UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

THE IMPLEMENTATION OF ENVIRONMENTAL SUSTAINABILITY STRATEGIES IN THE PHARMACEUTICAL INDUSTRY: THE CASE OF KRKA IN EASTERN EUROPE

Ljubljana, February 2021 YULIIA KONONENKO

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sl. – Slovene
EU – (sl. Evropska unija); European Union
EIB – (sl. Evropska investicijska banka); European Investment Bank
ACIS - Association of Chemical Industries of Slovenia
API - Active Pharmaceutical Ingredient
ARSO - Slovenian Environment Agency
CDP - Carbon Disclosure Project
CoS – Certificate of Sutability
DEA - Drug Enforcement Administration
EDQM - European Directorate for the Quality of Medicines
FDA - Food and Drug Administration
FTSE - The Financial Times Stock Exchange 100 Index
GHG – Greenhouse Gas Emission
GMP - Good Manufacturing Practices
GRI - Global Reporting Initiative
GZS - Chamber of Commerce and Industry of Slovenia
HACCP - Hazard Analysis and Critical Control Points
IMS – Integrated Management System
IPPC – Integrated Pollution Prevention and Control
IT - Information Technology
IUCN - International Union for Conservation of Nature (
RandD – Reasearch and Development
SBTi - Science Based Targets initiative
SDGs – Sustainable Development Goals
UN – Unated Nations
US – United States
WBCSD - The World Business Council for Sustainable Development
WRI – World Resources Institute

INTRODUCTION

Due to the rapid change in the world order, which is significantly globalized, the development of new centers of influence creates increased competition in almost all areas of activity. New technologies appear, access to information becomes much easier, and number of sources of innovation increases significantly. The development of a modern market economy provokes a gradual increase in the use of non-standard methods through the use of new business models to improve their efficiency. All those affect changing business environment; therefore, industrial companies are constantly forced to improve their internal and external processes. What is more, companies try to minimize operating costs. To maintain stable position in the market, as well as to provide profit higher than that of competitors, they need to form and strengthen competitive advantages. Since success of companies is increasingly measured not only by economic indicators, but also by social and environmental characteristics, many companies have begun to pay great attention to sustainable development (Stilz, 2018).

The relevance of the research is due to significant increasing interest of companies, state and society to the problems of business operations with the least negative impact on the environment. Environmental sustainability strategy includes a constant cycle of production resources and consumption and sustainable circulation of natural resources of substances that are returned to production without entering the environment. For example, when it comes to creating a new product, it is necessary for a company to think in advance about the ways of disposal, recycling or re-use of materials. The use of environmental sustainability model in the supply chains of large companies helps not only to increase the economic and environmental efficiency of production, but also improves the company's image and increases customer loyalty, which is very important for successful company's operation in the market (Abugre, 2020).

Unfortunately, despite the strong concern of world society, not all countries have issues of social responsibility and environmentally sound production on the agenda. In this regard, pharmaceutical products in the environment are a growing problem of global concern. Drugs taken by humans and animals enter rivers, lakes and even drinking water and can have devastating effect on human health and other organisms (Gruenberg et al., 2017).

The driving force of pharmaceutical industry is to improve people's health and well-being. Thus, pharmaceutical companies should recognize that reducing environmental footprint of their activities is an important step for positive impact on human health (De Soete et al., 2017). Moving to an environmentally sustainable model can bring many health benefits. For example, optimization of resources and processes aimed to reduce the environmental footprint will help to fight against climate change (Newton, 2017).

In countries where regulatory standards do not exist, pharmaceutical companies must do more to prevent harmful substances from entering the environment and take responsibility for the whole life cycle of their products. The best example of raising awareness about the problem will be companies with global experience in social responsibility policies and knowledge of the negative impact.

One of these world leaders in pharmaceutical industry is Slovenian company Krka. Responsibility for the environment in Krka is an integral part of everyday business life. With the ISO 14001 environmental certificate, and with a comprehensive environmental policy, the company strives to minimize the impact on the environment. This means both reducing emissions to the environment and reducing the use of natural resources and energy (Krka, 2019). Thus, pharmaceutical companies are able to change the vector of the economy and society as a whole.

The purpose of this master's thesis is to provide recommendations to the management of Krka in Eastern Europe how to strengthen the positions of environmental sustainability used by pharmaceutical companies. This work can serve as a guide to determine the further vector in the range of development strategies. Therefore, the main goal is to give advice and to offer the most realistic model for environmental sustainability strategies implementation, taking into account barriers and specifics of the country where the model of environmentally friendly business is at the initial stage.

To achieve this goal, it is expected to solve the following tasks:

- To systemize sources which reveal problems of implementation of environmental sustainability strategies in the pharmaceutical industry;
- To consider the methods of implementation of environmental sustainability strategies in the pharmaceutical industry;
- To determine the extent of the application of the environmental sustainability strategies in successful business operation.
- To analyse the international experience of the application of environmentally friendly industrial activity.
- To evaluate the possibility of implementation of environmental sustainability strategies in pharmaceutical industry in Eastern Europe.

The literature review revealed that scientific publications devoted to the problems of environmentally safe production contain a sufficient number of research and development, whereas the idea and implementation of environmental sustainability strategies in the pharmaceutical industry are relatively new. Based on this, the following research questions were formulated.

RQ1: What do past empirical studies show about the effect of environmental sustainability strategies on competitive advantage?

RQ2: What are the barriers and the risks of implementation of environmental sustainability strategies in Eastern Europe?

RQ3: How can pharmaceutical companies avoid barriers and implement a better environmental sustainability strategy in Eastern Europe?

In order to reach the goal, set in the master's thesis, general scientific methods, basically, methods of analysis and synthesis, induction and deduction will be used. The analysis of the literature will help us build a comprehensive understanding of the concept, compare the advantages and risks, define the problem of implementation of environmental sustainability business strategies. A significant role will be given to the systematic approach in combination with the structural and functional methods, which allow us to consider the implementation of environmental sustainability strategy as a component of successful business operation in a highly competitive environment. The induction method will help us generate a main idea of the impact of this strategy on creating competitive advantages for the business as a whole, based on the experience of successful companies that use specific mechanisms of green production. The method of deduction will be used to move from the general concept of the strategy of environmental responsibility to the specification of essential types of its application in the pharmaceutical industry. For deeper understanding of environmentally safe production, qualitative methods will be applied, namely case studies of this issue, a survey that is presented in the format of a questionnaire to collect data from representatives from Eastern Europe, as well as from Slovenia, and their further comparative analysis.

The master's thesis includes both primary and secondary data sources. Secondary data is mostly used in the theoretical parts of the thesis. The collective modern knowledge presented in books, articles, and journals will be used to form the general idea of the concept of environmental sustainability production. The thesis also involves analysis of the literature on the development of projects related to the models of environmentally sound business and its implementation in the policy of social responsibility of companies. On the other hand, primary data is mostly used in the empirical parts of the thesis. To determine the features of development of the environmental sustainability strategies for pharmaceutical companies, taking into account the particularities of Eastern European region, the main primary source will be a statistical analysis based on data obtained from a detailed survey. The survey is presented in the form of an anonymous questionnaire for both representatives of pharmaceutical industry and consumers to take into account the consumer's factor in the strategy development.

The master's thesis is divided into four parts. The first part is theoretical, which is used as a preparation for practical analysis and is devoted to familiarization with environmental sustainability. It describes key concepts and definitions, as well as challenges and benefits of the environmental sustainability strategies for companies, based on the analysis of the existing literature on this issue. The second part presents the role of environmental

sustainability strategies in the pharmaceutical industry, focusing on existing barriers and risks. The analysis of successful practices of pharmaceutical companies in relation to the environmentally friendly business helps to provide recommendations, placed in the last chapter of the master's thesis. The third part is dedicated to an empirical analysis of the Krka, taken as an example of a large pharmaceutical company which operates in Eastern Europe. It covers the presentation of the company and its sustainable development strategy, also provides specific examples of using the strategy of environmentally sustainable behaviour based on survey conducted with the pharmaceutical and non-pharmaceutical representatives from different regions. The final chapter involves recommendations made regarding the implementation of an environmentally sustainable production strategy in the pharmaceutical industry based on the specifics of the Eastern European region.

The most important limitation of the thesis is very restricted access to primary data. Krka is very strict in providing non-public information and is not an open for communication. Nevertheless, the questionnaire developed by the author was sent to Krka in electronic form, together with an official inquiry and a justification of the purpose of the request. In 5 months, an official refusal was received due to the company's official statement that the information asked in the questionnaire does not comply with the company's privacy policy.

1 THE OVERVIEW OF ENVIRONMENTAL SUSTAINABILITY

"If you really think that the environment is less important than the economy, try holding your breath while you count your money" (Guy McPherson).

1.1 Definition of the concept of environmental sustainability

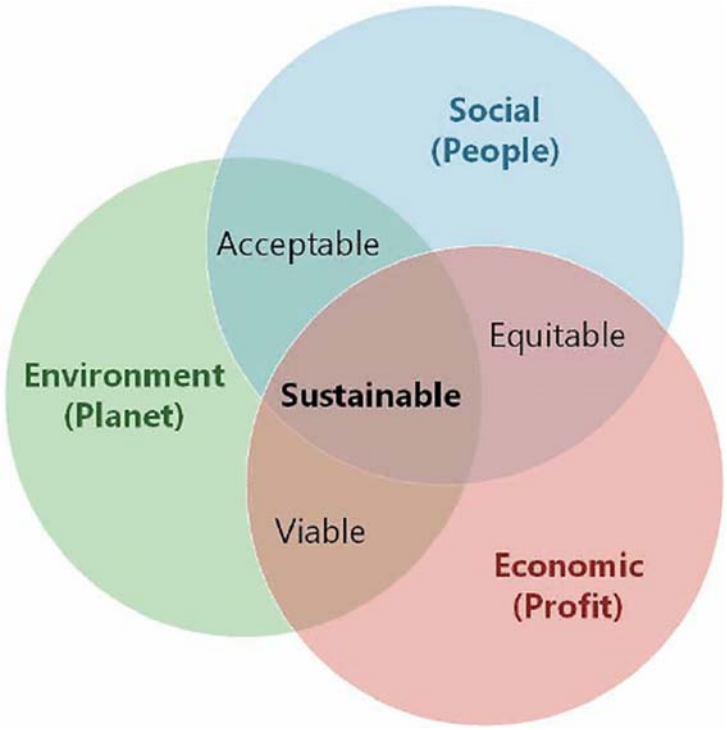
Since the beginning of 1945 one of the main goals set out in the Charter of the United Nations (UN) (Article 1, Paragraph 3) has been "To achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion" (Charter of the UN, 1945). Improving human well-being continues to be one of the main tasks of the UN to this day.

Nowadays, in the context of rapid development of world community, global crises, oversaturation of markets and environmental disasters, issues related to ensuring sustainable, self-sufficient development of mankind, that does not exhaust natural resources, are of decisive importance. It is important to get a point across environmental issues to the public, as well as for governments – to develop appropriate environmental policies and tools that encourage the desired social behaviour.

In the modern sense, the term "sustainability" has been widely used since it was published in the Report of the World Commission on Environment and Development in 1987. In the

report entitled "Our Common Future", Norwegian Prime Minister Gro Harlem Brundtland defined the term of sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). Thus, the concept of sustainability can be defined as processes and actions by which humanity avoids the reduction of natural resources in order to maintain ecological balance, so that the living standards of society do not decline. Based on the above, as we can see in Figure 1, sustainability has three main pillars: economic, environmental and social, which are also called profit, planet and people, respectively, which resources must be used wisely in the long-term future. The global community aims to emphasize the contribution of business to the implementation of the concept of sustainable development.

Figure 1: Three pillars of sustainability



Source: United Nations (1987); IUCN (2005); Makkar (2013); and Makkar and Ankers (2014).

The United Nations Millennium Declaration was adopted by General Assembly Resolution 55/2 on September 18th, 2000 (United Nations, 2000). In particular, the successful achievement of the goals such as poverty reduction and progress in health sector in developing countries, set out in the Declaration until 2015, exacerbated the issues of population growth and resource constraints. The urgency of growing problems influenced the search for new production models and innovative solutions, which development depends largely on private sector's activities. As a result, business acquires the status of one of the

key participants in the implementation of a new universal and coherent development paradigm (Pettinger, 2018).

In July 2015, the third UN International Conference on Financing for was held in Addis Ababa (General Assembly, 2015). The agreed programme of action, which was adopted by the participants in the field of creating investments to solve a number of economic, social and environmental problems, is considered a historic turning point in international cooperation. The Addis Ababa Agreement focuses on domestic resource mobilization, but at the same time emphasizes the importance of attracting private investment in sustainable development, along with public policy and legislative and regulatory framework.

Since September 2015, the idea of active business participation in the implementation of sustainable development has found specific practical expression in the UN Global Sustainable Development Goals, that are enshrined in the UN General Assembly Declaration "Transforming our world: the 2030 agenda for sustainable development" (General Assembly, 2015).

The 2030 Agenda for Sustainable Development sets out 17 goals that clearly define "the world we want". These include eliminating poverty, ending hunger, improving the health of people around the world, ensuring universal quality education, reducing inequality, combating climate change, and so on (United Nations, 2015).Unlike the previous UN Millennium Declaration (2000-2015), the list of goals now includes responsible consumption and production (Goal 12) as well as a call for companies, especially large and multinational ones, to " implement sustainable practices and include information related to sustainability in their regular reports" (Goal 17) (General Assembly, 2015).

The global understanding of development has changed over the years, and now countries have agreed that sustainable development is development that promotes prosperity and economic opportunities, enhances social well-being, and protects the environment (United Nations, 2015). Despite a fairly high level of awareness of sustainable development, some companies sometimes call into question the relevance of environmental and social factors, falsely defending the importance of only economic indicators (Pettinger, 2018).

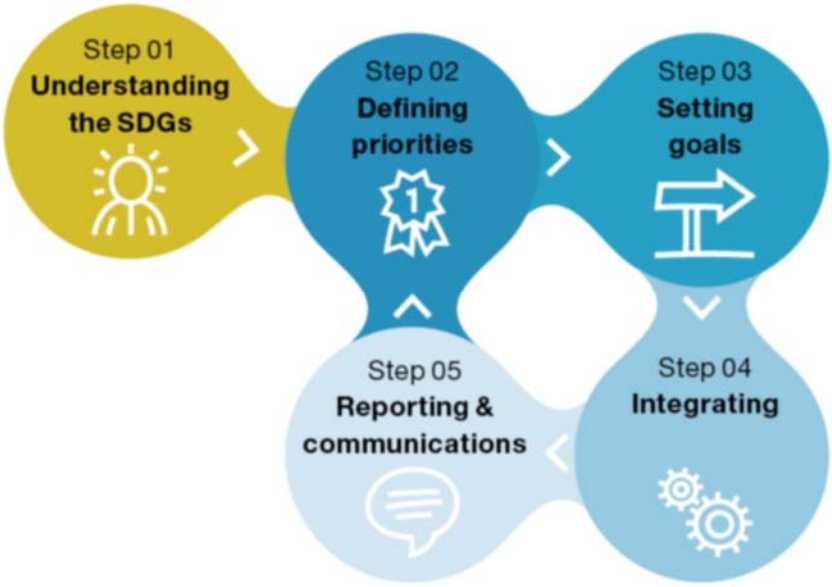
The Global Reporting Initiative (GRI), author of the most widely known and used guide on sustainable development, has published the first analytical article in the Reporting 2025 project. It surveys future trends in sustainability, corporate reporting and information disclosure.

Moving towards a sustainable economy is slow and difficult. However, as noted in the first analytical review of Sustainability and Reporting Trends in 2025: Preparing for the Future published by GRI, 2015 was a tipping point in turning corporate sustainability strategy and public reporting into key business objectives. "The movement for a sustainable economy has forever changed the perception of the role of business and its responsibility": business takes

the major part of the overall responsibility for achieving a better world (United Nations Global Compact, 2015).

The impact of business on sustainable existence of mankind is closely related to how handling issues of sustainability affects business. This creates a mutually beneficial circle. In order to help companies align their business strategy with the Sustainable Development Goals (SDG), the SDG Compass guide was created to measure their contribution to achieving performance targets. SDG Compass, which was developed by GRI, the UN Global Compact Initiative and the World Business Council for Sustainable Development (WBCSD), includes feedback from companies, government agencies, academic institutions, and civil society organizations around the world. The guide presents five steps for companies to set or adjust their course, depending on where they are on the track to ensure that sustainability is the result of their core business strategy (General Assembly, 2015). We can see this in more detail in Figure 2.

Figure 2: Five steps of Sustainable Development Goals Compass guide



Source: SDG Compass Guide (2015).

Participation in sustainable development means understanding the long-term problems of our planet and taking them into account in strategies and business practices. In modern conditions, most companies are strengthening the social orientation of their business and are looking for solutions to ensure long-term loyal from potential consumers and investors. However, the strategy of improving environmental index is effective only when all employees of the organization are aware of the functioning of natural systems and

understand the impact on business performance. It turns out, that the environmental literacy of managers, their attitude to the acute problems and the ability to convey the goals to their employees, are the main factors that determine the environmental strategy of the organization.

The company usually sets sustainable development goals, and then works to achieve them. The goals are often reasonable - for example, to reduce emissions by 5% - so that when a business reaches its sustainability benchmarks, it can call itself "green" or " sustainable" (Sudas, 2017). Such companies can achieve their sustainable needs by reducing emissions, curtailment on demand, getting products from fair trade organizations, and ensuring that their waste is properly disposed with as little carbon emissions as possible (Feretti, 2014).

A company can be recognized as sustainable not only if it cares about ensuring its own economic success in the long term, but also if its operations simultaneously contribute to the achievement of sustainability at the global level, as well as stimulate the country's economic growth, and also increase social benefits and maintain environmental balance.

1.2 Application of environmental sustainability as a way of building a competitive advantage

The concept of competitive advantage implies the superiority of a company, a product, a service, or a brand over competitors that work with you in the same niche. Beside the profit, competitive advantage helps to solve a whole range of other business tasks. First of all, the company that has a competitive advantage, strengthens its position in the market, increases the prospects for stable growth, in this regard, potential competitors face strong difficulties when they enter the market.

Michael E. Porter draws a sharp distinction between operational effectiveness and strategy in his seminal article named "What Is Strategy?" (1996). He argues that strategy "is about being different" and that "the essence of strategy is choosing a unique and valuable position rooted in systems of activities that are much more difficult to match" (Porter, 1996).

In recent years, an increasing number of companies around the world have voluntarily adopted and implemented various methods of sustainable development. For some of them it could be a form of strategic differentiation, for others it may be coercive measures related to the need for corporate survival in the face of fierce competition. Otherwise, taking such measures will not be a condition for creating a competitive advantage. For example, some companies implement environmental, water, or waste management systems in order to use cost effectiveness and thus increase their productivity. Although such systems are usually seen as implementing sustainable development practices, just few companies can expect to gain a competitive advantage by adopting them. In most cases, competitors can easily obtain such systems directly from third parties (Kramer, 2011).

On the other hand, some companies create a real strategic advantage, which means that they succeed against their competitors. For example, companies that implement innovative business models based on the principles of a circular economy. Alternatively, those who practice employee engagement and retention do so in order to differentiate themselves and therefore take unused or underutilized positions, developing a unique and difficult to imitate strategy (Berns et al., 2009).

The circumstances for switching to environmentally friendly production strategies may include, for example, public opinion or disapproval of certain non-ecological methods of work, legislation that calls for the economic expenditure of resources and imposes certain restrictions (Ioannou, 2019).

Since 2015, the official establishment of the SDGs in the UN Agenda has turned them into mandatory criteria by which the activities of all institutions and structures will be evaluated in the foreseeable future. Competition in the business environment is increasing due to the need to meet new requirements, which demonstrates the importance of companies' commitment to contribute to the creation of innovative and disruptive models of sustainable development. As a consequence, they increase their competitive advantages and maintain their own sustainability (Green Growth Knowledge Platform, 2018).

It turns out, that in the modern world any company can face the problem of sustainability, economical and rational use of resources. Whether it will be a temporary measure or a long-term one depends on further decisions of the managers made at the stage of the company strategy development.

In order to determine the importance and value of environmentally sustainable business activities, it is worth paying attention to a number of advantages that companies have while using this strategy in their practice. Nowadays, the company's degree of concern for the environment is becoming one of the reputation criteria by which the whole company is assessed. If a company cares about what it does and is willing to take responsibility for the consequences of its actions, then it is probably just as careful and considerate of finances, consumers, production, employees etc. The number of conscious customers is increasing every year and turning away from unstable businesses, even if they appear to be a cheaper option. They prefer to buy from companies that adhere to environmental values and are taking proactive steps towards changes.

Despite the fact that fair amount is often spent on creating environmentally friendly business procedures, this will save a lot of money over time. Thus, according to a study made by Harvard Business School, companies with a strong culture of sustainability management perform better financial results than the companies with a lower culture of sustainability management (PwC, 2017).

Thus, an eco-friendly business reduces costs and saves energy. Costs are also reduced when using recyclable materials. Optimization of the work of employees or transport saves soil, as well as a significant amount of money.

Employees receive a lot of support when a company begins to operate taking into account careful impact on the environment, most economical and adequate use of resources, as well as respect for the world around them. This all is one of the main goals of the company. They have a greater desire to work, and consequently, productivity and quality of work are improved (The Nielsen Company, 2019).

Involving employees in corporate environmental initiatives boosts morale. Employees believe that their health is taken care of and that they are more than expendable material. It's also a good way to reduce employee turnover, because employees don 't want to leave the place where they feel part of the work community that cares about them. What is more, you inevitably have to overestimate a lot, when you switch to a new style of work.

At the same time, it should be borne in mind that the transition to an environmental sustainability strategy will entail many changes, not only in financial terms. The principles of sustainable development force us to consider and defend not a separate part of the company, but the entire system as a whole. This will require a complete reorganization of the company, as well as a new course of action. The problem of sustainability is very multifaceted. In addition to new knowledge, this view significantly expands the horizons and gives you the opportunity to find new solutions, to see some problems that were missed or not noticed earlier. It also provides an invaluable communication experience and advantages in coordination sphere.

At present, the fear of risks is especially high, and the risks are quite difficult to predict, therefore, the company that is the most competent and thoughtful in its work, supports transparency, will arouse much greater confidence of stakeholders and potential partners.

In the eyes of the investment community, corporate commitment to the SDGs becomes not only a market value, but also a moral imperative. According to the research "Sustainability through the eyes of the investor", 72% of individual investors believe that it is profitable for companies to focus on sustainability. The so-called millennial generation (this study includes the 18-32 age group) also demonstrates more commitment to sustainable investment than average. They are three times more likely to seek employment in a socially and environmentally responsible company. In addition, they are twice as likely to invest in companies or funds that are focused on specific social or environmental goals, and are twice as likely to focus their consumption on brands of ESG-responsible companies etc. It is obvious that the future is for investing in environmental social and governance (ESG-investing) and socially responsible business. With the change of generations in business, the transition to sustainable investment will accelerate (Stanley, 2015).

As mentioned above, all companies will sooner or later have to adjust their working style in accordance with the principles of sustainable development. The sooner this happens, the more likely it is that the company will have a great opportunity to establish itself in the market as an environmentally conscious business, which will significantly reduce costs and attract a large number of customers (Hopkins, 2009).

These days, we have reached a stage where one person who makes decisions about changes is not enough, and the companies that play a leading role in this matter have really come a long way and set a strong example for others.

Customers begin to notice which companies are making efforts and making changes and which are sticking to their wasteful practices. In fact, according to a study by Nielsen, the "green generation" is 13% more likely to choose a more expensive but environmentally friendly product or service compared to standard industrial goods and services.

The more world-famous companies become "green", the more attractive the idea of "green" becomes. In fact, it becomes a symbol of the status of an environmentally friendly business. Computer company Dell has launched a recycling program that allows customers to return hard-to-process electronics at no charge (Dell, 2020).

Car manufacturer Honda is currently known as one of the most environmentally friendly companies in the automotive industry for optimizing fuel efficiency (Honda, 2020).

Research by Unilever has revealed that consumers are actively choosing brands that provide social or environmental benefits. As proof of this, consumer goods giant Unilever has also made great strides in developing eco-friendly packaging: in 2018, it began selling its PG Tips tea in fully biodegradable bags (Jansen, 2018).

Another study conducted by WineIntelligence found that wine consumers in the United States are willing to pay up to seven dollars more for a bottle of wine from companies using sustainable methods (WineIntelligence, 2020).

Similar evidence was also found by Pure Strategies. In its latest report, the consulting firm showed that increased spending on corporate sustainability led to a profit growth of between $ 5 billion and $ 8 billion in 2016 (Baldwin, 2017).

When it comes to the environmental benefits of a business, these advantages far outweigh any disadvantages. The time and money it takes to create new eco-friendly protocols pays off over the years in dividends, not only in money, but also in the sense that the company is planet-friendly.

1.3 Problems of implementing environmental sustainability in conditions of poor state regulation and policy

The development of business practices leads to increased requirements for social responsibility and information transparency of companies. The reorientation of business towards responsible investment in the interests of sustainable development is of fundamental importance, since it is considered as an essential part of the country's new development strategy, which should replace the old model based on hydrocarbon exports.

Everyday life is made easier by innovative products and services provided by companies. These companies, however, have their own natural resources in one form or another, but mostly deal with economic issues such as profit, turnover, market value and shareholder value. In most cases, the solution to the country's environmental problems remains at the discretion of the government that can organize information campaigns, establish laws, impose taxes and fines for garbage, but they are all only slightly effective.

"We have a mechanism in the form of laws, regulations and agencies for sustainable environmental management," said Joyce Msuya, the UN Environment Acting Executive Director. "Political will is now crucial to ensure that our laws work for the planet. This first global assessment of the environmental rule of law highlights the work of those on the right side of history - and how many countries have become stronger and safer as a result" (United Nations, 2019).

Since 1972, international assistance has helped countries conclude over 1,100 environmental agreements and develop many environmental framework laws. Despite this, according to the UN Environment report, neither aid nor internal budgeting has resulted in to the creation of strong environmental institutions that can effectively implement and stick to the law. Weak enforcement is a global trend that increases environmental threats. The authors of the report point to numerous factors contributing to poor compliance with environmental rule of law, including poor coordination between government agencies, weak institutional capacity, lack of access to information, corruption, and suppression of civic participation (Bruch, 2019).

"This report solves the mystery of why problems such as pollution, declining biodiversity and climate change persist despite the proliferation of environmental laws in recent decades «David Boyd, UN Special Rapporteur on Human Rights and the Environment said, "Unless the environmental rule of law is strengthened, even seemingly rigorous rules are destined to fail and the fundamental human right to a healthy environment will go unfulfilled".

On the one hand, we should not underestimate the fact that governments in developing countries are increasingly seeking to "green" their economies, in particular, in accordance with the Paris agreement, where almost all governments agreed to create national roadmaps for decarbonization.

In addition, many developing countries have adopted comprehensive national green growth strategies aimed at reducing their environmental impact and making this process as a new competitive advantage. In contrast, an increasing number of companies around the world are demonstrating an understanding of corporate sustainability strategies. However, when implementing sustainable development practices, companies face institutional and infrastructural constraints that are more common in emerging markets. Many companies have been criticized for using cost-cutting measures such as offshore manufacturing to obtain cheaper labour. This practice, while beneficial for practical results, is often achieved at the expense of employee security.

The market for environmentally friendly products is a mechanism for interaction between supply and demand entities, which makes it possible to ensure the balance between demand and supply of environmentally friendly products through price and non-price impacts. The role of the state in this case is to ensure stability and a positive growth trend using available economic policy tools.

The most important task of both business and government is to educate responsible business leaders at various levels, who are able to think in terms of sustainable development and responsibility, and thus, practically implement a new business strategy.

An empirical study conducted by Agnieszka Leszczynska in three countries: Poland, Ukraine and Australia involved more than 200 employees from public and private corporations from these countries. The research tools were divided into two parts. The first part was dedicated to the environmental awareness of employees. The second part of the study deals with the beliefs and opinions of environmental managers. The answers were given on an interval scale from 1 to 5 for a specific question. The survey results showed that in some countries companies have "gaps" in the components of awareness, and therefore between beliefs, environmental values and willingness to act. In addition, a gap in awareness was found between more developed and less developed countries. Thus, the study demonstrated that the perception of various environmental threats changes along with changes in socio-economic development (Leszczynska, 2010).

The Principles for Responsible Management Education (PRME) is a United Nations-supported initiative founded in 2007 as a platform to raise the profile of sustainability in schools around the world (United Nations, 2007).

Principle 1. Purpose: to develop capabilities of students to be future generators of sustainable value for business and society at large and to work for an inclusive and sustainable global economy.

Principle 2. Values: to incorporate into academic activities and curricula the values of global social responsibility as portrayed in international initiatives such as the United Nations Global Compact.

Principle 3. Method: to create an educational frameworks, materials, processes, and environments that enable effective learning experiences for responsible leadership.

Principle 4. Research: to engage in conceptual and empirical research that advances understanding about the role, dynamics, and impact of corporations in the creation of sustainable social, environmental, and economic value.

Principle 5. Partnership: to interact with managers of business corporations to extend knowledge of the challenges in meeting social and environmental responsibilities and to explore jointly effective approaches to meeting these challenges.

Principle 6. Dialogue: to facilitate and support dialogues and debate among educators, students, business, government, consumers, media, civil society organizations, and other interested groups and stakeholders on critical issues related to global social responsibility and sustainability.

Environmentally responsible companies pay a lot of attention to "green" issues: they comply with the requirements of environmental legislation, analyse and optimize their environmental footprint, use technologies to preserve the environment, conserve resources, encourage employees to participate in national campaigns, conduct seminars for employees on an environmental lifestyle and create conditions for the application of these practices in daily work. It is worth emphasizing the importance of interaction between business and public authorities, since the regulatory role of the latter depends on the introduction of new "sustainable" technologies, products and services into the economy. In addition, the proper reallocation of public and private investment will help to maintain the stability of both society and markets. Effective participation of informed civil society is also important that leads to better decision-making by the government, more responsible environmental actions by companies, and more effective environmental legislation. The provision of periodic reports on the quality of the country's environment, including air and water quality, helps to achieve these goals.

2 ENVIRONMENTAL SUSTAINABILITY IN PHARMACEUTICAL INDUSTRY

More than 100,000 tons of pharmaceutical products are consumed worldwide every year. The emergence of new medicines, which improve quality of life, is at the heart of the growth in drug consumption across the globe. The demand of the most commonly used medicines has increased, at least in part, due to the complex relationship between behavioural change and ecological turnover. For example, an increase in consumption of statins and antidiabetic drugs may be associated with the spread of sedentary lifestyle due to urbanization, or deterioration of the health of people with respiratory diseases may be associated with air pollution (Thomas, 2017).

It is clear that the success of the pharmaceutical industry brings obvious benefits in terms of health and economics, but at the same time, the production, use and disposal of active pharmaceutical ingredients (API), as well as other chemicals are released into the environment.

2.1 Reasons and incentives for environment sustainability strategies in the pharmaceutical industry

Ever and again, ecologists can detect pharmaceutical residues in surface and subsoil waters, drinking water, soil and animal tissues at different concentration with different pharmacological actions. The problem becomes compounded by the fact that people intentionally dispose unused drugs by throwing them into the sewer system. Among them are painkillers, antimicrobials, antidepressants, contraceptive and antiparasitic drugs, and so on.

Although modern water treatment systems are designed to remove pollutants from wastewater before they re-enter the environment, some harmful substances still remain. It is suggested to pay special attention to endocrine disrupters (BIO Intelligence Service, 2013).

For example, due to birth control, high levels of oestrogen in wastewater can prevent fish from reproduction, reducing their population. Hormones and other substances that make up medicines can damage entire ecosystems. Two hormones are included in the EU surface water watch list of emerging pollutants: oestradiol (E2) and ethinylestradiol (EE2), however monitoring data of these substances is still scarce due to the lack of measurements undertaken with sufficient analytical capacity to quantify these substances (Schwindt, 2014).

Once these chemicals enter the water, they fall into the food chain and eventually affect animals that also live on Earth, including humans. Another serious threat is that the release of antibiotics into the environment can contribute to the natural development of antibiotic-resistant pathogens that are more difficult to treat.

An environmental risk assessment is currently mandatory for all applications for marketing authorization for both human and veterinary medicines. However, risks to the environment remain, partly due to the very recent introduction of elements of legislation.

Given the undoubted benefits of pharmaceuticals for modern medicine, it is important that strategies aimed at reducing their negative impact on the environment focus on preventing or reducing these impacts in order to find ways to manage them, but not to affect the effectiveness and availability of medicines and their acceptable cost.

On 11 March 2019, the European Commission (EC) released a Communication which outlines a strategic approach to pharmaceuticals in the environment. It sets out goals and corresponding actions to achieve them in terms of encouraging innovation that can help to

eliminate risks associated with pharmaceutical residues in the environment, and contribute to a circular economy. Reducing the risks of adverse environmental effects does not jeopardize access to safe and effective pharmaceuticals required for humans and animals.

Consequently, recommendations that relate to all stages of the life cycle of pharmaceutical products have been formulated. These are the following (European Commission, 2019):

- to raise awareness about the reasonable use of pharmaceuticals;
- to promote the wise use of medicines that pose a risk to the environment that can significantly reduce the problem at source;
- to support the development of pharmaceuticals that are inherently less harmful to the environment and promote more environmentally friendly production.
- It is necessary to encourage the pharmaceutical industry to pay more attention to the environment in terms of a life cycle and to stimulate responsible behaviour at the design and production stages;
- to improve identification and analysis of environmental risks;
- to establish partnerships with international organizations and enhance access to data which can contribute to more effective risk management;
- to reduce waste and improve waste management. Proper disposal of pharmaceutical products will stem a risk to the environment. It is necessary to update and introduce innovations of wastewater treatment technologies, as well as control the sources of diffuse emissions from livestock;
- to expand environmental monitoring. Knowing more concentrations of pharmaceuticals in the environment can improve environmental risk assessment and increase the targeting of measures. It is really significant to cooperate with stakeholders;
- to fill in other knowledge gaps. Although the above actions include some research, the ability to manage risk can be significantly enhanced though extensive research in other areas.

The approach to the gradation of medicines depending on their impact on the environment, used in Sweden, is very indicative. The advantage of this policy is the ability of doctors to prescribe less harmful drugs in terms of their impact on the external environment (Stockholm County Council, 2014). In addition, it is absolutely necessary to reorient social norms towards a more responsible approach to the use of medicines by educating the public. In this context governments and healthcare professionals play a key role by bringing together relevant professionals, contributing to funding specific training programmes, and ensuring the adoption, implementation and application of relevant legislation (Laxminarayan et al., 2013).

In the European region, there are various educational events held for schoolchildren, such as the e-Bug course, which have already proven themselves on the positive side (Touboul et al., 2011). Despite advances in technology to reduce the negative impact of pharmaceutical

waste, these measures are costly, difficult to implement and do not address the root cause of the root cause of drug overuse.

There are still a number of problems regarding the availability of information to the public. Thus, there are no specific rules for waste management of most medicines. There are no restrictions on the content of pharmaceuticals in drinking water, surface water or wastewater, even from hospital wastewater. Only a few drugs can be evaluated for harmful effects because as there are generally not enough developed requirements for manufacturers to monitor API emission limits (European Environmental Bureau, 2019).

A broader analysis in the context of social, political and economic factors will help to understand not only how to approach the disposal of medicines, but also to obtain data for the development of attitudes that effectively respond to the root cause of problems, for example, why certain drugs are prescribed to certain groups of the population, whether they are used by them or thrown away. One of the reasons for requirements of many commonly used medicines in the European region is the relationship between lifestyle changes and changing natural environment (Thomas, 2017).

Thus, over the decades, the population of Eastern Europe in particular is still exposed to the negative legacy of the Chernobyl accident. According to the Chernobyl Forum, people exposed to radiation after the disaster are more in need of drugs used for thyroid cancer, cardiovascular diseases, neurological disorders and maintenance of the reproductive system (Kinly, 2006).

The impact of pharmaceuticals has been underestimated for many years, but this problem needs to be addressed in the same way as the effect of other chemicals, such as pesticides, biocides, or industrial chemicals known as those which influence environment and human health. Uncontrolled release of medicines in the environment not only harms ecosystems, but can even undermine the work of these same medicines for the benefit of humanity.

With the global shift towards a sustainable future, the pharmaceutical industry is increasingly being forced to make commitments that will have a positive impact on the environment and society.

2.2 Analysis of successful practices of international companies using environmental sustainability strategic models

The patient's health can never be compromised in favour of drug selection based on their environmental impact. Patient health and safety take priority over environmental considerations; therefore, it is a challenge for stakeholders to balance this dilemma (Schaaf et al., 2016).

The growth of competition in the pharmaceutical market around the world has forced many companies to look for fundamentally new models of evolvement, to develop a new philosophy of their activities. The need to ensure the health and life of population indicates that the pharmaceutical industry is special and requires the use of modern technologies, methods and tools of production and management for sustainable development. In the modern world, the leading trends in pharmaceuticals are the sustainable development of the company's activities in accordance with the requirements of good manufacturing practices.

As noted above, the pharmaceutical industry is one of the most high-tech sectors in the global economy. Not least is the development of environmentally sustainable production strategies. By minimizing the environmental impact of manufacturing activities, the pharmaceutical industry is becoming a driving force for positive change towards a sustainable future. As for the industry, we have seen a significant shift in thinking in recent decades, while companies set their own goals and initiatives to reduce the environmental impact of their activities and products.

2.2.1 Chiesi

Many pharmaceutical companies are looking for ways to make their products more efficient and sustainable, such as green IT practices to reduce costs, increase sustainability and lower energy consumption in their data centres.

As mentioned above, the development and production of drugs and devices inherently consumes a large amount of natural, human and economic resources. Despite the challenges, there is an advantage – many key players in the pharmaceutical industry, including Chiesi, have committed to protect environment throughout the entire life cycle of production; from invention to disposal.

Chiesi's focuses on becoming carbon-neutral. The "We ACT" program which stands for "we actively care about tomorrow" is a project that raises awareness and directs behaviour and processes to better sustainability. Within the framework of the project, Chiesi actively promotes and informs society on the importance of maintaining sustainability through environmentally friendly production. On September 25, 2019, the company held an annual "We act" Day to mark the anniversary of the adoption of 17 sustainable development goals by United Nations. Since Chiesi is a company that mainly works in the respiratory sector, there is a particular focus on initiatives and projects dedicated to air quality (Chiesi, 2019).

The company states that "Our Sustainable Chemistry Policy is dedicated to the responsible management of chemical substances used for Research activities. The policy addresses both the environmental safeguard and our employees' safety, with the ambition to be always above the best standard of health and safety" (Chiesi, 2019).

As already mentioned, the company is actively engaged in social activities, one of which is corporate volunteering. Since 2015, they have been running Chiesi volunteer week, involving employees in projects with non-profit local associations. These include funding and participation in the school Breakfast Clubs, support of centres for the homeless and the rehabilitation of prisoners. These initiatives are truly sustainable partnerships that provide positive experience not only for the community, but also for the Chiesi employees who are involved.

2.2.2 Novo Nordisk

Another example is the Danish pharmaceutical company Novo Nordisk. Company emphasizes the importance of reducing the negative impact on the environment, both as corporate responsibility practice and as a way to reduce long-term risk. The strategy they use to achieve their goals is called Circular for Zero. Thus, they develop products that can be recycled or reused, and change business practices to minimize consumption and eliminate waste.

Since 2005 Novo Nordisk has focused on reducing direct emissions associated with products along the entire value chain, more clearly it is shown in Figure 3. Nowadays, the company's direct emissions account for less than 10% of the total carbon footprint. The next step is to expand the focus on indirect emissions as well. For example, the company cooperates exclusively with suppliers who have the infrastructure and capacity to properly dispose of waste and have invested in eliminating CO 2 and other harmful emissions. Reductions of emissions associated with purchased goods and services, such as business trips and official cars, are also taken into account (Novo Nordisk, 2020).

Figure 3: A value chain approach to carbon emissions

Source: Novo Nordisk (2020).

According to the company's annual report, energy consumption for operations decreased by 3% in 2019 compared to 2018. Energy consumption for production decreased by 2% due to lower energy consumption for finished products. Energy consumption in offices and

laboratories was reduced by 10% due to various small changes at several sites. In 2019, 76% of the electricity used at production sites came from renewable energy sources, lower than in 2018 (Table 1). This is due to lower energy consumption at the largest wind power production site in Kalundborg, Denmark (Novo Nordisk, 2019).

Table 1: Statement of environmental performance

	Note	2019	2018	2017
Resources				
Energy consumption for operations (1,000 GJ)	11.1	2,993	3,099	—
Share of renewable power for production sites	11.1	76%	77%	79%
Water consumption for production sites (1,000 m^3)	11.2	3,149	3,101	3,276
Emissions and waste				
CO_2 emissions from operations and transportation (1,000 tons)	12.1	306	278	—
Waste from production sites (1,000 tons)	12.2	124	142	157
Responsible business				
Breaches of regulatory limit values	13.1	16	27	23

Source: Novo Nordisk (2019).

In accordance with an agreement to provide solar power in the United States, which takes effect since 2020, Novo Nordisk is on track to achieve 100% renewable energy at all production sites in 2020. As part of the new environmental strategy "Circular for zero", Novo Nordisk will challenge water demands and constantly strive to save water, paying special attention to water scarcity areas (Novo Nordisk, 2020). Regarding waste, 18% of it is classified as hazardous, which is less than 21% in 2018. This decrease was due to a declining amount of ethanol waste from API production.

The company declares that as part of the circular of New Zero Strategy all offices and laboratories will receive renewable energy by 2030. CO2 emissions are expected to be decreased significantly in 2020 thanks to various renewable energy projects, including solar power across all US operations, wind power in Europe and green steam in Denmark. Emissions from transport are also expected to be reduced due to the company's car policy, which encourages the transition to hybrid and electric vehicles, as well as through cooperation with EV100 (Novo Nordisk, 2019). As environmental problems are often complex, innovative solutions are needed to achieve sufficient results. According to global experience, these solutions are frequently best developed and implemented when working in partnerships. And Novo Nordisk was not an exception.

In 2018, Novo Nordisk, together with energy company Vattenfall, introduced a long-term solution for renewable energy in Europe. This solution has provided electricity from Danish wind farms to Novo Nordisk's European production sites since 2020.

The Kalundborg symbiosis is an integral mechanism which implies that pharmaceutical companies together with local farms, utilities and other companies are a part of the industrial

ecosystem. Symbiosis is a closed cycle: an unnecessary product from one company becomes a resource for another (Appendix 2) (Kalundborg Symbiosis, 2020).

In 2018, Oersted and Begadan opened their first joint biogas plant, which converted approximately 300,000 metric tons of biomass from Novo Nordisk and Novozymes into bio-natural gas and fertilizers. Thus, the new eco-friendly bio-natural gas can be used as a substitute for fossil natural gas and provide significant carbon savings.

2.2.3 AstraZeneca

AstraZeneca is one of only three companies to achieve double 'A' listing for both Climate Change and Water Security for the fourth year running by CDP (AstraZeneca, 2018). In January 2020, the company announced "Zero Carbon strategy" which is focused on decarbonization. Currently, the process of transition to a decarbonized business is about taking action in order to eliminate greenhouse gas (GHG) emissions from enterprises; it is also planned to minimize negative carbon emissions throughout the value chain by 2030 (Appendix 3) (AstraZeneca, 2018).

The company actively funds in research and development (R&D), takes an active part in scientific research on climate change and uses this knowledge to create its strategy and inform the public. As a result, they set science-based targets to reduce greenhouse gas emissions in 2015 and were one of the first companies in the FTSE 350 to approve them under Science Goals Initiative (SBTi), which means that the company's goals meet the level of decarburization needed to maintain global temperature rise below 2 degrees Celsius.

Consequently, in 2019, AstraZeneca received confirmation from SBTi that the company's goals are in line with the reductions required to maintain warming to 1.5 degrees Celsius, which is the most ambitious goal of the Paris agreement and is recognized as best practice.

The efficient use of water resources has not been left out as well. The approach of responsible use of water in production is based on the Aqueduct tool of the World Resources Institute (WRI). This tool identifies and evaluates water risks around the world. Based on this information and usage data, the company regularly conducts audits at the key facilities to determine water saving opportunities. Facilities located in areas with water scarcity submit reports on risks and measures to mitigate water consumption and conservation. Based on this, a target indicator for the conservation of water consumption will be set in the future (AstraZeneca, 2018).

Sustainable development is not only about protecting the environment or improving patient access to medicines, but also about empowering, using resources to encourage communities to care for their health and well-being.

Some communities have Unused Medications Return Programs approved by the Drug Enforcement Administration (DEA). Some pharmacies also allow unused medications to be mailed or disposed of at kiosks. The DEA also organizes a National Drug Take Back Day. However, there are some medications that have recommendations on the label that they can be disposed of in a regular household waste bag. The Food and Drugs Administration (FDA) recommends mixing them with something unpleasant, such as dirt, cat litter, or coffee grounds in a sealed plastic bag, and then the bag can be disposed. In such a way the drugs can be masked and pets can be prevented from consuming them. If you throw away a container of prescription medication, be sure to remove all potentially identifying information to protect your privacy and identity.

2.3 Barriers and risks of using environmental sustainability strategies for pharmaceutical companies

In pharmaceutical manufacturing, the patient's needs are the most important considerations. The goal is to ensure safe delivery to the patient along with all necessary components and instructions for effective use.

At the same time, packaging is perceived as one of the main threats to our planet, as it turns into waste immediately after use. For this reason, companies from a wide variety of industries are looking for ways to create a closed cycle of resource use in order to minimize the negative impact of packaging on the environment while preserving its useful properties.

Based on this, there are some difficulties in the transition to a sustainable development strategy, as the issue of reducing or moving away to more environmentally friendly packaging calls into question the viability of sterile storage of medicines. For example, a pain relief product must maintain the promised level of effectiveness as long as the drug is distributed throughout the supply chain. Lack of packaging to protect its contents from such elements as light and air that could endanger the effectiveness of the product is not a characteristic of a sustainable solution. Packaging also plays an important role in providing tracking and authentication measures that protect against counterfeit and falsification.

Considering strict parameters and standardization, achieving a balance between environmental protection in general and human health safety can be a serious obstacle. Producers should look for other ways to achieve environmentally sustainable production. In the previous section, we have already described the strategies of world manufacturers in the pharmaceutical field that have made significant progress in this matter. One of the most effective ways is to cooperate and solve urgent problems together through innovation.

The combination of pharmaceutical products with medical device delivery systems means that the products in general become simpler and more convenient in use and require less packaging. An example of such collaboration in action is the work carried out by both pharmaceutical and medical device manufacturers in the field of implantable devices. For

example, pill bottles can now be digitally time-stamped to remind patients to take medication, and a doctor can monitor them remotely to ensure that patients take the correct doses.

As healthcare services become more complex, pharmaceutical and medical industries will continue to combine their technologies and expertise to provide patients with solutions that combine pharmaceuticals and medical devices into one simple and convenient product. Ultimately this opens up opportunities to increase sustainability through consolidation.

This approach is a win-win because it enables innovation to improve patient compliance, uses unique drug delivery methods, and improves packaging integrity and product safety. It goes without saying that, like any other industry, pharmaceutical production is liable to risks that they cannot influence in any way by choosing a strategy, including an environmentally sustainable one. These include external factors and, first of all, legal regulation of the state. Since the level of social responsibility of the pharmaceutical industry at the state level is assessed as high, the market requires effective legislative regulation. A special role is assigned to the process of adaptation to changes in legislation. A timely response to legislative innovations will be an advantage for some players; however, it will create additional threats for others who adapt more slowly. In addition, research and development in the field of sustainable development of the pharmaceutical industry requires more effective support at the state level and ensuring the necessary level of coordination.

As the pharmaceutical industry grows, the importance of investment and funding of promising industry projects increases. However, there is a threat which lies in the termination of funding for the sustainable development projects, the implementation of which has already begun. The reason for this may be, for example, fluctuations in the microeconomical environment. To prevent investment "hunger", the industry should focus on its own financing or borrowing. Thus, the decline in business investment opportunities will not be felt so acutely.

We should not lose sight of the macroeconomic risks as well. In the modern world, it is impossible to talk about certain countries with relatively macroeconomic stability that can guarantee the absence of this type of risk. Certainty, there are countries that are more or less subject to fluctuations, but in the era of the global economy, it is inappropriate to consider temporary success in the future for several years. Systematic approaches to risk management play a key role in the process of ensuring the stabilization of the industry and its innovation-oriented development of strategies.

For pharmaceutical manufacturers, sustainability will always be a challenge, but a multi-faceted approach can provide the most effective results with the least environmental impact. Companies should take into account the specifics of their work when choosing a development strategy, where everything is strictly limited by the regulatory that controls both the effectiveness and safety of products for consumers. Thus, they often have to go

beyond the more traditional ways to achieve success in the field of environmental responsibility. Through collaboration, innovation and careful assessment of existing operations and practices, companies specializing in the field of biological sciences can implement sustainable initiatives with maximum efficiency (Sandhu et al, 2019).

3 IMPLEMENTATION OF ENVIRONMENTAL SUSTAINABILITY STRATEGY BY THE EXAMPLE OF KRKA IN EASTERN EUROPE

3.1 Presentation of Krka

The history of international pharmaceutical company Krka began more than 60 years ago, when a small pharmacy laboratory was opened in Novo Mesto. Today Krka is one of the leading generic manufacturers in the world. As a part of its business strategy, Krka has set a goal of balanced sales in six different regions. The key market for Krka in Central Europe is Poland, followed by the Czech Republic, Hungary and Lithuania among other markets in the region. The key market in Eastern Europe is the Russian Federation. Other important markets in the region are Ukraine, Kazakhstan, Uzbekistan, Georgia, and Azerbaijan. In the region of South-Eastern Europe, Croatia, Romania and Bulgaria are the largest markets. The region of Western Europe and foreign markets are becoming increasingly important, especially the markets of Germany, Great Britain, Scandinavian countries and Italy. Krka also sells its products in Africa, the Arabian Peninsula, and East Asia. In general, the company's products are represented in more than 70 countries around the world (Appendix 4).

The variety of production lines and services is conditioned by the company's desire to provide people with a comfortable, healthy and high-quality life. Krka's core business is not only production and sale of prescription drugs, over-the-counter medicines, and animal health products. The company's activities are also complemented by spa and tourist services in Slovenia.

The main advantage of all Krka products is their high quality. All products of the company are manufactured in compliance with strict rules and requirements for the production of medicines in accordance with international GMP standards. As a generic manufacturer, Krka produces medicines that can take fair place among the world's leading pharmaceutical companies in terms of quality, safety and effectiveness.

A strictly followed systematic approach is designed to meet customer requirements and achieve the company's goals. The company's values are represented by constant development, thereby increasing not only productivity, but also contributing to the opening of new niches of activity. Thanks to operativity and adaptive skills, the company ably copes with changes and fluctuations in the market. The company develops and sells high-quality

products at reasonable prices; it has made the name of Krka recognizable in many parts of the world. Its generic pharmaceutical products are based on their own innovative methods of synthesis or separation of active pharmaceutical ingredients. Nowadays, there are more than 350 patented innovations, issued in various countries of Europe, America and Asia.

The certificate of suitability (CoS) issued by the European Directorate for the quality of medicines (EDQM) is the highest quality standard in Europe. This confirms that the API meets European pharmaceutical standards. Krka received this certificate for a number of APIs (Krka, 2019).

This success is due to the company's development strategy which has two key advantages: vertical integration and strong correlation of development and production processes. This allows one of the first to achieve the set goals and deliver value-added products to the market.

The Notol 2 plant is the largest investment in Krka's history. The new progressive plant for the production of solid formulations was the result of increased investment. The Notol 2 plant was opened in 2015, it is one of the most technologically advanced pharmaceutical plants in the world. Closed production systems, vertical flow of raw materials, as well as a high degree of automatization and computer control represent its distinctive features. In general, it guarantees the highest level of product and labour safety (Krka, 2019).

At the end of 2014, its production began the Sinteza 1 plant in Krshko, which primary focus was the production of active pharmaceutical ingredients for Krka’s finished products. Thus, thanks to its self-production, the company has full control over the most important part of each medicine. The plant complements the active pharmaceutical ingredient factory in Novo Mesto called Sinteza 4, opened in 2007, and is one of the largest factories of such type in Europe (Krka, 2019). As research and development is part of a vertically integrated business model, it enables Krka to develop and maintain a competitive product portfolio. The company guarantees uninterrupted supplies of new and competitive medicines to various markets through comprehensive and detailed monitoring of products throughout their life cycles. By strengthening long-term business relationships in product development, delivery and marketing, the company maintains trusting relationship with partners.

Krka actively invests in R&D facilities as well as in its own production and distribution centres around the world. Krka's business performance is based on the adherence and knowledge of its employees. The company strives to attract, motivate and retain committed and talented employees, and create an international corporate culture. Investing in the knowledge and development of all employees increases their professionalism and qualifications.

Krka strongly supports employees in the free expression of their ideas and encourages to implement them if these ideas prove to be useful for the company. According to the company's vision, the only real way to achieve first-class results is to create an atmosphere that motivates employees to be innovative and creative. In terms of safety at work, Krka

exerts all efforts to provide employees with a safe workplace, that is why it conducts comprehensive monitoring and analysis of accident and health risks for all positions and types of technologies.

Many employees found their calling in charity events and volunteering at the events organized by Krka or on their own initiative. In this way, the company has been strengthening its social responsibility and humanitarian activities for more than six decades. Krka has been organizing the "Krka Week of Charity and Volunteering" since 2012. Over the past eight years, acts of kindness and volunteer spirit have brought together caring people in more than 8,313 charity events (Krka, 2019).

3.2 Krka's sustainability strategy

The successful business history of the company stems from a long tradition, in particular a commitment to high ethical standards. Running a smart business also means understanding and taking into account the long-term impact of economic activity on the entire social environment. Since its foundation, not only positive results in business, but also ensuring a more prosperous, better quality and enjoyable life has become a strategic goal of the company.

Environmental protection is an important aspect of Krka's business strategy. Since the company's activities directly affect people and society, reducing harmful impact and ensuring a favourable and healthy environment is an important step. Environmental sustainability is becoming increasingly important for the public. This is why Krka refers to the ISO 14001 environmental management system, which was introduced in 2001. Krka has prepared and included some points to their integrated environmental protection system in accordance with the requirements of the Ministry of Environmental Protection and territorial planning and the Order for Integrated Pollution Prevention and Control (IPPC order). Meanwhile, in accordance with ISO 14001, Krka has implemented a transparent system for monitoring and notification of environmental requirements, which allows for innovative approaches to protect the environment.

Various aspects of the business are managed in a unified way using an Integrated Management System (IMS) aimed at achieving optimal business goals (Figure 4). The IMS defines and integrates the attitude to quality, environment, health and safety in the workplace, information security and business continuity.

Figure 4: Krka's integrated management system

Source: Krka (2019).

GMP is the oldest quality system in Krka and serves as the basis for the development of all other management systems. Compliance with GMP is required by law, and without it, the production and sale of medicines would not be possible. Operational tasks are performed by the environmental protection service. All employees are included in the environmental management system specified in the company's basic environmental document. Thus, the environmental management system requires that environmental care is integrated into the entire lifecycle of a product and controlled both internally and externally.

The Krka's sustainable development strategy is designed for a five-year period and updated every two years to adapt it to the constantly changing business environment. The main principles of the environmental sustainability strategy are (Krka, 2019):

- monitoring the environmental impact regularly;
- integrating environmental awareness at the earliest stages of development and specific investments;
- eliminating the risk of emergency events;
- ensuring the rational use of water, fuel and energy, raw materials and other resources;
- replacing (where it is possible) dangerous substances used in technologies with less dangerous ones;
- reducing or preventing environmental impacts throughout the product lifecycle using the best available technologies and other measures;
- raising environmental awareness of employees through education and training;
- complying with legal and other requirements accepted by the company regularly;

- informing employees and other stakeholders about the current state and achievements related to the environment; through a holistic approach to environmental protection, the company strives to promote positive and responsible attitude to the environment among all employees;
- maximizing environmental awareness of contract partners; Krka from time to time monitors the functioning of the quality management system for its suppliers and contractors;
- updating the environmental protection program to improve the current state of the environment;
- implementing appropriate environmental policies in Krka's subsidiaries abroad.

The application of environmental strategies can only be maximized if it is adapted from the initial stages of the process. For this reason, the company pays special attention to product development, the selection of environmentally less labour-intensive raw materials, and the production process itself. Waste generated from certain operations is treated in accordance with the best available methods and in accordance with legal and other requirements adopted by Krka.

Krka uses innovative approaches to production and follows best practices that have been improved and refined through the evolution of the industry. The results of research and development, as well as a practical understanding of legal requirements, allow the company to establish and manage registration documents, as well as obtain marketing permissions for products in a timely manner.

Beside the company's management, Krka is also accountable to national authorities. Reports on monitoring emissions to the environment are submitted to the Slovenian Environment Agency (ARSO), reports on responsible care are sent to the Association of Chemical Industry (ASIC) at the Slovenian Chamber of Commerce and Industry (GZS) and other interested parties.

3.2.1 Water consumption

The pharmaceutical industry is one of the least intensive in terms of water consumption, but one of the strictest in terms of water quality. All water supply systems in Krka are managed in accordance with Good Manufacturing Practices and the HACCP system.

River water and drinking water supplied by public utilities are the main sources for Krka. The company has developed a computerised water utilization management system that records total discharge and total consumption. Careful monitoring of these parameters helps to detect any increase in drinking water consumption in time and find out the root causes. Drinking water supplied by municipal utilities is additionally purified using sophisticated membrane technologies.

About half of all river water is used for cooling by various heat exchangers, especially in API production. The remaining amount is used to prepare industrial water for energy supply and production. Table 2 below shows that in 2019, river water consumption increased by 15% compared to 2018, mainly due to increased API production. At the same time, drinking water consumption decreased by 6.4% (Krka, 2019).

Table 2: Consumption of drinking and river water

Consumption of drinking and river water		2019	2018	2017	2016	2015
Water consumption (total)	m^3	**1,399,303**	**1,341,333**	**1,588,474**	**1,279,065**	**1,362,297**
Drinking water	m^3	613,919	655,837	644,577	600,781	628,770
River water	m^3	785,384	685,496	943,897	678,284	733,527

Source: Krka (2019).

According to various sources, the share of active pharmaceutical ingredients released into water from the pharmaceutical industry is much lower than the share of these substances released into water by end users.

Wastewater treatment protects surface and underground water from organic and microbiological contamination as well as the ingress of nitrogen and phosphorous components; that is why ensuring the most effective treatment is one of Krka's priorities in the field of environmental protection.

3.2.2 Energy expenditure

To protect the environment, renewable energy sources are used in production. A solar power plant was installed on the roof and facade of the warehouse for packaging materials to generate emission free energy. The energy management strategy is part of a broad corporate strategy and covers the actions required to achieve cost-related and environmental goals.

This strategy is included in the Krka's integrated management system and developed in accordance with ISO 50001 principles. Compliance with legal and other requirements, adopted by Krka, is periodically checked and evaluated by the Environmental Monitoring Committee. Whereas, the Committee is in charge of appointing responsible people and determining when additional activities should be carried out in accordance with the changed legal requirements. Thus, it allows the company to manage and at the same time improve processes based on the principles of sustainable development and circular economy, maintaining a high level of environmental protection.

In order to comply with environmental and energy policies and internal standards, Krka makes constant and considerable efforts to maximise the utilization of heat generated as a

by-product in various processes. The company prepares heating water by using waste heat from the compressed air station, flue gases from steam boilers, vapours from the steam boiler system, and condensed heat from cooling aggregates and cogeneration, which results in a 54% (or 23.5 GWh) reduction of natural gas consumption when preparing heating water. Due to systematically implementing measures and constant investing in energy efficiency improvements in recent years, the company has achieved average electricity and natural gas savings of more than 50 GWh per year. As a result, CO2 emissions have been reduced by 17,000 tonnes. The impact of the reduction is comparable to planting 85,000 trees (Krka, 2019).

The global trend of using electric vehicles has not been ignored. Based on this, a charging station for electric vehicles was installed at the headquarters of Krka, which can be used by co-workers, business partners and visitors of Krka. The company is also actively involved in sustainable mobility projects and encourages the use of alternative and less environmentally harmful ways to commute to work. In 2019, the Krka Car-Free Day was organized for the fourth time in a row. Employees in Slovenia and 17 subsidiaries and representative offices abroad were invited to work on foot, by bicycle, in public transport or by bus with colleagues.

3.2.3 Waste management

Waste is an important source of raw materials and energy, therefore special attention is paid to the separation of waste, starting from its source of formation. The company has reduced the amount of waste by 3% compared to 2018 due to the waste management system and the increase in the amount of separately collected waste. Thus, the system of separate collection of aluminium and plastic composite materials was upgraded, as a result of which 451 tons of waste were collected. They were transferred to a waste processing plant, which extracted 166 tons of aluminium and 256 tons of plastic for further processing. Consequently, it also contributed to the circular economy in waste management (Krka, 2019). Solid performance can only be achieved with the responsible work of all employees, so regular training in waste management was an important part.

3.2.4 Communication

Awareness of the importance of sustainable development and related environmental values is an integral part of Krka's business strategy, which makes responsible behaviour and reliable information about the environment a daily routine. Environmental sustainability management is included in the introductory workshop for newly recruited employees. In 2019, 420 people took part in environmental trainings (Krka, 2019). The company's goal is to provide employees with educational programs and courses.

Krka complies with the high environmental standards that must be applied in all EU member states worldwide, and strives to include responsibility for our natural environment in the various activities carried out by its subsidiaries abroad. Through constant collaboration, information exchange and investments, Krka transfers best practices in the field of environmental protection to all subsidiaries, taking into account local legislation. It is worth emphasizing that the company encourages its employees to take responsibility for the environment and raise awareness of such issues, thereby minimizing the impact on the environment.

The public representatives are also informed about environmental activities through announcements in the media, as well as at various seminars, symposiums and round tables. Krka is actively involved in the development of environmental legislation, and become a co-founder of the Environment and Energy Section of the Dolenjska and Bela Krajina Chamber of Commerce and Industry (Krka, 2019).

The company works in close rapport with professional and scientific organizations in Slovenia and abroad. Educational institutions at all levels organize factories visits to learn about modern environmental protection technologies. Being invited as speakers, Krka employees participate in post-graduate programs.

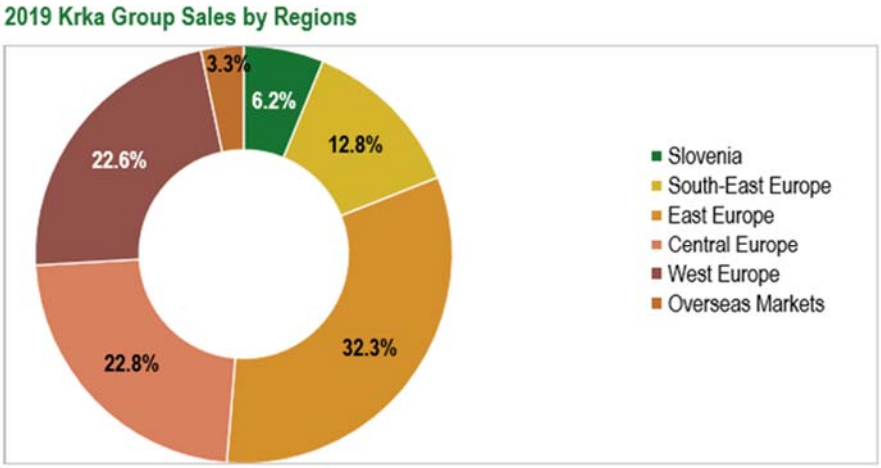
3.3 Current prospects and pitfalls for Krka's environmental sustainability strategy in Eastern Europe

An enterprise can be competitive if it is able to adapt its activities effectively to the external environment, take preventive measures against the impact of various factors, or use the opportunities provided to it in time. The modern external environment of enterprises is characterized by an extremely high level of complexity, dynamism and uncertainty. Thus, each region has an individual set of environmental characteristics, and each state has a specific set of individual environmental problems and tools to solve them.

Eastern Europe region has been Krka's largest sales region for many years. In 2019, sales in this region totalled €481.2 million, representing 32.3% of total sales. The sales have increased by 17% year over year. This was largely due to the strong performance in the Russian Federation and Ukraine with high growth rates.

Krka has been supplying its products to Russia for more than 40 years. Over these years, Krka products have won the trust of consumers and the respect of partners. Currently Krka has its own production and distribution centres in the Russian Federation. In 2019, the company completed the construction of its own wastewater treatment plant in Krka-Rus in the Russian Federation. The Russian Federation remains the key and largest market for Krka, with sales of €310.5 million, up 13% from 2018. In Ukraine, product sales increased to €79.8 million, which is 42% more than in 2018. Significant sales growth was also recorded in most other regional markets (Krka, 2019).

Figure 5: Krka Sales by regions



Source: Krka (2019).

Table 3: Krka Sales by regions

Krka Group and Krka Sales by Regions

	Krka Group			Krka		
€ thousand	2019	2018	2019/18 Index	2019	2018	2019/18 Index
Slovenia	92,375	88,872	104	52,902	51,280	103
South-East Europe	191,320	176,206	109	187,068	171,120	109
East Europe	481,155	412,945	117	298,053	263,611	113
Central Europe	339,574	318,259	107	323,501	304,209	106
West Europe	336,098	287,076	117	290,401	247,580	117
Overseas Markets	48,558	43,389	112	43,752	39,844	110
Total	**1,489,080**	**1,326,747**	**112**	**1,195,677**	**1,077,644**	**111**

Source: Krka (2019).

The importance of analysing factors that affect an external environment on the company lies in predicting opportunities, developing a contingency plan, and forming an appropriate strategy. However, the lack of the necessary amount of reliable information is hindering to timely and objective assessment of processes and trends occurring in the external environment.

Despite the positive sales figures, the Eastern Europe region has its own pitfalls and difficulties. They are especially evident in the implementation of projects related to environmentally sustainable development.

3.3.1 Political-legal

Businesses that operate in other countries and form complex supply chains, as in our example with Krka, are increasingly exposed to political and legal risk factors in these countries. These include instability and uncertainty in public policy, fluctuations in the rule of law, and the level of bureaucracy and corruption.

One of the key problems of these countries is the insufficiently developed state legislation in the field of environmental protection. So, the main direction of the economy is at odds with the main directions of greening – it is mostly about the priority of meeting the material needs of society.

Unfortunately, the imperfection of legislation in the field of environmental management and protection cannot sufficiently contribute to the formation of the market for environmental entrepreneurship. Another significant factor is the low price of natural resources, which makes projects involving the use of secondary raw materials for production or energy unattractive for investors (Gorkina, 2016).

The countries of this region are characterized by “paper" methods of environmental protection. This is the development of regulations that describe common standards for maximum allowed emissions related to technological processes, as well as a system of relatively minor penalties for non-compliance.

Obviously, all this indicates a certain interest on the part of the state, but in this case, the prospects for the development of environmentally friendly production will not bring the desired success. The reason for this is the universality and obvious obsolescence of these standards, rather than a specialized focus on each industry separately.

Therefore, Eastern European countries need dynamic and flexible standardization systems and urgently should develop and implement effective "green" programs for environmentally friendly treatment.

The legislation does not cover all areas of environmental standardization and certification and requires significant system improvements. For example, according to the Law of Ukraine "On the basic principles (strategies) of the state environmental policy of Ukraine for the period up to 2020", one of the tasks in this area was to develop and implement a system of incentives for business entities that implement an environmental management system, principles of corporate social responsibility, apply environmental audit, and improve the environmental characteristics of products in accordance with established international environmental standards (VR, 2011). However, this task of the strategy has not been completed yet, and the goals have been postponed to the next decade. A similar situation is observed in other countries in the region.

3.3.2 Economic

The escalation of external risks, including those related to global economic growth, oil prices and global geopolitical environment, can undermine overall macroeconomic stability. Therefore, an economic downturn can change the costumer's buying propensity that can force companies to lower prices or radically change their business plan.

Krka regularly monitors market conditions, analyses them and, if necessary, has to adjust payment terms. This is due to the fact that currency risks and their impact on sales in euros in markets where sales are made in local currency, especially in the Russian Federation, were high.

Exchange rates can be complex and unstable and they affect all activities related to export or import. Currency risk is a threat of financial loss as a result of adverse changes in exchange rates. As a result of fluctuations in exchange rates, the value of goods sold or purchased may ultimately differ significantly from what is expected.

The average value of the Russian rouble in the first quarter of 2020 climbed by 1.5% compared to the same period in 2019. In the first quarter of 2020, Krka suffered foreign exchange losses due to a long position in the Russian rouble. The company pursues its key policy of eliminating foreign exchange risks through natural hedging, usually through forward contracts. Less than 50% of the Russian rouble risk exposure was hedged by forward contracts (Krka, 2020).

A good understanding of economic risks is an important factor for sustainable economic growth and sound decision-making. In an unstable economy, the environmental responsibility of enterprises can become one of the factors of increasing their competitiveness, but again only if state support and incentives are provided.

3.3.3 Socio-cultural

The prospects for formation of a strategy for sustainable development of the environment the primarily depend on motivation and belief of both management and staff in its validity and necessity. The entire business community should be involved in building this type of system, and environmentally sound behaviour should become a component of the overall production culture and ethics (Potay, 2005). It is also important to have a public interest in the environmental component of the enterprise, because this creates loyalty for consumers and, accordingly, the company's image.

In Eastern Europe, there is a practice when citizens are aware of their responsibility to protect the environment. The style of healthy and ecological life is being promoted. In food establishments, plastic tubes are replaced with iron or paper ones, and in stores, plastic bags are replaced with fabric ones. At the same time, this region still has a long way to go before a radical change in awareness.

3.3.4 Technological

The philosophy of the pharmaceutical industry, as well as chemical production in general, is to maximize profits while maintaining the proper quality and safety of products. Competitive pressure forces companies to fight for the quality and safety, introducing modern production technologies and continuously improving all possible aspects.

In the Eastern Region, there is a lack of synchronization between science, technology policy and health system priorities. Research and development of medicines is based not on the needs of the healthcare system, but on the capabilities of medical science. Financial resources for different stages of pharmaceutical development are distributed among different ministries and institutions, which makes it difficult to move from one stage to another.

All innovations related to industrial technologies must be initiated by those who produce the products. The future of pharmaceuticals is shaped up in such a way that innovators, not regulators, will decide the destiny of innovation. It is hoped that the regulatory authorities will pay attention to the needs of the industry and provide favourable conditions for the development of new production technologies in the next few years. Continuous production is an example of where commercial and financial considerations can drive innovation.

3.3.5 Ecological

First of all, it should be noted that such factors as activities of environmental authorities in various areas, as well as reliability and availability of information on the magnitude of the impact on the environment, require immediate monitoring and improvement.

Dependence on foreign markets makes requires expanding standardization and certification of the infrastructure. The Eastern European market, the practice of implementing environmental management only at the request of foreign partners or investors is dominated, and in very rare cases on their own initiative. The countries of Eastern Europe need dynamic and flexible standardization systems and should urgently develop and implement effective "green" programs for environmentally friendly relations. The necessity of certification must be conscious; otherwise, it turns into a "paper" formality. The most important thing in the process of implementing environmental management systems is the approval of new behavioural stereotypes of business entities.

There is a certain correlation between environmental and social indicators. The enhanced degree of individualism, typical for this region, leads to an increased sense of responsibility for one's own life. The consequence of this is a more responsible attitude towards the environment.

These days, not only the government, but also climate change protesters are putting pressure on businesses to reduce their carbon footprint and use green technologies. While some

governments are relaxed, others have strict goals, which in turn affect consumer loyalty to companies that pursue eco-friendly strategies.

3.4 Consumer factor in adapting the environmental sustainability strategy, taking into account the realities of the Eastern European region

One of the management strategies that is likely to be most effective in reducing the risks of pharmaceuticals to the environment is to raise awareness among stakeholders about the rational use and proper disposal of pharmaceutical products. Before starting the awareness-raising process, firstly, it is necessary to evaluate existing knowledge about the issue in the community. Since there are not many such studies, this research was planned to assess the knowledge, attitude and practice in the field of eco pharmacology on the part of consumers, as well as to compare the responses from residents of Slovenia and representatives from Eastern Europe, in particular, from Ukraine.

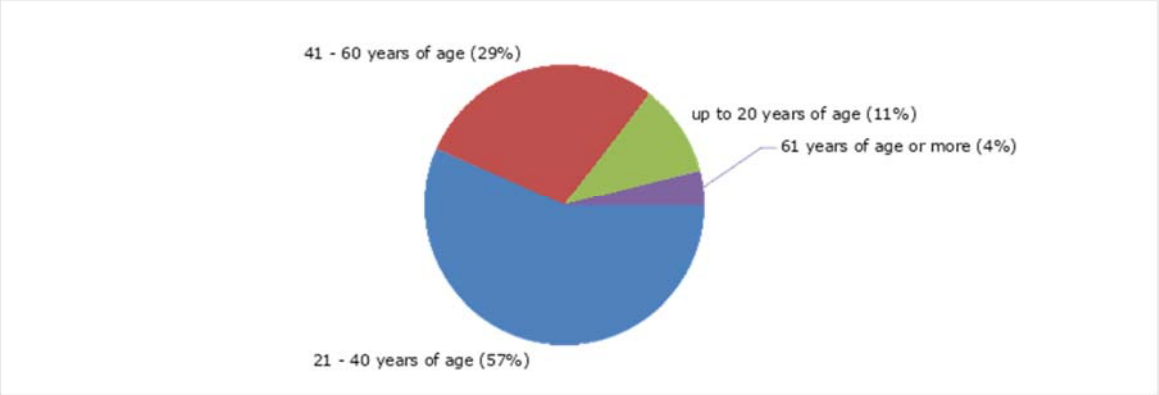
The purpose of the study was to find out whether the company's environmental safety strategy affects consumer loyalty and how respondents dispose of their pharmaceuticals. It was a descriptive survey conducted using a pre-validated structured questionnaire, created in electronic way for distribution by email. To reach people from different regions, we used the "snowball" method when sending out the questionnaire by email. This method implies that the initial circle of selected respondents, after completing the questionnaire, sends empty questionnaires to other people from their own contact lists who can also participate.

The study was conducted over a period of two months between September 2020 and November 2020. The study population was of either gender, selected in equal numbers from Ukraine and Slovenia, and included both representatives and non-representatives of the pharmaceutical industry in both groups.

The questionnaire consisted of five sections. The first section included questions about participants' awareness of the effects of medications on the environment. The second section was devoted to the attitude to the environmental safety strategy of companies. Questions about proper disposal and personal experience of the respondents were presented in the third and fourth sections. The final section was dedicated to the respondents' personal information. The questionnaire was voluntary and anonymous, containing 29 questions, 5 of them to determine the demographic profile of participants and were not related to facts concerning consumption and disposal of the pharmaceuticals.

Out of the 181 agreed participants, 122 completed the questionnaire satisfactorily and were included for evaluation. The study population consisted of the following age groups: the youngest group under 20 years old were 11 %, 57% of participants were between the ages of 20 and 40, about 29% – from 41 to 60 years old, and people over 61 years old made up the smallest group (about 4%) (Figure 6).

Figure 6: Age groups of participants

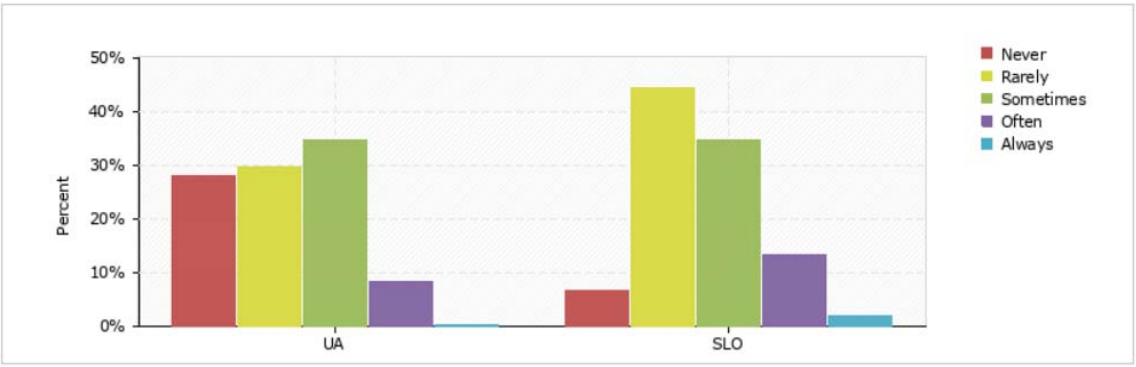


Source: Own work.

All statistical calculations were performed using the 1KA (an open-source application that enables services for online surveys, developed by the Centre for Social Informatics, at the Faculty of Social Sciences, University of Ljubljana).

Based on the results of the study, more than half of the respondents in both groups did not have the habit of following media reports regularly on the subject of the study (Figure 7).

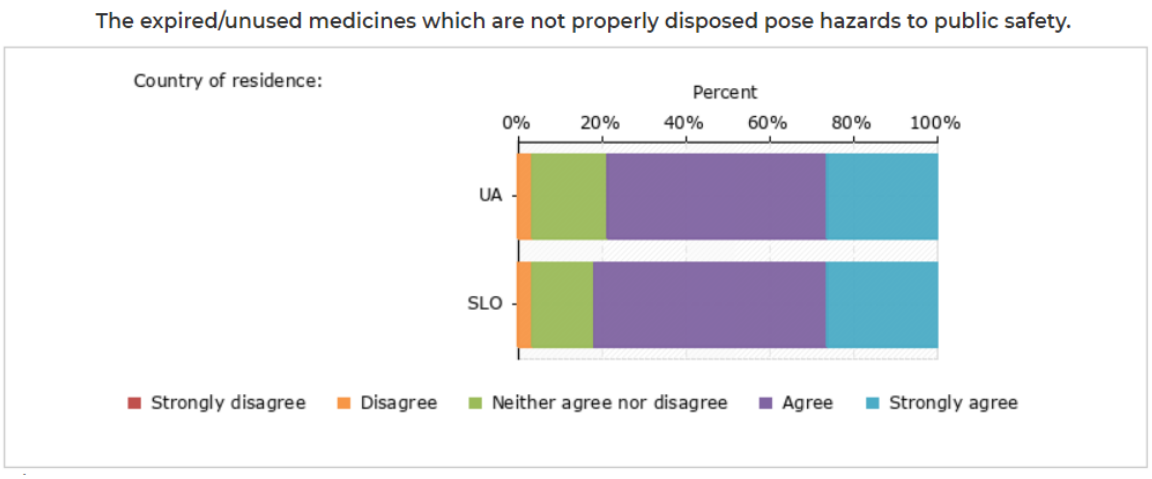
Figure 7: Frequency of following media



Source: Own work.

However, most of the participants believed that their medications could cause environmental pollution and were aware of the dangerous environmental and health impact of improper disposal of unused and expired drugs (Figure 8). It is also worth noting that the participants in both groups recognized personal responsibility to some extent.

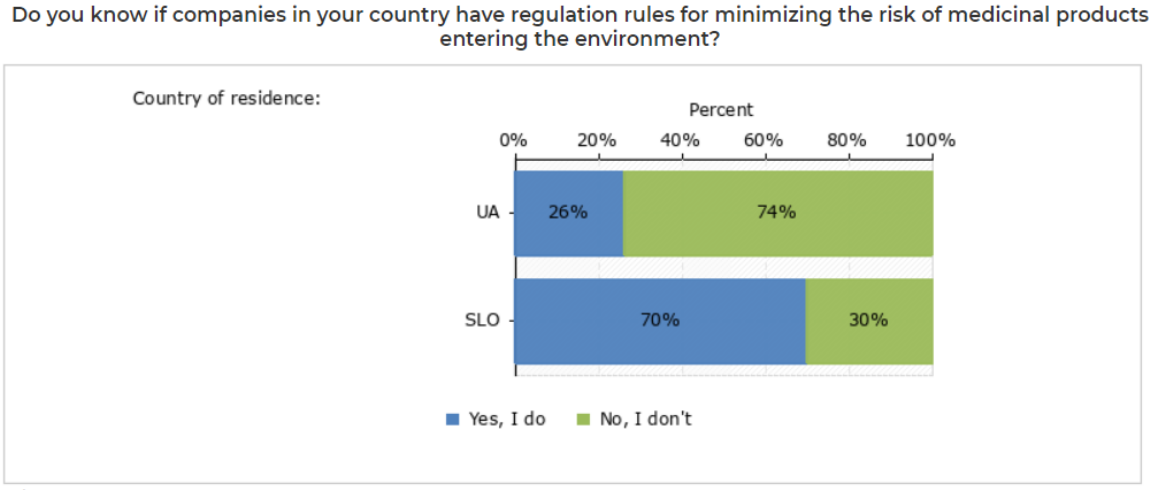
Figure 8: Awareness of the negative impact of improperly disposed medicines



Source: Own work.

A significant difference between the groups surveyed was in the responses regarding the knowledge of a company that uses an environmentally sustainable production strategy in the host country. Surprisingly, statistical analysis showed the opposite result. Thus, 70% of respondents from Slovenia indicated that they were familiar with such companies, while 74% from Ukraine were not (Figure 9).

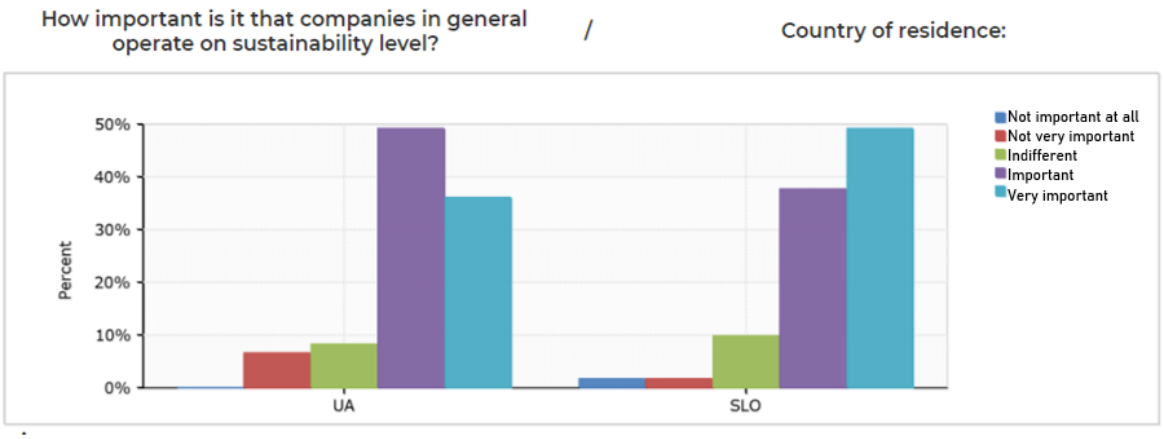
Figure 9: Companies that minimize harmful impact on the environment



Source: Own work.

Despite the lack of information about the companies' activities, more than 85% of representatives from Eastern Europe affirmatively stated that it was important for them that the company operated at a sustainable level (Figure 10).

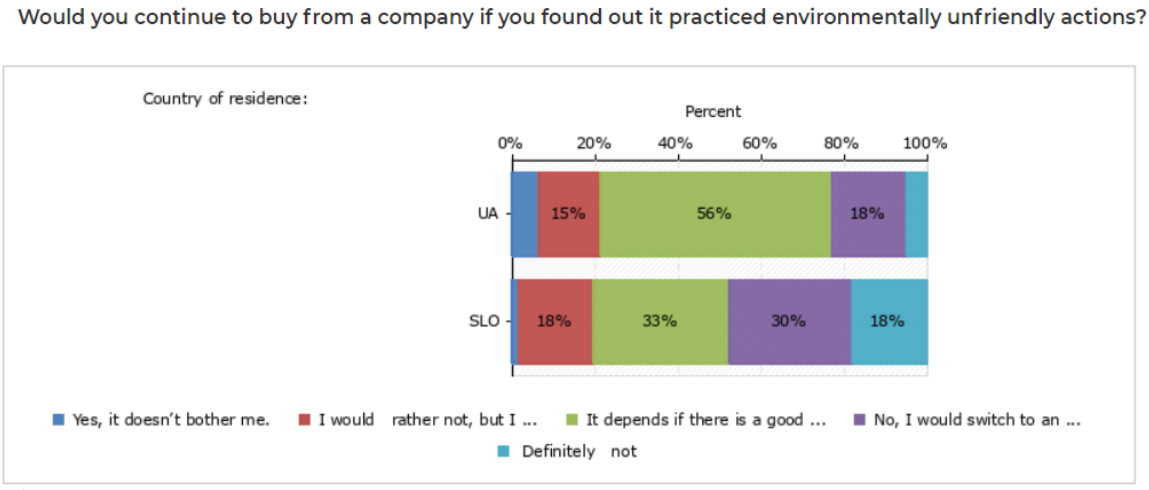
Figure 10: The importance of the company's sustainability level



Source: Own work.

It was also more important for the representatives of Eastern European group to have substitute products in an environmentally friendly market before declined a company considered as unfriendly to the environment (Figure 11). 90% were more likely to overpay for eco-goods. The same probability from the Southeast European group was slightly lower – 86%.

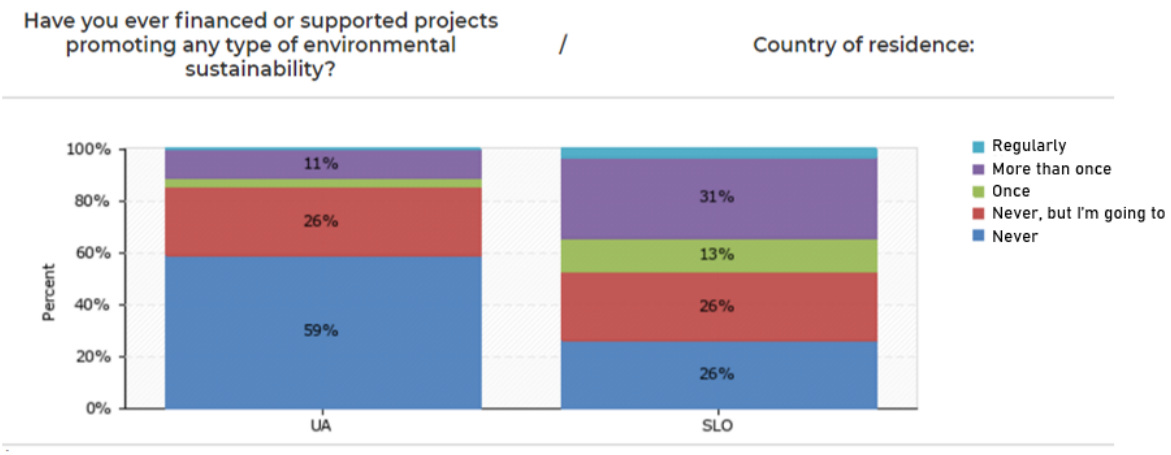
Figure 11: Environmentally unfriendly actions of the company



Source: Own work.

There was a significant difference in the frequency of participation or funding for projects related to environmental sustainability. Respondents from Slovenia were more active in this regard. Perhaps this was due to the greater popularity of such projects and their social promotion in the region. However, a large number of participants in both groups considered it was their duty to protect the environment and expressed their willingness to participate in projects to raise awareness on this issue (Figure 12).

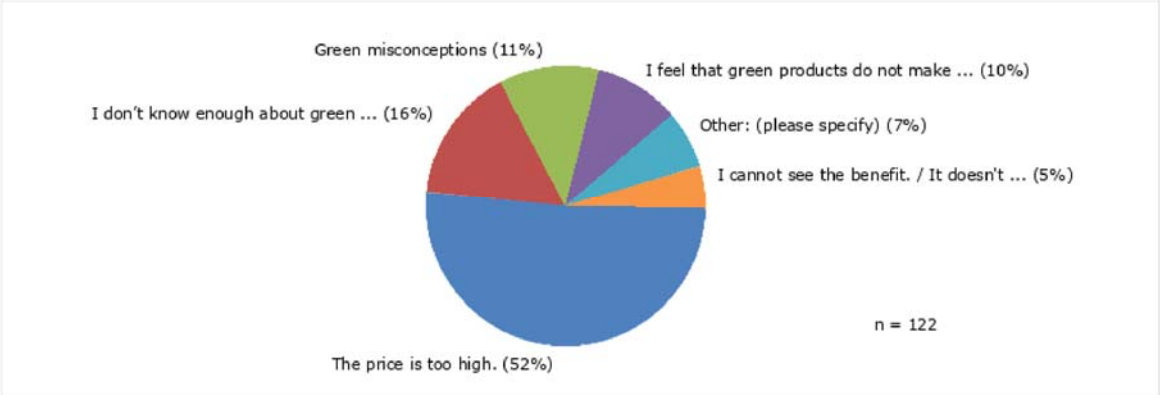
Figure 12: Participation in environmental projects



Source: Own work.

Among the reasons why respondents were not willing to pay more for more environmentally friendly products were: in the first place – too high prices (48% of Ukrainians, 56% of Slovenians), the second place was lack of awareness about green products (20% of Ukrainians, 11% of Slovenians), the third and the fourth places were shared by misunderstanding associated with eco products (13% of Ukrainians, 10% of Slovenians) and scepticism that green products significantly affect the environment. Also, the same percentage (5%) of respondents from the both groups noted that they do not see any advantages in them (Figure 13). There were also those who choose their own option. For example, under the name of eco-products, unscrupulous sellers hide completely non-eco-products and sell them at overcharged prices. Some of them also noted that the benefits of using "regular" products sometimes exceed "green" products several times.

Figure 13: Reasons not to pay more for green products

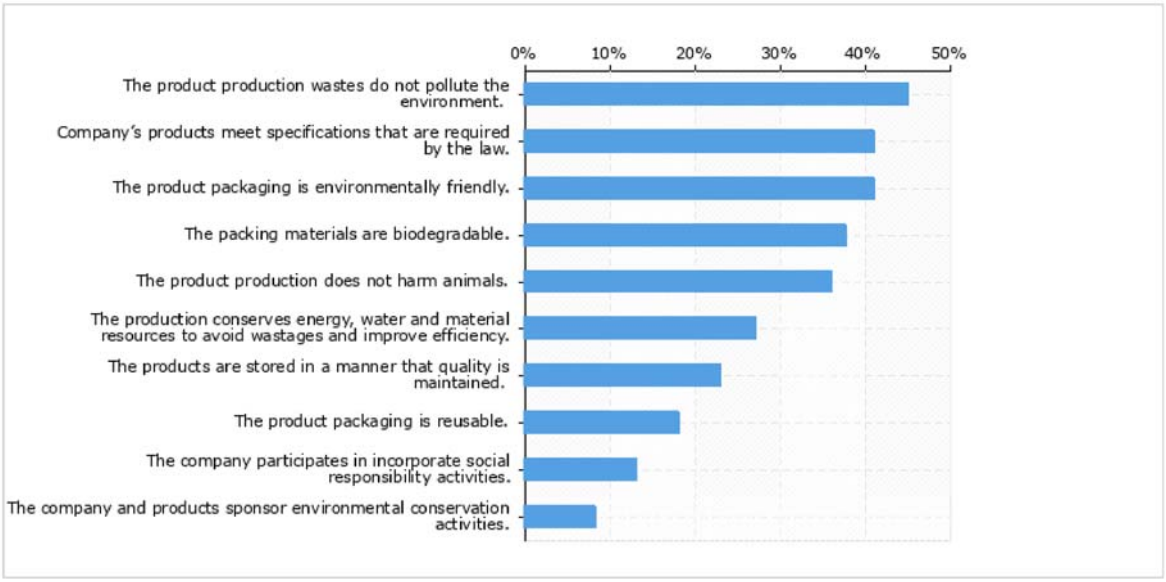


Source: Own work.

Participants were asked to choose the options they believe are the most important for a company that positioned itself as environmentally friendly. Three main categories were: 1) production waste does not pollute the environment; 2) the company's products meet

specifications established by the law; 3) the product packaging is safe for the environment and/or biodegradable (Figure 14).

Figure 14: Main categories of companies' eco-friendly strategy

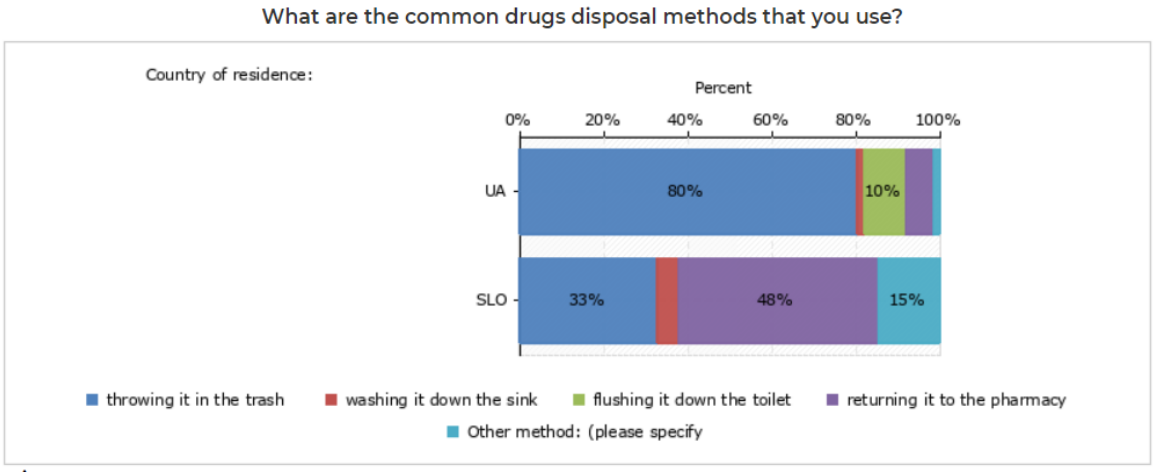


Source: Own work.

Participants in the current study were concerned about how to dispose of unnecessary medications at home, but were unaware of safe disposal methods. This situation is particularly critical in Eastern Europe.

Almost 92% of respondents usually threw out expired pharmaceuticals along with household waste or flushed them down the drain. In Slovenia, the main method of disposal is to return unnecessary medicines back to pharmacies (Figure 15).

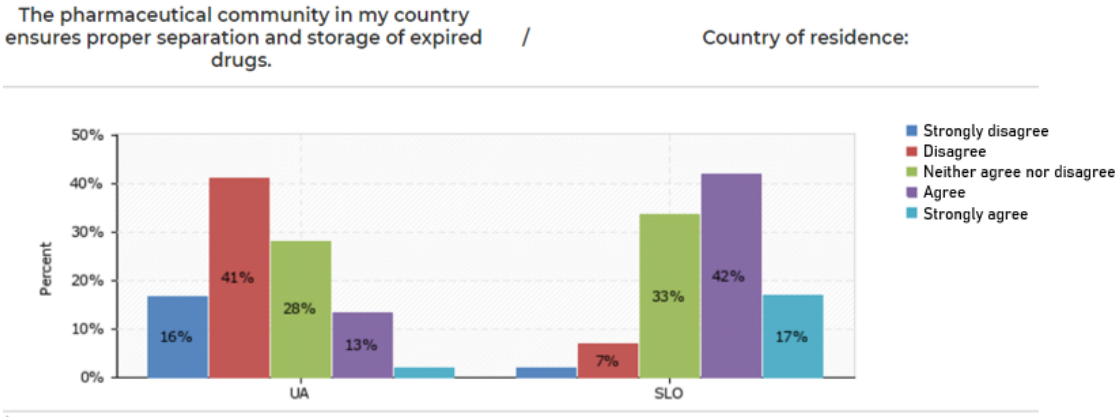
Figure 15: Drugs disposal methods



Source: Own work.

While most countries in the Western world passed laws a decade ago obliging citizens to return unused drugs back to wholesalers or to special drug collection points, in Eastern Europe this issue is still not properly regulated by either manufacturers or authorized bodies. The gravity of the situation is shown on the chart below (Figure 16).

Figure 16: Proper separation and storage of expired drugs



Source: Own work.

Therefore, compared to the group with high level of communication and trust in the pharmaceutical community, the Eastern European group needs immediate pharmaceutical reform. Below there are the categories that in the minds of society require changes towards environmental sustainability. They are the following:

1) making public aware of the consequences of improper handling of expired medications;
2) introducing local government waste disposal system;
3) appropriate training of healthcare workers in handling of expired drugs;
4) improving research focus and the government's attention to this area;
5) proper law enforcement strategies.

It stands to reason that a pharmaceutical company will not be able to influence some of these points without government involvement, but there are also some things that can be changed by showing a strong social position.

It is obvious that a pharmaceutical company cannot influence some of these points without government involvement, but there are also some things that can be changed by demonstrating a strong social position.

The analysis of the questionnaires reveals the level of consumers' awareness and willingness to change their usual practice of disposing of pharmaceutical products. The majority of respondents actively voted for the need to distribute public instructions on the proper use and disposal of unnecessary medicines, as well as the need to install special containers and notifications about the drug return scheme to the collection points.

Preventive measures that eliminate waste before disposal are also important. Immediate measures should be taken to minimize the use of pharmaceutical products by educating consumers about their correct and rational consumption and proper disposal of unused and / or expired pharmaceutical products. The effectiveness of these actions mainly depends on public awareness.

Our research has some limitations. First of all, due to the limited time frame, the number of respondents does not give us a complete picture of the real scale of the issues studied. There are also situations where some respondents were aware that burning, dumping, or other disposal of expired pharmaceutical products at home was irresponsible. They also didn't want to admit that they used any of these forms of utilization, so they chose the answer "I don't remember" not to make them look unfavourable. The same could be applied to the questions related to the attitude to companies' strategy.

4 RECOMMENDATIONS BASED ON THE IMPLEMENTATION OF ENVIRONMENTAL SUSTAINABILITY STRATEGIES IN THE PHARMACEUTICAL INDUSTRY IN EASTERN EUROPE

Recently, at different levels, people are increasingly talking about the environment, and the press is full of various encouraging forecasts that the air has become cleaner and the climate situation has improved due to the forced isolation of the whole world and the suspension of industrial processes. Reports of the immediate reaction of the environment to the absence of the harmful influence of civilization gave a certain kind of hope.

The coronavirus crisis has slowed economic activity in many countries, which automatically led to a reduction in the anthropocentric industrial load on the environment. Downturn of economic activity, as well as the reduction in road and air traffic, engendered much hope that the current situation can have a positive impact on the climate.

It is self-deception to think that nature has taken care of itself. Unfortunately, if we don't urgently change our thinking and take appropriate measures, this stagnation in the economy can hit the environment with double force. The fact is that the most severe outbreaks of the pandemic occurred in large industrial cities, where almost all activities had to be frozen. Thus, the indicators for all harmful emissions have become lower than they have been in recent years. Unfortunately, this effect is temporary, since the economy is now recovering, and the capacity will increase more than before (Ambrose, 2020).

It turned out to be an interesting fact: countries which activities were mainly based on extracted resources were subjected to the strongest blow of the crisis. The pandemic has hit oil prices and once again raised the question of the financial stability of countries which economies are overly dependent on oil production and exports. In particular, this has had a strong impact on the economy of Eastern Europe. Forced circumstances have pushed

executives of large companies with outdated linear economies to reconsider their strategy towards renewable energy sources. Long-term structural changes are needed now more than ever. The recovery plan for the economic crisis should include an environmental aspect, taking into account the support of modernization and transition to "green" technologies in any industry (Misicka, 2020).

To implement the concept of sustainable development, it is necessary to form a fundamentally new environmental policy. The social and environmental challenges which business community faces can be more effectively addressed though cooperation and joint actions. Therefore, we recommend the companies to work actively with a wide range of industry associations, as well as with national and international civil society organizations.

In terms of relatively quickly accessible methods, a rational action from the point of view of preserving the environment will be to minimize the formation of waste from non-degradable plastic. For example, by minimizing the amount of blister packs produced for medicines and biotechnological products. Of course, it is not always possible to change technological processes and reduce the amount of plastic waste, but today it is possible to take an important step in this direction.

For example, the Swiss company Dividella develops and manufactures pharmaceutical packaging solutions and systems for secondary packaging such as vials, ampules, syringes, combined packages, medical devices, blisters, etc. As a result, products are packed in 100% mono carton boxes. Cooperation with such companies will be a good start for searching optimal solutions for safe packaging of sensitive products. Dividella folding boxes are pure mono material packaging made from 100% recyclable cardboard. For customers in the pharmaceutical industry, this means that the required space and transport costs can be significantly reduced. Another advantage of using Dividella's equipment is its multitasking: one machine can pack ampoules, vials, syringes, insulin pens, cartridges and their combinations. In addition, its modular, modernized and re-equipped construction allows adding new components and modules for packaging various products at any time; therefore, it provides maximum flexibility and functionality. The capital costs and environmental impact of the modular production concept is significantly reduced by lowering the footprint and decreasing cost of heating, ventilation and energy supply. It also creates more favourable conditions for cleaning and sterilizing premises (Dividella, 2020).

Large companies should not neglect the partnership with young start-ups and little-knowns but progressive organizations. The sustainable development agenda is not about competition, but about collaboration. This is about creating products and projects together to achieve common goals. Electronic devices have a short lifespan, and recycling of such materials is often expensive and difficult. With the right approach to design, companies can significantly simplify the processing of metals and plastics.

The goal of the start-up Kavaca, which is represented in Eastern Europe, is to reduce the harmful impact of the industry on the environment by extending the life of equipment and changing the technological operations of enterprises. The company produces nano-ceramic coatings of the latest generation with unique protective and operational properties. The protective material can be used for both energy-saving panels and to extend the life of the equipment. All this fits well with the green concepts of modern projects. By developing effective partnerships, companies can get much more to achieve their goals than by working in isolation.

The initial purpose of the study was to analyse possible recommendations for improving the so-called internal strategy of the company based on international experience and taking into account the specifics of the Eastern European region. However, in the process of research and delving into the essence of the issue, considering it from both the manufacturer and the consumer, it became clear that no "internal" strategy will be effective enough if it remains within the production walls.

Influential companies should be a link in promotion of environmentally responsible business and consumption in the represented countries. The social and environmental responsibility of business is closely linked to ethical standards. It represents the conscious and motivated participation of business in various activities aimed at identifying and minimizing negative impact on the environment, rational use of natural resources, and saving raw materials and energy resources.

Our recommendations are based on the needs and capabilities of the Eastern Europe region. One of the main reasons for choosing this direction is the weak state regulation of issues related to the environmental aspects and the lack of information. Nevertheless, we see that consumers are changing; their habits and preferences are changing as well. The modern generation looks not only at the product, but also at the values that the manufacturer declares. The research conducted in this region reveals that today consumers are increasingly interested in the products of those companies that build their business, thinking about the environment and the well-being of society. According to the study, more than 80% of consumers are willing to overpay for the products of a company whose values of sustainable development they share. However, considering the activities of the pharmaceutical industry, we see a situation when outside the walls of production, the products of this activity (medicines, drugs) are no longer controlled by the enterprise, which leads to incorrect use and improper disposal by consumers, due to their low environmental awareness, dispose of their pharmaceuticals with solid waste, dump them in the sewer or burn them. Thus, organizations that manufacture and distribute pharmaceutical products on a wholesale and retail basis should comply with restrictive obligations related to the safe disposal of the waste.

In our opinion, so that the company's strategy is considered complete and bringing the maximum possible benefit, in modern realities, there should be an integrated approach that

begins with production and ends with the end user. Thus, the company's strategy should not be limited to certain regulations and standards, but should be widely promoted, explained and taught to their consumers to act in accordance with the principles of environmental culture and ideas of sustainable development. Many large pharmaceutical companies are supporting similar projects around the world, and the Eastern European region should be part of this too.

To ensure the long-term effect of the strategy, we recommend that companies combine economic indicators and assistance to society. Taking a social position, the company will expand the consciousness of people who are not related to production, but play an important role in preventive measures related to environmental safety. When we talk about the strategy of environmental sustainability, there is no need to separate business and production from the actions of society outside the companies, as it concerns everyone. Due to their scale and influence, large corporations in the pharmaceutical industry can become a driving force in promoting environmental issues to the masses.

Therefore, the key recommendation for companies are not about in-company activities, but about showing active social behaviour, acting as a kind of educator and guarantor of the very strategy of environmental safety. After all, it all starts with packaging and waste reduction and ends with us. Only when the conditional barriers between business and society cease to exist, only when they start working as a single organism, together and coordinating their efforts, the necessary indicators to reduce the harmful impact on the environment will be achieved.

Also, the organization of public events will be a profitable investment, which is designed to provide a synergistic effect: on the one hand, a positive impact on the company's reputation, strengthening its image in the market and on the other hand, it helps protect the environment for future generations and has a positive impact on the ecological well-being of the planet as a whole. As an example, there is so-called compensation program. Despite all efforts, there are still processes, especially in the pharmaceutical industry that cannot function without side effects on the environment. In this case, compensation is a way to counterbalance the negative impact. This could be, for example, a collective tree planting format. Such a social program can involve both volunteers from the public as well as corporate employees of the company. In turn, this will be a good example for other companies as well.

Despite the large number of existing problems, a favourable environment is gradually emerging for green production strategies as an alternative direction in Eastern Europe. Development of an environmentally sustainable strategy and its extension to the consumers is a promising solution for manufacturers, which provides an opportunity to work out long-term development strategies without fear of environmental risks, which are quite large in the current situation.

CONCLUSION

This thesis was a comprehensive study of the importance of environmental sustainability strategy in the pharmaceutical industry. The study consists of a literature review, an empirical research and individual recommendations based on the results of the study.

It is assumed that the concept of a sustainable enterprise is based on three main components: economic, environmental and social development. The unity of the three components makes it possible to harmonize the operation of any enterprise. Despite a fairly high level of awareness of the importance of sustainable development, some companies still bring into question the importance of environmental and social factors from time to time, falsely defending the importance of economic indicators only. This thesis focuses on the importance of environmental aspect in modern business strategies.

Based on the research findings regarding the implementation of the strategy for sustainable development of the environment, the following conclusions were made.

1) The first chapter of this thesis revealed the essence as well as general characteristics of environmental sustainability. It is becoming evident that environmentally responsible behaviour has become one of the main drivers of business development and competitiveness.

When it comes to the benefits for business of being environmentally friendly, the advantages far outweigh any disadvantages. The expenses required to create new eco-friendly procedures will be paid off in dividends over the years, but also in feeling that the company is friendly to the planet. Thus, this can become a tool for managing the reputational risks of the organization.

One of the main factors that determine the environmental strategy of an organization is the environmental literacy of managers, their attitude to the environmental problems and the ability to convey to their employees their goals in this direction.

The principles of sustainability force us to consider and study not a separate part of the company, but the whole entire system. Therefore, we must be prepared for the fact that this will require a complete reorganization of the company and a new course of action. To achieve this goal, there are different driving forces: internal and external. Internal drivers usually come from business benefits, while external drivers come from state policies and international obligations.

2) In the second chapter, we explored what motivates companies to switch to a more environmentally friendly production and why it creates additional barriers for pharmaceutical companies and encourages the search for unconventional innovative solutions. Taking into account strict parameters and standardization, achieving a balance between environmental protection on the one hand, and human health safety on the other, is a serious challenge.

Some companies choose to implement green technologies voluntarily, while others are forced to do so in order to meet the requirements for reducing environmental pollution. Those who choose voluntarily are aware of the current trend and the likely growth of the business. For both types of companies, there are many solutions to optimize the placement of green technologies in any business. Through collaboration, innovation, and careful evaluation of existing operations and practices, companies can implement sustainable initiatives with maximum efficiency.

3) To help find optimal solutions, we took as an example the Krka company, which can be a model for other companies in the transfer of sustainable development practices.

The third chapter defines the specifics of the application of the sustainable development strategy of the pharmaceutical company Krka and the conduct of an environmentally loyal business.

This company presents us with its proactive position in preserving the environment through the use of a multi-functional approach. The environmental sustainability strategy includes:

- continuous training of employees;
- employee reward system;
- regular monitoring of the environmental impact of production processes;
- control over the optimal use of energy and resources;
- research and development on the issues;
- participation in social projects to raise public awareness of the population about the problems associated with the impact of anthropogenic activities on the environment, etc.

4) Taking into account the specifics of the Eastern European region, the reasons that could become an obstacle were identified, as well as the reasons that can contribute to the success of environmentally friendly production.

Risks:

- it has been shown that there are no specialized models that are most suitable for each type of business activity. Generalized standards for energy consumption, water resources, acceptable percentages of emissions and waste, but without taking into account the different characteristics of each industry, therefore, there are no effective regulatory mechanisms;
- many employees find it difficult to adapt their preferences to corporate needs, where standards and rules have not yet been properly established;
- there is a need for effective environmental regulation at the state level;
- prevalence of corruption and bribery.

In the process of implementing an environmental sustainability strategy, the company should be prepared for some obstacles that may affect implementation failure. In a developing

country, it is easy to find obstacles that can slow down business operations while creating a stable system. However, the Eastern European region could become a path of new opportunities and potential.

Possibilities:
- cheap labour (less costs compared to other regions provide advantages for sponsoring sustainable development projects);
- low competition, which allows one of the first in the methods of doing environmentally friendly business, thereby improving companies' image before investors and consumers;
- a powerful natural resource base that allows the use of alternative energy sources;
- educational, scientific and technical potential;
- location and similarity of cultures;
- increasing public engagement in green production.

5) The recommendations for expanding this strategy in the Eastern European region were made taking into account the existing strategy of sustainable development of the pharmaceutical company Krka, as well as by stimulating the successful global practice of other companies.

The study demonstrated and justified aspects that require immediate intervention, not only for preservation of ecosystems, but also for the health of each of us.

The main objective of the concept of sustainable development is to form an integrated approach to existing problems based on the principles of cooperation and concentration of efforts not only within the company itself, but also outside it.

To our mind, it is necessary to reorient social norms towards a more responsible approach to the use of medicines through public education. Moreover, companies should actively be involved in public awareness and education. This approach will help companies achieve a double advantage. First of all, this, of course, will affect the environmental well-being of the region, but it will also strengthen the company's position in the market and increase its economic performance due to the loyalty of conscious consumers.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

Naloga je bila obsežnega študijskega pomena strategije okoljske trajnosti v farmacevtski industriji. Študija je sestavljena iz pregleda literature, empirične raziskave in posameznih priporočil na podlagi rezultatov raziskave.

Predpostavlja se, da koncept trajnostnega podjetja temelji na treh glavnih sestavnih delih: gospodarskem, okoljskem in družbenem razvoju. Enotnost treh komponent omogoča uskladitev poslovanja katerega koli podjetja. Kljub dokaj visoki stopnji zavedanja o pomenu trajnostnega razvoja, nekatera podjetja občasno še vedno dvomijo o pomenu okoljskih in družbenih dejavnikov, lažno zagovarjajo pomen le ekonomskih kazalnikov. Naloga se osredotoča na pomen okoljskega vidika v sodobnih poslovnih strategijah.

Na podlagi ugotovitev raziskave o izvajanju strategije trajnostnega razvoja okolja so bili sprejeti naslednji zaključki:

1) Prvo poglavje te naloge je razkrilo bistvo in splošne značilnosti okoljske trajnosti. Jasno je, da je okolju odgovorno vedenje postalo eno glavnih gonil za razvoj poslovanja in konkurenčnosti.

Ko gre za koristi za podjetja, ker so okolju prijazne, so prednosti daleč večje od vseh pomanjkljivosti. Stroški, potrebni za ustvarjanje novih okolju prijaznih postopkov, se bodo skozi leta povrnili v obliki dividend, pa tudi v občutku, da je podjetje prijazno planetu. Tako lahko to postane orodje za obvladovanje tveganj organizacije.

Eden iz med glavnih dejavnikov, ki določa okoljsko strategijo organizacije, je okoljska pismenost menedžerjev, njihov odnos do okoljskih problemov in sposobnost, da svojim zaposlenim sporočijo svoje cilje v tej smeri.

Načela trajnosti nas silijo, da ne upoštevamo in preučujemo ločenega dela podjetja, temveč celotnega sistema. Zato moramo biti pripravljeni na dejstvo, da bo to zahtevalo popolno reorganizacijo podjetja in nov postopek. Za dosego tega cilja obstajajo različne gonilne sile: notranje in zunanje. Notranji gonilniki običajno izhajajo iz poslovnih koristi, zunanji pa iz državnih politik in mednarodnih obveznosti.

2) V drugem poglavju smo raziskali, kaj podjetja sili k prehodu na okolju prijaznejšo proizvodnjo in zakaj ustvarja dodatne ovire za farmacevtska podjetja ter spodbuja iskanje nekonvencionalnih inovativnih rešitev. Upoštevanje strogih parametrov in standardizacije je resen izziv za doseganje ravnovesja med varstvom okolja na eni strani in varnostjo zdravja ljudi na drugi strani.

Nekatera podjetja se odločijo za prostovoljno izvajanje zelenih tehnologij, druga pa so to prisiljena, da bi izpolnila zahteve za zmanjšanje onesnaževanja okolja. Tisti, ki se prostovoljno odločijo, se zavedajo trenutnega trenda in verjetne rasti posla. Za obe vrsti podjetij obstaja veliko rešitev za optimizacijo umestitve zelenih tehnologij v katero koli

podjetje. S sodelovanjem, inovacijami in natančnim vrednotenjem obstoječih dejavnosti in praks lahko podjetja izvajajo trajnostne pobude z največjo učinkovitostjo.

3) Za iskanje optimalnih rešitev smo za primer uporabili podjetje Krka, ki je lahko vzor drugim podjetjem pri prenosu praks trajnostnega razvoja.

Tretje poglavje opredeljuje posebnosti uporabe strategije trajnostnega razvoja farmacevtske tovarne Krka in vodenje okolju prijaznega poslovanja. To podjetje nam s svojim večnamenskim pristopom predstavlja proaktivni položaj pri ohranjanju okolja.
Strategija okoljske trajnosti vključuje:
- stalno usposabljanje zaposlenih;
- sistem nagrajevanja zaposlenih;
- redno spremljanje vplivov proizvodnih procesov na okolje;
- nadzor nad optimalno porabo energije in virov;
- raziskave in razvoj na tem področju;
- sodelovanje v socialnih projektih za ozaveščanje prebivalstva o problemih, povezanih z vplivi antropogenih dejavnosti na okolje itd.

4) Ob upoštevanju posebnosti vzhodnoevropske regije so bili ugotovljeni razlogi, kateri posledično postanejo ovira, in razlogi, ki lahko prispevajo k uspehu okolju prijazne proizvodnje.
Tveganja:
- izkazalo se je, da ni specializiranih modelov, ki bi bili najprimernejši za vsako vrsto poslovne dejavnosti. Splošni standardi za porabo energije, vodne vire, sprejemljive odstotke emisij in odpadkov, vendar brez upoštevanja različnih značilnosti posamezne panoge zato ni učinkovitih regulativnih mehanizmov;
- mnogi zaposleni težko prilagodijo svoje želje korporativnim potrebam, kjer standardi in pravila še niso pravilno določeni;
- obstaja potreba po učinkoviti okoljski ureditvi na državni ravni;
- razširjenost korupcije in podkupovanja.

V procesu izvajanja strategije okoljske trajnosti mora biti podjetje pripravljeno na nekatere ovire, ki bi lahko vplivale na neuspeh izvajanja. V državi v razvoju je enostavno najti ovire, ki lahko upočasnijo poslovanje, hkrati pa ustvarijo stabilen sistem. Vzhodnoevropska regija pa bi lahko postala pot novih priložnosti in potenciala.
Možnosti:
- poceni delovna sila (nižji stroški v primerjavi z drugimi regijami zagotavljajo prednosti za sponzoriranje projektov trajnostnega razvoja);
- nizka konkurenca, ki omogoča enega prvih načinov okolju prijaznega poslovanja, s čimer se izboljša ugled podjetij pred vlagatelji in potrošniki;
- močna osnova naravnih virov, ki omogoča uporabo alternativnih virov energije;
- izobraževalni, znanstveni in tehnični potencial;

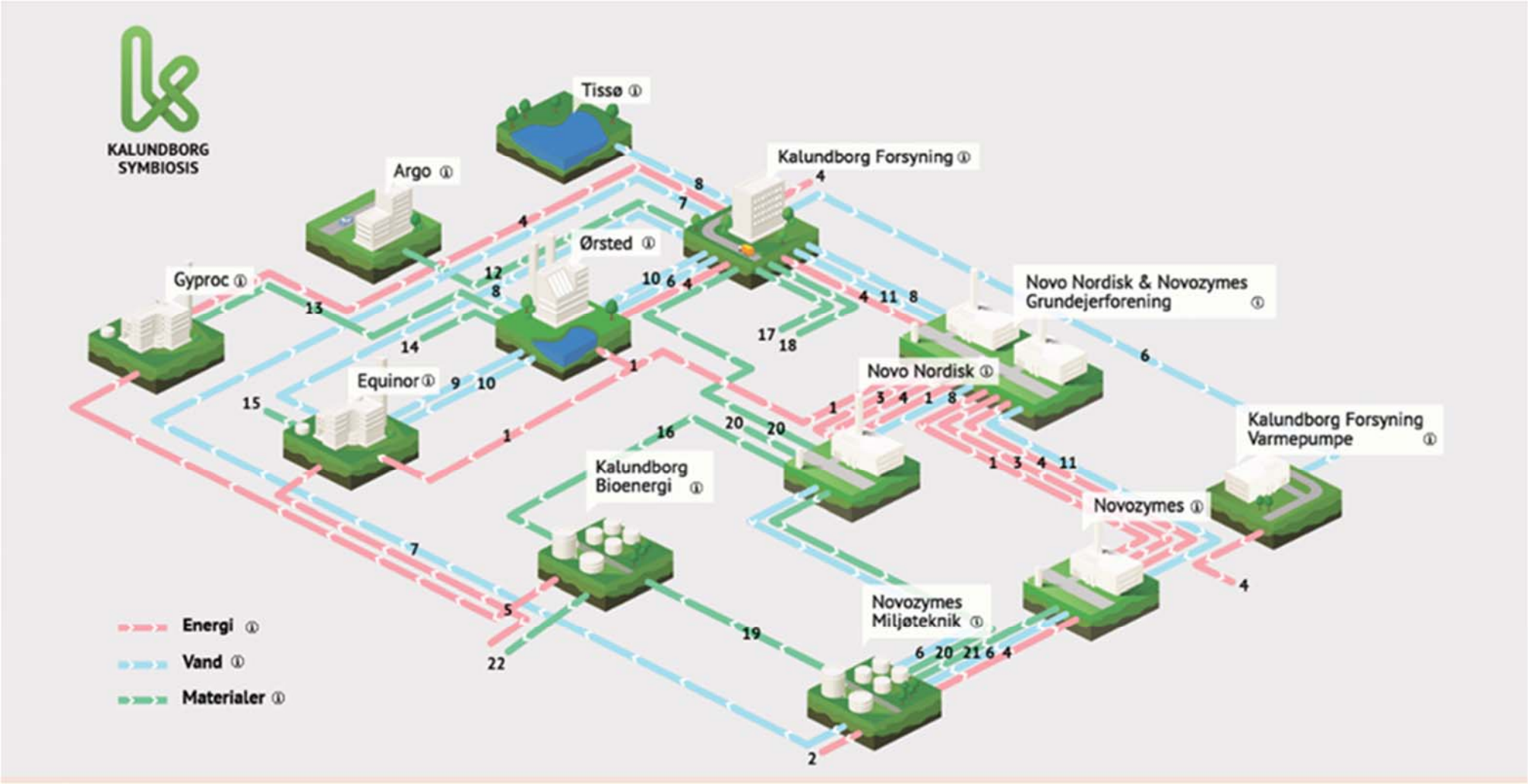
- lokacija in podobnost kultur;
- povečanje javne udeležbe v zeleni proizvodnji.

5) Priporočila za širitev te strategije v vzhodnoevropski regiji so bila podana ob upoštevanju obstoječe strategije trajnostnega razvoja farmacevtske družbe Krka, pa tudi s spodbujanjem uspešne svetovne prakse drugih podjetij. Raziskava je pokazala in upravičila vidike, ki zahtevajo takojšnje posredovanje, ne samo za ohranitev ekosistemov, temveč tudi za zdravje vsakega posameznika.

Glavni cilj koncepta trajnostnega razvoja je oblikovanje celostnega pristopa k obstoječim problemom, ki temelji na načelih sodelovanja in koncentracije prizadevanj, ne samo znotraj samega podjetja, temveč tudi zunaj njega.

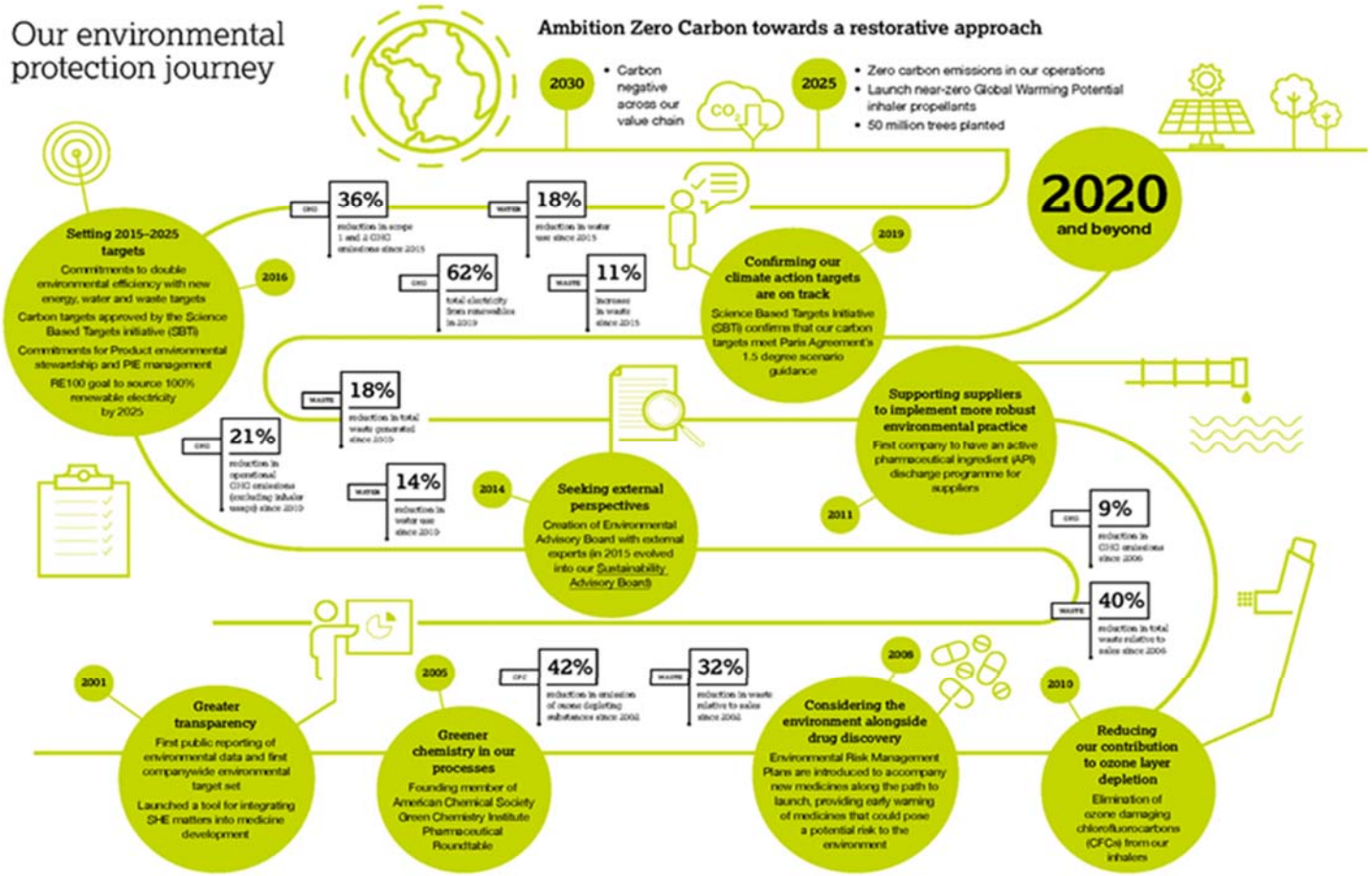
Po našem mnenju je treba s pomočjo javne izobrazbe preusmeriti družbene norme v odgovornejši pristop k uporabi zdravil. Poleg tega bi morala biti podjetja dejavno vključena v ozaveščanje javnosti in izobraževanje. Ta pristop bo podjetjem pomagal doseči dvojno prednost. To bo vplivalo na dobro počutje regije, krepilo pa bo tudi položaj podjetja na trgu in povečalo njegovo gospodarsko uspešnost zaradi lojalnosti zavestnih potrošnikov.

Appendix 2: Kalunborg Symbiosis



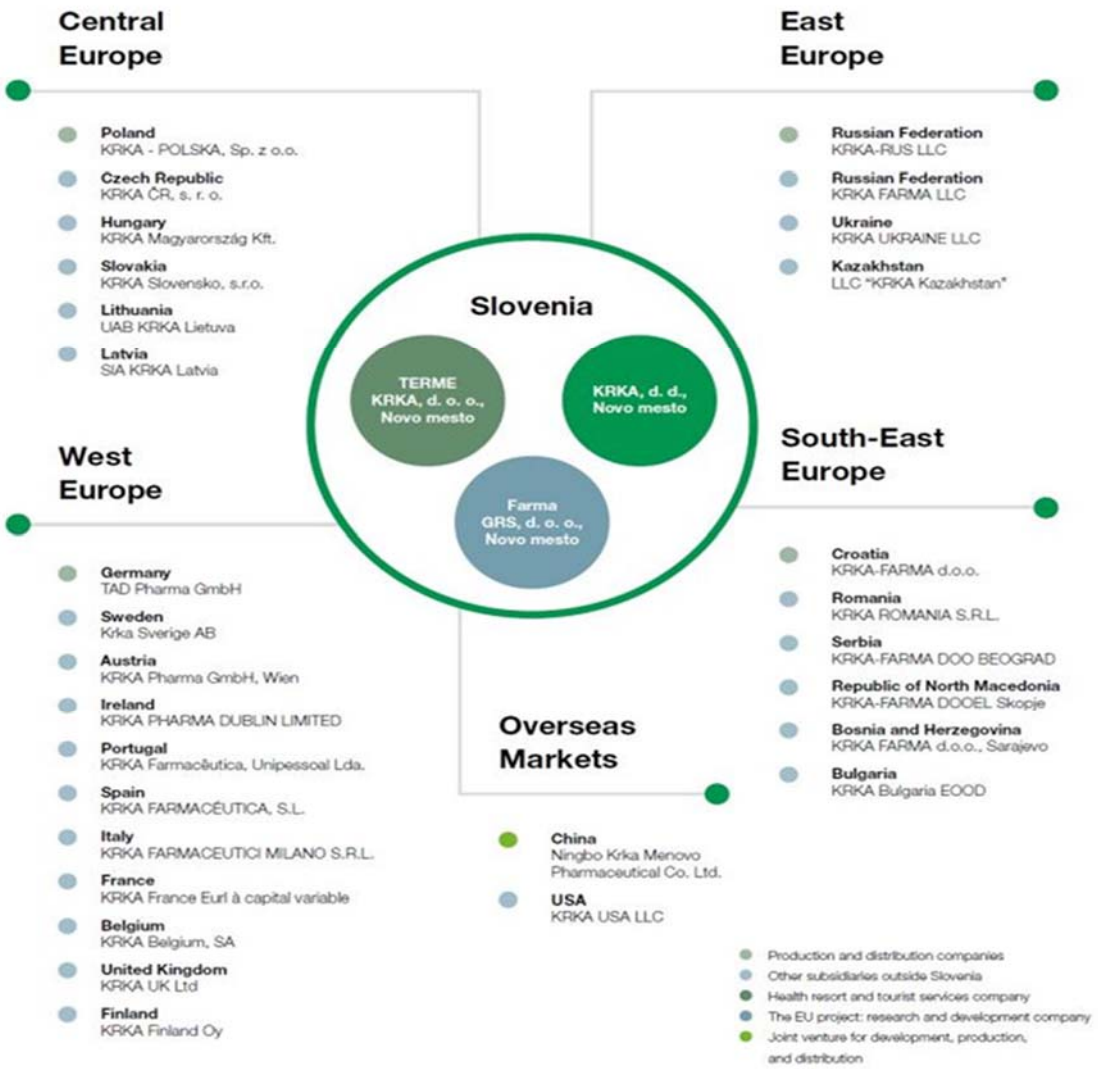
Source: Kalundborg symbiosis (2020).

Appendix 3: AstraZeneca Environmental protection journey



Source: AstraZeneca (2020).

Appendix 4: Krka Group Organisational Chart



Source: Krka (2019).

Appendix 5: Questionnaire

ATTITUDES OF PEOPLE TOWARDS THE IMPACT OF MEDICINE ON THE ENVIRONMENT

KNOWLEDGE ABOUT THE IMPACT OF MEDICINES ON THE ENVIRONMENT

	1	**2**	**3**	**4**	**5**	**0**
1. Do you follow any media reports regarding the effect of drug pollution on the environment?	Never	Rarely	Sometimes	Often	Always	
	□	□	□	□	□	
2. The expired/unused medicines which are not properly disposed pose hazards to public safety. o	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
	□	□	□	□	□	
3. Disregarding what others are doing, how much of the environment (water and soil) will be affected if you, as an individual, throw away unused medications in the trash? o	No damage at all	Slight damage	Sufficient damage	Serious damage	Extreme damage	I don't know
	□	□	□	□	□	□
4. Disregarding what others are doing, how much of the environment will be affected if you, as an individual, disposed unused medications in the sink or the toilet (sewage)?	No damage at all	Slight damage	Sufficient damage	Serious damage	Extreme damage	I don't know
	□	□	□	□	□	□

5. Do you know if companies in your country have regulation rules for minimizing the risk of medicinal products entering the environment?

o Yes, I do.
o No, I don't.

ATTITUDE TOWARDS COMPANIES' ENVIRONMENTAL SUSTAINABILITY STATEGIES

	1	2	3	4	5
6. How important is it that companies in general operate on sustainability level?	Not important at all	Not very important	Indifferent	Important	Extremely important
	□	□	□	□	□
7. How much attention do you pay, as a consumer, to the fact that an organization includes the concern towards corporate environmental responsibility among its objectives? o	Not important at all	Not very important	Indifferent	Important	Extremely important
	□	□	□	□	□
8. Would you continue to buy from a company if you found out it practiced environmentally unfriendly actions? o o	Yes, it doesn't bother me.	I would rather not, but I might.	It depends if there is a good substitute on the eco-friendly market.	No, I would switch to an environmentally friendly competitor.	Definitely not
	□	□	□	□	□
9. Green or environmentally friendly products are worth the money.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	□	□	□	□	□

10. How likely are you to buy a more expensive product, if its production is more environmentally friendly than its competitor's product?	Very unlikely	Unlikely	Likely	Very likely	Extremely likely
	□	□	□	□	□
11. Have you ever financed or supported projects promoting any type of environmental sustainability? o	Never	Never, but I'm going to.	Once	More than once	Regularly
	□	□	□	□	□

12. What is the main reason you are not inclined to pay more for green products?
    - o I cannot see the benefit. / It doesn't affect me.
    - o The price is too high.
    - o I feel that green products do not make a genuine difference to the environment.
    - o Green misconceptions
    - o I don't know enough about green products.
    - o Other (please specify): _____

13. Have you purchased at least one product from an environmental responsible organization during the past six months?
    - o yes
    - o no

14. Choose three categories that are the most important to you in companies' eco-friendly strategy.

Company's products meet specifications that are required by the law.
The product packaging is environmentally friendly.
The products are stored in a manner that quality is maintained.
The product packaging is reusable.

The packing materials are biodegradable.
The product production does not harm animals.
The product production wastes do not pollute the environment.
The production conserves energy, water and material resources to avoid wastages and improve efficiency.
The company participates in incorporate social responsibility activities.
The company and products sponsor environmental conservation activities.

ATTITUDE OF PARTICIPANTS TOWARDS DISPOSAL OF MEDICINES

	1	2	3	4	5
16. Is it your responsibility to protect the environment from the pharmaceutical waste even if others are unconcerned or irresponsible?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	□	□	□	□	□
17. Has proper disposing of excess medicines ever posed a problem to you?	Never	Rarely	Sometimes	Often	Always
	□	□	□	□	□
18. There should be public guidelines for ecologically safe disposal of drugs.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	□	□	□	□	□
19. Unused, expired or unwanted medicines and medical waste should be disposed of in special safe containers.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	□	□	□	□	□
20. The manufactures and pharmacies should have drug take back schemes.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

	□	□	□	□	□
21. The pharmaceutical community in my country ensures proper separation and storage of expired drugs.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	□	□	□	□	□

22. What are the common challenges of proper disposal practices of expired drugs in your opinion?

- poor awareness of and education about handling of expired drugs
- poor documentaries about handling of expired drugs
- poor law enforcement
- other (please specify): _____

THE PRACTICES OF THE PARTICIPANTS

23. How often do you buy medicines?

- as indicated by a specialist (doctor/pharmacist)
- self-medication

24. What are the common drugs disposal methods that you use?

- throwing it in the trash
- washing it down the sink
- flushing it down the toilet
- returning it to the pharmacy
- other method (please specify): _____

25. What are your recommendations regarding changes to improve the environmental sustainability situation in your country? ***(Rank them from 1-5):***

a) adequate law enforcement strategies
b) improving research focus and the government's attention in this area
c) adequate training of health workers in handling of expired drugs
d) creating public awareness about the consequences of improper management of expired medications
e) implementation of a local government-run disposal system

A FEW MORE QUESTIONS ABOUT YOU

Gender: female □ / male □
Year of birth: _____
Country of residence: _____
Professional status: student □ / unemployed □ / working □
Your current position: pharmacist □ / non-pharmacist □