide a channel to illustrate the brand's promises. With the help of connected packaging, designers can send a much wider range of messages without restriction to the surface of the packaging. It takes people to a new dimension, which can be a website, microsite or AR and allows much more to be expressed. These can be functional messages, such as "first steps" lessons, rational brand messages that present additional reasons for buying, or emotional messages that help build a brand community or that reflect people's needs and aspirations. With the connected packaging, there is no limit to what you can express. The application of WebAR, which can be activated by direct connection from channels such as social media, email and website, has proven to be useful against the background of Covid-19. With canceled live events for now, AR allows brands to continue to offer intriguing experiences - all from the safety of consumers' homes. (Strategii za opakovkite, 2021).

### **Conclusion**

One of the most obvious consequences of the pandemic is the greater reliance on *e-commerce purchases*. Thus, transport packaging are crucial for the timely and quality delivery of essential goods in times of crisis. Packaging industry proves to be key to the successful implementation of activities and satisfying the changing consumer requirements. Modern packaging is developing under the influence of a number of factors, the most important of which are the *personalization of products* for end customers and *digitation on manufacturing processes*. In addition, the packaging sector must take into account *design trends, environmental requirements and opportunities for greater consumer awareness*.

Leading place in the packaging industry are solutions related to: process automation, reduction of materials used, reuse of the same, naturally oriented design and construction, the ability to easily manipulate packaging throughout the logistics of packaging to the end user.

Sustainability as a basic principle of action in every field, including the packaging sector, requires the use of environmentally friendly and smart packaging. Packaging is getting “smarter”, with a minimalist and simple design, produced with the capabilities and quality that digital printing provides. Augmented reality (AR) connects the packaging sector with new thinking and new lifestyles, showing that the industry is following the future trends and continuing to move in the right direction.

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