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Role of information management in implementing the Green Deal in the EU and the US

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Abstract. The global climate crisis poses an existential threat to the natural ecosystem and the entire humanity, while new effects (Covid-19, war in Ukraine, etc.) and factors increase the risk to national security and public stability in the EU countries and beyond. The most important global challenge of our time has prompted the formation of climate change management policies around the world; international agreements have been concluded for this purpose. In 2015 the Paris Agreement was signed and the United Nations General Assembly approved the United Nations Agenda for Sustainable Development until 2030. The goal 13 "Take urgent action to combat climate change and its effects" and tasks for the implementation of this goal were established and approved by the EU legal acts. The European Green Deal was initiated to define the EU's vision of creating a climate-neutral economy by 2050. Those interested in climate change and the green course often raise the question of whether everything possible has been done to prevent (stop) or eliminate climate "erosion" processes. To climate change sceptics, these documents or efforts may seem excessive (and expensive), but it is important to determine whether the full-fledged, comprehensive or targeted communication is available in the EU, whether the dissemination of public information about the processes of the green deal is sufficient and what the management of this information entails. This is because information

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management is one of the most important components of the successful implementation of the Green Deal. The supreme audit institutions of the EU countries conducted assessment of EU countries in preparation for the implementation of the Sustainable Development Goals (SDGs). The assessment of the public's knowledge and understanding of the EU green deal was performed using a uniform, approved and generally accepted control model. The article aims to analyse the role of information management in implementation of the Green Deal in the EU and the US by distinguishing the 2020-2022 period of global COVID-19 pandemic based on a Lithuanian case study.

Keywords: European Green Deal, information management, Sustainable Development Goals, EU, US, Lithuania

JEL Classification: Q42, Q48, P46

1. INTRODUCTION

The truth about climate change is inconvenient, the cost of inaction is clearly higher than our climate ambitions, numbers alone cannot show the dire consequences of a vicious cycle of routine (European Commission, 2021). In recent decades, many problems of ecosystem degradation have worsened to the point of causing a global ecological catastrophe. For this reason, it becomes increasingly important to increase people's awareness of climate change issues and climate change mitigation measures that can be taken to prevent the negative effects of economic development on the environment (Ozturk et al., 2021; Sharif et al., 2020; Fisun et al., 2022; Streimikiene, 2022). The main challenges posed by climate change are related to pollution, global warming, biodiversity loss, public health issues, ozone layer depletion, deforestation, etc. (An et al., 2021).

The dynamics of the global energy and climate agenda are progressing rapidly. The EU has taken an active role in international climate policy, creating relevant strategies as early as the 1990s, and to this day promoting the implementation of the ambitious 2050 European Green Deal with the aim of making the EU the first climate-neutral economy and society (Ruse, A., & Pubule, J. 2022; Shevchenko et al., 2021; Naumenkova et al., 2022; Pauliukevičienė & Stankevičienė, 2021; Streimikiene, 2021). Information management at the political level and how information is communicated to various groups in society is very important in order to achieve the set goals.

According to global and European innovativeness indicators, Lithuania still lags behind other countries of similar development and size. In the 2021 European Innovation Scoreboard published by the European Commission, Lithuania ranked only 18th in the list of EU countries (European Commission, 2021b). Regardless of Lithuania's place on the scoreboards, it should be noted that the issue of effective information management is necessary and mandatory at three closely related levels: the first inter-institutional level (supreme government and self-government), the second lower level of economic entities (private - state in a broad sense) and the third - the lowest, but at the basic level, shaping changes in society's lifestyle.

Significant changes in climate change are observed. The last five years were found to be the warmest in the entire history of meteorological weather observations. In 2020, the average global temperature was 1.2 °C higher than pre-industrial levels. Due to the increasing frequency of extreme climate-related events, the economic losses incurred are correspondingly increasing. In the EU alone, these losses already exceed 12 billion on average. EUR per year. According to scientists' forecasts, if no measures are taken and if the average global temperature is allowed to rise, the current EU economy would suffer at least 170 billion

annually. EUR losses, corresponding to 1.36% of the EU gross domestic product (European Commission, 2021b).

According to the latest information provided by scientists, human activity is the main, all-determining factor in global climate warming. Thus, when evaluating the diversity of human activity, it should be noted that the causes of change are multi-profile, multi-faceted, therefore urgent long-term changes in all activities and areas are necessary. The signs of climate change are observed all over the world, therefore the directions, tasks and goals of the development of world society and its well-being must not be based on the need for economic prosperity of an individual country or society, but on the determination and implementation of a unified policy based on science and green innovations in preserving nature and its resources on a global scale. EU scientists warn about the necessary long-term solutions for "green course technologies", the EU's green transformation at the level of urban urbanization, the development of a neutral digital and circular economy, and the behavior of society in the post-COVID-19 era and the initiation and monitoring of correct behavior (Androniceanu, 2020). The success of the realization of the green course of the state policy and the goals of sustainable development is information technology (IT), artificial intelligence (AI) and a society with targeted knowledge, abundant digital involvement of citizens in the problem and the realization of its solutions. The necessity and importance of information management and communication about the implementation of the circular economy, the green course and the necessary measures, strategic planning are emphasized, especially a lot of attention should be paid to the transfer of targeted knowledge that is attractive and perceived by the public.

Information and scientific knowledge about climate change, the factors influencing it, and the threatening consequences for humans and their activities if the situation of climate change is not controlled, must be transmitted to the scientific community in a language they can understand. There is research gap in understanding of the role of information management and communication processes for implementing the Green Deal in EU and other countries. The paper aims to overcome this gap and provides comparative assessment of information management for implementation of Green Deal in EU and US based on Lithuanian case study. The information dissemination and management processes in Lithuania for implementation of European Green Course were assessed based on in depth-analysis of national policy documents and results of various audits conducted in the country.

2. LITERATURE REVIEW

A critical point has been reached where the world must respond to the climate and The dynamics of the global energy and climate agenda are progressing rapidly. The EU has taken an active role in international climate policy, creating relevant strategies as early as the 1990s, and to this day promoting the implementation of the ambitious European Green Course until 2050 with the aim of making the EU the first climate-neutral economy and society (Ruse, A., & Pubule, J. 2022). Information management at the political level and how information is communicated to various groups in society is very important in order to achieve the set goals.

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Information and scientific knowledge about climate change, the factors influencing it, and the threatening consequences for humans and their activities if the situation of climate change is not controlled, must be transmitted to the scientific community in a language they can understand. The processes of implementing the European Green Course in the EU countries and Lithuania may not be sufficient and ineffective if the factors that can influence public behavior are not assessed in time, especially due to the deficit of information dissemination at various levels of information transmission. By 2050, a responsible, non-consumerist, "green" generation that understands the need and necessity of sustainability must grow up. The EU's green course includes the development of environmentally friendly technologies and their legal regulation and regulation. For example, the development of green technologies obliges to save energy resources, reduce the emission of greenhouse gases into the environment, as well as any other activity aimed at changing the attitude of the consumer society (looking for as much and cheaper as possible to purchase products and services) to the opposite: better, more expensive, but less and the most important thing is that it should be sustainable, environmentally friendly accessories and technological solutions. The green course or otherwise known as the green transformation can be defined as the harmony of economic growth with the conservation of environmental resources (Cheba et al., 2022). As a strategy for economic growth and competitiveness, the European Green Deal is helping to change the global narrative, which affects political and business markets, and sets a role model (European Commission, 2021a).

One of the main principles of the European Green Deal is solidarity between Member States, regions, rural and urban areas, and between different generations and social strata. Neutralizing climate impacts requires a shared sense of purpose, collective effort and recognition. However, there is still no single

universally accepted way of implementing climate policy. This happens in many ways and depends on many different factors (European Commission, 2021a).

In recent decades, the EU has become increasingly committed to combating climate change. Climate change mitigation targets and related legislation have been at the fore in the international context and have helped strengthen the EU's international leadership in climate change mitigation. Through decisive policies and actions, the EU is a global standard-setter and a driving force behind climate change ambitions worldwide (FCCC, 2015). However, the internal climate policy of the EU has been assessed as insufficient in order to implement the limitation of the global temperature increase to 1.5 or 2 degrees Celsius provided for in the Paris Agreement (Dupont et al., 2020).

In order to further align climate change mitigation policy with the Paris Agreement, in December 2019, the EU presented a long-term emissions reduction strategy and updated climate action plans, committing to reduce EU emissions by at least 55% compared to 1990 by 2030. The ultimate goal of the EU is to ensure climate neutrality by 2050. This will require a transformation to which all sectors of the economy would contribute with essential actions, which would be socially balanced and fair, and which would preserve the competitiveness of the EU.

In solidarity, EU members and other countries integrate the green transformation and the goals set with it into their legal systems. Achieving these set goals would bring about the fundamental changes that our economy, society and industry absolutely need. The goals of the green transformation are a collective responsibility and an opportunity that must be open to all – innovators and investors, companies and cities, consumers, households and individuals. The main question of Europe's transition to a green economy is what to do so that everyone can benefit from it faster and more fairly, while increasing the competitiveness of countries, creating the jobs of tomorrow and effectively solving the problems related to the costs and impacts of the transition (European Commission, 2021a).

When examining the implementation processes of the EU Green Course in the context of information management, first of all, it is necessary to define the definition of information perception in a broad sense. A person is always surrounded by information - knowledge flows. Each person reacts, absorbs, understands and communicates certain information differently. Information is the content of an object perceived by a person, consisting of data as a primary product or material for acquiring knowledge. Information is knowledge that can be transmitted, received, memorized. Information becomes knowledge only when a person wants it, when it is accepted and understood (John B. Anderson & Johannesson, 2005). This is the basis for knowledge management systems development and their effective usage to prevent economic losses (Bencsik & Juhasz, 2020; Oliinyk et al., 2021; Petrushenko et al., 2021; Ton & Hammerl, 2021). The word information, depending on the context of use, is usually closely related to the following concepts: meaning, knowledge, instruction, message, communication, representation, mental stimulus. The most popular meaning is scientific, social, political, technical knowledge, transmitted from one person to another orally, in writing, or by means of mass communication (through the press, radio, television, cinema). Information is the primary vehicle through which all decisions made are documented, communicated, and shared with others (Bjork, 2001; Koskela & Barghav, 2008).

Hicks et al. (2006) define information management as the overarching activities that support the information life cycle from creation, presentation and maintenance to reuse. It is based on strategy and processes, with a focus on creating, sharing and managing content to effectively run organizational processes. The effective support of information management processes requires appropriate efforts aiming at personnel development (Liem & Hien, 2020; Samoliuk et al., 2021; Hazudin et al., 2022) as well as communication systems within enterprises (Pisar & Mazo, 2020). Therefore, the successful information management is the main goal of many individuals, unions, political parties and other organizations. Effective information management of the EU Green Deal is not an easy task.

3. STUDY FRAMEWORK AND METHODS

The study framework is based on analysis of the implementation of basic goals of EU Green Deal and comparative assessment of resources used for implementation of EU Green Deal in Lithuania and comparative assessment of information management in EU and US based on Lithuanian case study where Lithuania serves as example of EU country.

The European Green Deal aims to ensure the following goals for citizens and future generations (Bloomfield & Steward, 2020; European Commission, 2021a):

1. Clean air, clean water, healthy soil and biodiversity;
2. Renovated, energy-efficient buildings;
3. Healthy and affordable food products;
4. More public transport;
5. Cleaner energy and the most modern clean technology innovations;
6. More durable products that can be repaired, recycled and reused;
7. Development of promising workplaces and skills necessary for transformation;
8. A globally competitive and resilient industry.

The comparative assessment of Green Deal information management in EU and US will be based on Lithuanian case study in order to reveal the similarities and differences in information management for implementation of Green Deal courses in both continents. The covid-19 period will be evaluated separately to distinguish the impact global pandemics on information management.

In order to assess how the countries, manage information about the green rate at the national level, national and international audit organizations will be used for the evaluation processes. Until now, the main evaluation indicator of information about the green course has been the level of knowledge acquired by the public that would provide the public with specific information on the green course. Through the prism of explaining the knowledge level of public awareness about the green course, the aim is to assess the ability of state institutions to implement and lead the country in the direction of the green course.

The desire to effectively manage information can be determined by various factors, such as plans to improve the efficiency of business processes, comply with legal requirements and the desire to provide sustainable, efficient and innovative technologies and services. This means integrating multiple technological systems with information management, meeting multiple private and public needs, and addressing complex cultural issues. Information management also includes such systems as: document management, web content management, intranet platforms, digital asset management, learning management systems, collaboration systems - the transition to larger team integration and collaboration at an international level (Robertson, 2005).

4. LITHUANIAN CASE STUDY

4.1 Assessment of resources for implementation of EU Green Deal

For the implementation of the goals of the Green Course, it is planned to allocate resources on an unprecedented scale - through the EU economic recovery plan, the "NextGenerationEU" program, of which at least 37% must be allocated to the green transition (European Commission, 2020). In order to achieve the goals of the European Green Deal, the Commission has committed to mobilize at least EUR 1 trillion for sustainable investments over the next decade.

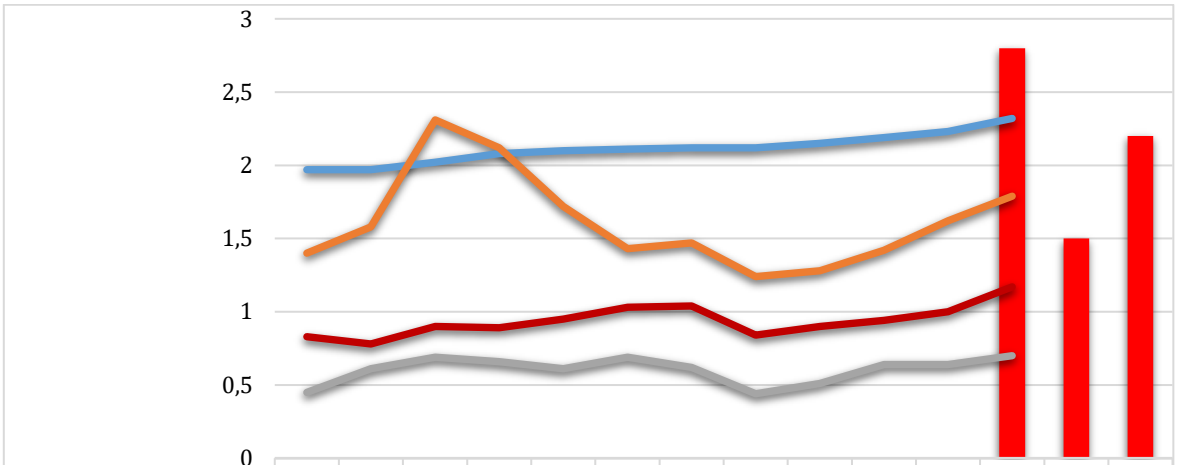
The ongoing EU cohesion policy helps EU countries, regions, local authorities and cities implement major investments that contribute to the implementation of the European Green Deal objectives. To realize this goal, EU countries must allocate at least 30 percent. funds received from the European Regional

Development Fund. In addition, 37% of the funds of the cohesion fund will be dedicated specifically to the neutralization of climate impacts until 2050. The Commission has prepared the European Green Deal Investment Plan, otherwise known as the Sustainable Europe Investment Plan, which is part of the Green Deal. It provides for a Just Transition Mechanism to ensure a fair and just transition to a green economy. Between 2021 and 2027, many investments will be mobilized to support citizens in the regions most affected by this transition (European Commission, 2020).

In Lithuania, state activity audits were carried out to assess the effectiveness of the processes of using EU funding sources for one's own scientific research and experimental development (R&D). During the audit, attention was drawn to the issue of R&D public sector monitoring due to its great importance. The purpose of the European Regional Development Fund (ERDF) is to strengthen territorial, economic and social cohesion in the EU by eliminating regional imbalances. In the EU, member states were allowed to choose which projects to finance and take responsibility for their day-to-day management and information dissemination. When allocating funding to R&D projects from the ERDF, the projects do not compete with projects from other EU countries.

Figure 1 shows a comparison of R&D spending with GDP. In Lithuania, the largest funding for R&D was received from the ERDF fund and accounted for 86 percent. R&D of all grants received. In Estonia, 69% of grants were received from the ERDF, and the amount of this funding is almost the same as in Lithuania (684 million EUR in Lithuania, 623 million EUR in Estonia) - noted the State Audit Institution of Lithuania (Supreme Audit Institution, 2022). In order to develop innovation, Lithuania has planned to allocate EUR 756 million to R&D activities in the EU fund investment program for the period 2021-2027. It should be noted that the Seimas of the Republic of Lithuania is considering and planning to approve the National Climate Change Management Agenda from 2021. The draft of the Seimas Resolution "On the Approval of the National Climate Change Management Agenda" is public, accessible to everyone, and an opportunity has been given to submit proposals related to the project directly to the Seimas Chancellery (Resolution on the Approval of the National Climate Change Management Agenda, 2021).

In principle, part of the goal of the National Progress Plan is prepared and aimed at implementing: "to move to a sustainable economic development based on scientific knowledge, advanced technologies, and innovations and to increase the country's international competitiveness". In the comparison table of the audit reference R&D expenditure with GDP between the countries of the EU, Estonia, Latvia, Lithuania in the years 2009-2020, 2025 and 2030, it is indicated that one of the planned indicators of the impact of the goal - all planned R&D expenditure, compared to the country's GDP, in 2030 will amount to 2.2 % of GDP.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Lithuania goals												2,8	1,5	2,2
European Union	1,97	1,97	2,02	2,08	2,1	2,11	2,12	2,12	2,15	2,19	2,23	2,32		
Estonia	1,4	1,58	2,31	2,12	1,72	1,43	1,47	1,24	1,28	1,42	1,62	1,79		
Latvia	0,45	0,61	0,69	0,66	0,61	0,69	0,62	0,44	0,51	0,64	0,64	0,7		
Lithuania	0,83	0,78	0,9	0,89	0,95	1,03	1,04	0,84	0,9	0,94	1	1,17		

Figure 1. R&D expenses compared to GDP, %

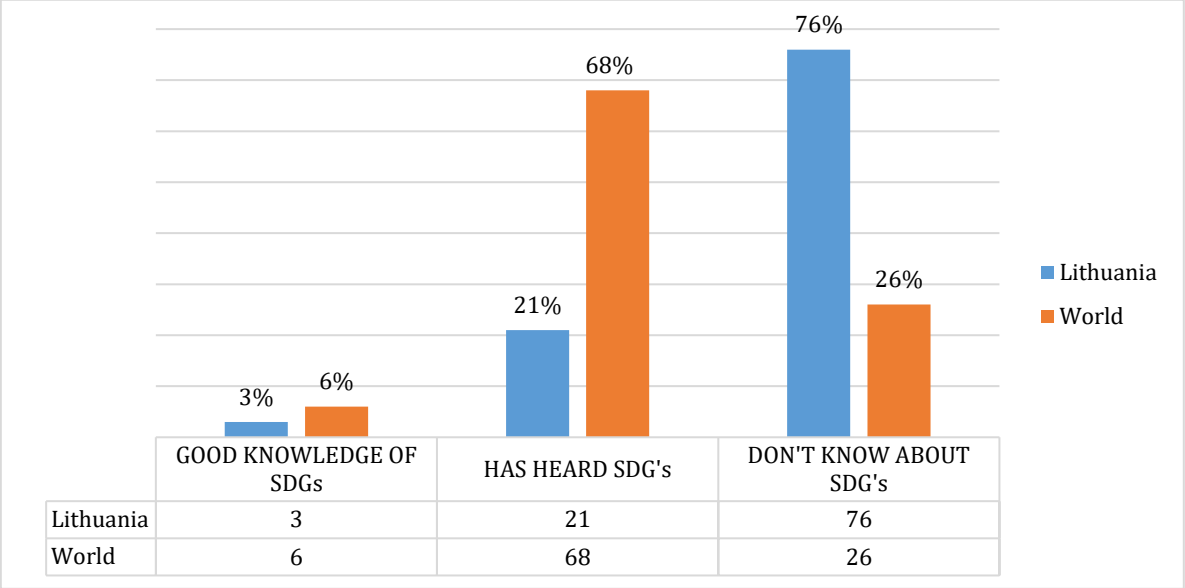
Source: Supreme Audit Institution, 2022

It is believed that the focus of the Lithuanian society and the ability to absorb the allocated funds in its activities and according to the investment plan of the green rate (Sustainable Europe Investment Plan) will allow the introduction of transformation measures to ensure a fair and just transition to the green economy in Lithuania.

4.2. Comparative assessment of Green Deal information management in EU and US

Both the EU and Lithuania must increase the level of public awareness of the green course and the goals of sustainable development, ensure the involvement of interested parties in the partnership for the implementation of global tasks. No one doubts the importance and necessity of these processes, but information dissemination and its management are not given priority. Comparing the level of knowledge of the Lithuanian public with the level of knowledge of other EU publics about these processes, the problem of insufficient information of the Lithuanian public became clear (Dilienė J. et al., 2021). In 2019, the market research company "Sprinter research" (2019), according to the survey research "Inhabitants' Opinion Survey on the Use of Investments" showed that only 24% of Lithuanian residents have heard about the goals of sustainable development or are well aware of them (Development Cooperation Platform - Issuu, 2021).

In three years, the share of the population that knows what it is or has heard about it has increased by only 4% (from 20% in 2016 to 24% in 2019), which shows a slow and inferior information process and a completely ineffective information management process. Comparing these obtained data with the results of an international survey conducted in the same year (2019) (Ipsos, 2019), it became clear that on a global scale, the value of this indicator is three times higher and reaches as much as 76%. According to the latest research, the population's awareness of SDGs in Lithuania has not changed - only 24% of the population have heard of them or know them well (Development Cooperation Platform - Issuu, 2021).



	GOOD KNOWLEDGE OF SDGs	HAS HEARD SDG's	DON'T KNOW ABOUT SDG's
Lithuania	3	21	76
World	6	68	26

Figure 2. Awareness of sustainable development goals in Lithuania and the World

Source: Ipsos, 2019

The low level of public awareness in Lithuania shows the ineffectiveness of publicizing information on the green course, SDGs on a national scale, and the inefficient coordination and management of information (Figure 2). The auditors of the National Audit Office noted that there is no plan for publicizing measures adopted at the state level, the implementation of which would ensure a focused information process and information management of both state institutions and the public (Dilienė J. et al., 2021). The inability of state institutions and other interested parties to get involved in the processes was revealed, the problem was identified that an effective and continuous dialogue between the public and private sector, society and science representatives is not created.

Cities play an important role in implementing the EU's green transformation. They generate and emit most of the greenhouse gases that are one of the components contributing to global warming (IEA, 2021). Many cities have directly experienced the devastating effects of global warming, from heat waves to tornadoes and floods.

It should be noted that due to the ongoing war in Ukraine caused by Russia and the sanctions imposed by the EU countries on Russia, the perfect environment for the energy crisis is being created. Power cuts or even shutdowns are planned for factories, and bill increases are predicted for households. This only highlights the need for urgent solutions and their implementation in the field of renewable energy (Androniceanu & Sabie, 2022). They can be developed on the innovative basis in this area (Angelova & Pastarmadzhieva, 2020; Gavkalova et al., 2022). The EU's green course is the implementation of sustainable, innovative technological solutions in everyday human life. The implementation of the Green Deal aims at the development of "climate-smart cities". We can define climate-smart cities as the application of digital technologies to cities. These technologies, above all, must be in harmony with the climate, the reduction of the amount of greenhouse gases, meet the necessary processes for the implementation of social and economic development goals, and realize the aspiration of not depending on the energy resources of other countries. It is associated with the quality of life of citizens and the financial success of businesses. Although environmental sustainability is often the goal of smart city projects (Ismagilova et al., 2019), it usually takes a back seat in the course of project implementation compared to efficient city management and the scope of economic development. The basis of the concept of climate-advanced cities is the initiation of projects

for climate-neutral solutions involving scientists and highly qualified specialists, publicizing these projects, and state support for their implementation.

In order to develop resilient urban urbanization, it is necessary to develop the capacity to absorb, recover from climate shocks and prepare for a sustainable transition to green energy. Many cities geographically connected to water bodies are investing in infrastructure to reduce, adapt to, control or avoid vulnerability to urban fabric risks due to rising sea levels, rising ambient temperatures and increasing air pollution. Nevertheless, the necessity of the implementation of the green course, the trends and directions of the impact have been highlighted by the events of today, showing the dependence of the EU countries on fossil fuels. It is clear that EU countries are still not ready to withstand shocks in the energy sector, and the events of aggression and war force this flawed situation to change urgently (Pee & Pan, 2022).

More than 50% of the world's population lives in cities and it is cities that generate about 80% of the world's gross domestic product (IEA, 2021). With better digital infrastructure, connectivity and access to seed funding, it's no surprise that cities are at the forefront of the digital economy. As cities move forward in their digital transformation, the opportunities and threats of climate change are also becoming clearer. Companies can more efficiently and affordably take advantage of the transition to green industry, production. As in the area of the electrical technology sector of the digital economy, FinTech also has various climate-related programs that facilitate responsible investment and financing (Lietuvos bankas, 2021). Despite the contribution of IT as a solution direction for climate action and an indicator of a certain process, it should be noted that even the carbon footprint of IT technologies must be monitored and thoughtfully managed (Pee & Pan, 2022).

The general definition of industry refers to the part of the economy that produces material goods, the success of which is highly mechanized and automated (Lasi et al., 2014) production procedures. The fourth industrial revolution is read to be based on IT, such as artificial intelligence, blockchain and the deployment of 5G internet connectivity. The fourth industrial revolution seeks to create modular and efficient production systems that allow for the customization of product lines or even "batch-size" production volumes (French et al., 2021). Industry and production technologies that cause the greenhouse effect and gas emissions are being studied more and more often and in more detail. Their impact on the environment is emphasized. Reduction or elimination of the negative impact on the environment must be carried out on the basis of information studies carried out by scientists. Obvious areas of opportunity are already identified, including the use of large-scale data streams for energy optimization, AI, and the benefits of machine learning application development. Cyber-physical systems can include renewable energy from recycled resources. In addition, information researchers specializing in open IT, AI innovation or cross-organizational systems can promote the development, realization, supply and implementation support of green technologies not only in the EU but also in developing countries (Kirchherr & Urban, 2018). Knowledge transfer at this level has new dimensions and challenges that require further research beyond our current theoretical understanding of cross-border informational knowledge transfer and management (Ravichandran & Giura, 2019).

4.2. Comparative assessment of Green Deal information management in EU and US during global COVID-19 pandemic

A global public health and economic crisis is ending the COVID-19 pandemic. It had and has (it is believed that its effects will be long-term) a significant negative impact on the implementation of the green course in sustainable development countries (Sustainable Development Report, 2021). The reports were prepared by independent experts from the SDG and Bertelsmann Stiftung organizations in 2020-2021. The review of the impact of the COVID-19 pandemic on the implementation of the green course and the SDG

was carried out (Dilienė J. et al., 2021; Dupont et al., 2020). The COVID-19 crisis has shown that the preparedness of the health systems of countries to respond to extreme health situations of this scale and nature is not sufficient (3rd MDG), including many countries of the Organization for Economic Co-operation and Development (OECD), which were assessed before the COVID-19 crisis how well prepared they are for the possible risks and events of emergency situations.

However, at the global level, it should be noted that along with the negative expressions of the losses of the COVID-19 pandemic, the positive expressions of the COVID-19 pandemic have also emerged, such as: the processes of implementing digital technologies and services have become faster, creating the conditions to facilitate further communication remotely; processes and information transfer and its management not only in the state, public sector but also in society. Conducted studies show that global investments in research and development (9th SDG) have increased significantly (Dilienė J. et al., 2021).

The EU countries recognize that the information battle was lost during the COVID-19, and the lies that often took its place can hinder the attitude and progress of a certain part of society to achieve the SDGs and follow the path of the green course. After the end of the COVID-19 pandemic, research on public behavior and its changes is necessary. It becomes a challenge to unite the society and basically go purposefully in the direction of the implementation of the green course in a unified and purposeful way. In this place, information dissemination, its management is a necessary part of information management. Special attention must be paid to strategically selected, effective IT, publicity, information dissemination, oral communication tools, communication specialists - professionals and those with this specialized knowledge, and the like.

The period of the global COVID-19 pandemic of 2020-2022 can serve and be counted as a base point for data and real achievements on the level of implementation of the SDGs and the Green Course. The different achievements of the EU countries in the field of the implementation of the green course and the SDGs, the reduction of the differences in the level of their realization and the elimination of these differences in the future are the aspirations of the EU. To achieve this, it is necessary and mandatory to give priority to information and its management (dissemination) on the state level about the green course and SDG at all levels: state institutions (making decisions), scientific and research institutions (developing IT, AI), economic entities and business (implementing the established policy and solutions that create domestic product) and society (daily consumption and behavior) and individual consumption. Based on the evaluations carried out by the state audit institutions, it is stated that regardless of the definition of information as such, the level of effectiveness of information management tools is decided according to the public's knowledge about the green transformation of urban urbanization, the emergence of a neutral digital economy or the creation of opportunities for it to happen, the digital involvement of citizens in the green course and SDG prism and context (Consumer PRO, 2021).

Due to the ongoing climate change, various decisions are made to promote the green transformation, but these decisions will not be implemented fully or 100% if people are not informed about the causes of negative climate changes and the necessary preventive actions of the green course, decisions, and are not aware and focused on global goals and the green course for knowledge, implementation in everyday life of society. IT solutions provide opportunities and offer attractive ways to raise public and individual awareness of climate change. IT can teach and educate city dwellers about responsible consumption and sustainable behavior. Data researchers, public information and information dissemination sources can also rely on targeted knowledge accumulated by IT. The recognition of IT and the ability of AI to understand the attitude, behavior, objects of interest of city residents and to send feedback targeted information to the IT user about responsible consumption is the main source of information provision, therefore it is especially important to lay the foundations of ecological IT. Today, IT and the Internet are an integral part of people's lives, one of the main platforms for people's science - information absorption (Pee & Pan, 2022).

Citizens of certain countries are already choosing more sustainable and environmentally friendly solutions, such as mobile devices (e.g. FairPhone - manufacturer headquarters: Amsterdam, Netherlands), computers - made from recycled materials or components (e.g. lead-free and halogen-free computer motherboard), smart utility meters, electric cars (e.g. Tesla), digital personal health data records, e-commerce or logistics service platforms (e.g. developing a food delivery service network). Greener options are often available to consumers in climate-advanced cities. Often, the possession of individual and/or public knowledge does not mean the implementation of this knowledge in practical, everyday activities. As a classic illustrative example, there is a situation where consumers usually claim to have a positive attitude towards organic products and services, an understanding of their benefits for the environment and health, but the actual application of this knowledge in consumption practice remains limited due to a stereotypical approach (Pee & Pan, 2022). Research on the use and perceived usefulness of green IT has been largely conducted in organizations rather than in individual households (Singh & Sahu, 2020). The data obtained and processed during these researches, the scientifically based information and its comparison with the existing real green IT users, allow scientists to increasingly integrate the use, integration and development of green IT by applying IT in various fields of activity. In climate-smart cities, this provides much greater opportunities for economic and environmental policy development (Warkentin et al., 2017).

IT digital information management, including accelerators and research platforms in information dissemination and processes, adapting complex technological language by simplifying it to the point where it can be used and applied in practice, in training and education programs, in the daily life of citizens, allows the general public, more or less in all age groups, to get involved in the process of scientific research - from determining problem areas and scope, drawing up scientific research questionnaires, participating in surveys, collecting data and after receiving them - analyzing, interpreting the results, and implementing the processes of participation in the development of technologies and applications (Bonney et al., 2014). Citizen volunteers are usually used to implement climate-related projects. One successful example is the use of public volunteers to transcribe and digitize historical weather records in order to compile and track climate change phenomena, create change models, monitor natural changes, or provide change calculation methodologies that enable the analysis of future scenarios of global warming. For example, in Australia, the Urban Microclimate Citizen Science Project provided participants with a mobile recording app, introduced them to a data-sharing platform, provided applications such as a thermal comfort calculator and a data visualization tool to collect local weather data; on the basis of data visualization, participants were given the opportunity to understand the climate change trends of that region (Rajagopalan et al., 2020), and compare them with other regions of the country.

Thus, IT is one of the more important components in the implementation of the goals of green transformation. Information research and IT and AI analysis of the resulting data are an integral part of creating smart, sustainable cities. These studies are full of challenges arising from values, interpretation of theories and epistemological differences, but most importantly, the implementation of global goals can be achieved with the help of these studies. Epistemology as epistemology, cognitive theory, is a branch of philosophy that examines the nature, origin, structure and boundaries of knowledge and cognition to this day and is considered as a concept of management and planning of information presentation. Educational institutions have compiled information management study programs designed to prepare specialists who must be able to work not only in traditional information storage and management institutions (archives, libraries, museums, etc.), but also in modern activities of legal entities (business companies, various organizations, big data management institutions, etc.). During these studies, one learns not only to find, organize and store information, but also to create and provide information-related educational, cultural and other services for various target groups of society, to identify and evaluate people's information needs and behavior. These degree programs should include a broad course on the green course.

The US greenback was revived in January 2019. The resolution was approved in July 2019. Recognizing the federal government's responsibility to create a new green course links radical environmental and economic agendas. This package of programs, introduced by Democrats Alexandria Ocasio-Cortez and Edward Markey, sparked a wave of enthusiasm internationally, suggesting a broad resurgence of transformative politics (Authenticated U.S. government information GPO, 2019). Such political attractiveness was confirmed by the decision of the newly appointed Commission to launch its European Green Course in December 2019 by proposing the linking of climate and financial policies so that sustainability is the basis of the economic strategy. However, in this case the political leadership was conservative and centrist rather than radical social democratic. In keeping with the European traditions of moderate intervention, it also reflected the nature of recent political "bruising". But fundamentally, it expressed a deeper tectonic shift in the political terrain caused by the new global climate reality shaking old partisan foundations (Dupont, et al., 2020).

5. DISCUSSION OF RESULTS

Despite the gap between European and US discourses, and the existing moderate and radical interventions in the new policy architecture, two propositions typical of the green deal have emerged. Both European and US proposals reformulate and link three main policy pillars with separate traditions: environmental policy, fiscal policy and industrial policy. This configuration defines the essence of the innovative conception of the green course policy (Dupont, et al., 2020), opens the way for new information communication and its management:

The first pillar of the policy is the main challenges related to the climate: biodiversity loss, pollution, waste. These highlighted concepts indicate clearer and more understandable environmental policy formation, process directions and impact paths. The EU and the US are working to address the bewildering global crisis of disruptive changes in air, land and water ecosystems and the diversity of associated and emerging threats, and offer more effective impact guidance than traditional confusing toolkits. Policymakers in the EU and the US are pursuing increasingly clear goals that focus on shared benefits for humanity, such as individual and/or societal health and well-being in general (Dupont, et al., 2020; Pazarskis et al., 2022). It can be assumed that the information provided to the public about the necessary guidelines for the impact of the sample became more informative and more understandable when it was presented through changes in the improvement of biosystems and human health, a constant discussion of "what will we leave behind for future generations".

The second policy pillar is a fiscal policy revolution that recognizes two new, inextricably linked fundamental goals: promoting targeted financial spending for environmentally sustainable investments and demanding serious progress in social justice and universal inclusion. It should be noted that informing the public about the newly planned production facilities, their capacities and volumes, the resources planned to be used in the processes, and the generated waste acquires a practical expression. Assessment and publicity of the environmental impact of these facilities, the transparency of these processes have become an integral part of the management of information about the green course, and the emerging debates between the public and producers are periodically heard. However, it can be assumed that the knowledge of the participants of the discussion about the green rate is still fragmented, there is no consistency.

The third pillar of the policy is the transformation of the main energy, transport, housing and food consumption/production systems and related areas. Plans to transform all systems seem impossible. The goals of the transformation are realized in order to make the right decisions for the social systems, technologies and methods that create large emissions. Not only transformation, responsibility for decisions, but also responsible use and provision of services are encouraged (Geels, 2004; Geels, 2020).

Table 1 provides the main similarities between EU and US green course directions based on Lithuanian case study where Lithuania served as example of EU country in comparative assessment between EU and US.

Table 1

Similarities between EU and US green course directions

SYSTEMS		**ENVIRONMENT**		**FINANCE**	
European green deal COM (2019) 640	US Green New Deal H. RES.109 (2019)	European green deal COM (2019) 640	US Green New Deal H. RES.109 (2019)	European green deal COM (2019) 640	US Green New Deal H. RES.109 (2019)
Energy		**Waste**		**Investment**	
Supplying clean, affordable and secure energy	Meeting power demand through clean, renewable and zero emission energy sources	Mobilizing industry for a clean and circular economy	Massive growth in clean manufacturing	Additional green investment from public and private sectors	Providing and leveraging capital for green new deal mobilization
Buildings		**Climate**		**Rules**	
Building and renovating in an energy and resource efficient way	Buildings to achieve maximum energy efficiency, affordability, comfort	Increasing the EU's climate ambition for 2030 & 2050	Achieve net zero greenhouse gas emissions	Sustainable investment taxonomy and disclosure	Complete environmental and social accounting
Mobility		**Biodiversity**		**Jobs**	
Accelerating the shift to sustainable and smart mobility	Transportation systems to remove pollution and greenhouse gas emissions	Preserving and restoring ecosystems and biodiversity	Restoring and protecting ecosystems and enhance biodiversity	Expand sustainable and job-intensive economic activity	Create high quality union jobs and guarantee jobs to all
Food		**Pollution**		**Justice**	
From 'farm to fork': a fair healthy and environmentally friendly food system	A more sustainable food system that ensures access to healthy food	A zero pollution ambition for a toxic-free environment	Mitigating the adverse health effects of pollution	A just transition fund focused on carbon – intensive regions and sectors	Direct investments to communities that struggle with the transition from ghg intensive industries

Source: Bloomfield & Steward, 2020

The EU has a particularly large role and recognized global leadership in the implementation of the green course and the SDGs. The presented basic elements of the future economy are necessary for the successful implementation of the European green course: radical strategies for biodiversity, circular economy, zero pollution, sustainable and smart mobility, renovation wave, sustainable food, hydrogen, batteries, marine renewable energy resources and many other areas (European Commission, 2021a). Attention is focused on the Commission's plans and aspirations to implement the goals of the European Green Deal. Financial obligations during the next decade are particularly large - at least 1 trillion. EUR for the implementation of sustainable investments. The directions of implementation of the green course of the countries are different. Comparing the directions of the green course of the EU and the USA, it can be unequivocally stated that at the political level, there is a real, intensified incentive to implement sustainable solutions on a global scale that encourage the creation and systematic implementation of new, innovative

technologies in the production sectors, households, and other interested countries. The Green Deal policy platform for both the EU and the US makes targeted proposals for a new "sustainable transition policy" that includes a broader mix of interventions than just market-based measures.

6. CONCLUSIONS

1. Based on the main theoretical foundations of the EU Green Deal, the European Green Deal is formed as a strategy for economic growth and competitiveness, which, based on the principle of solidarity, helps to change the global narrative that affects political and business markets, and sets an example for other countries in the world to follow.
2. Acquainting the public with the First European Climate Act, etc. obligations established in the agreements, it is important for the SDGs to communicate correctly with the public, informing them that these measures are the most important goal for the implementation of long-term changes in climate change. In their course, new opportunities for innovation, investment and job creation are opened.
3. Unprecedented resources are being allocated to managing climate change and meeting the goals of the European Green Deal. It is planned to mobilize at least 1 trillion in the next decade to implement sustainable investments. EUR, and this shows a real priority for the implementation of climate change changes and the pursuit of long-term results. How much funds are needed to achieve the EU's final goal of ensuring climate neutrality by 2050 is probably not possible to accurately calculate, because the countries of the world are at different levels in all aspects, so the pace of implementation of the countries' impact measures may be different. Nevertheless, the pursuit of SDGs on the principle of solidarity should reduce these differences.
4. The comparative assessment of information management for implementation of Green Deal in EU and US was performed based on Lithuanian case study. The Lithuania served in this case study as example of EU country and the main similarities and differences between information management in implementing green deal in both continents were distinguished.
5. The comparison of the EU and US green course implementation directions allows to identify the gap of opinion between European and US discourses, and at the same time helps to clarify the policy areas of the green course connecting the EU and the US: environmental policy, fiscal policy and industrial policy. This configuration of communion opens the way for new information communication and management. The convergence of approaches to the implementation of the EU and US green course at the levels of environmental policy, fiscal policy and industrial policy encourages the global implementation of sustainable solutions, the development of new, innovative technologies and their systematic implementation processes in production sectors, households, etc. This new EU-US green course policy platform is particularly important for shaping the new period of "sustainable transition policy".
6. After evaluating the management of information in order to implement the directions of the green course in the processes of urban urbanization, neutral digital economy, digital citizen engagement, the deficit of information and public knowledge can be noted. An audit of information management processes is necessary both at the highest level of state control and at a lower level - in economic entities and companies. The submitted audit conclusions and recommendations must be consistently implemented. The effectiveness of information management and the impact of measures is determined by conducting public surveys - it is believed to be one of the methods showing the level of public knowledge in the areas of the green course and SDG.

7. Extreme situations such as the COVID-19 pandemic and the war in Ukraine have impact on the change the behavior of society, the attitude towards the implementation of sustainable development and the green course as well.

REFERENCES

An, H., Razzaq, A., Nawaz, A., Noman, S. M., & Khan, S. A. R. (2021). Nexus between green logistic operations and triple bottom line: evidence from infrastructure-led Chinese outward foreign direct investment in Belt and Road host countries. *Environmental Science and Pollution Research*, 28(37), 51022–51045. https://doi.org/10.1007/S11356-021-12470-3

Androniceanu, A., Sabie. O.M. (2022). Overview of green energy as a real strategic option for sustainable development. *Energies*, 15(22), 8573; doi:10.3390/en15228573

Androniceanu, A. (2020). Major structural changes in the EU policies due to the problems and risks caused by COVID-19. *Administratie si Management Public*, 34, 137-149. DOI: 10.24818/amp/2020.34-08

Angelova, M., & Pastarmadzhieva, D. (2020). Development of bio-based economy: Entrepreneurial endeavors and innovation across Bulgarian wine industry. *Journal of International Studies, 13*(2), 149-162. doi:10.14254/2071-8330.2020/13-2/11

Authenticated U.S. government information GPO. (2019). 16th Congress 1d Session In The House Of Representatives H. RES. 109. Access via the Internet https://www.congress.gov/bill/116th-congress/house-resolution/109/text

Bank of Lithuania. (2021). The Lithuanian FinTech sector in the 2020s: a path paved with challenges to new opportunities | Lithuanian bank. Access via the Internet https://www.lb.lt/lt/naujienos/lietuvos-fintech-sektorius-2020-aisiais-issukiais-gristas-kelias-i-naujas-galimybes

Bencsik, A., & Juhasz, T. (2020). Impacts of informal knowledge sharing (workplace gossip) on organisational trust. *Economics and Sociology, 13*(1), 249-270. doi:10.14254/2071-789X.2020/13-1/16

Björk, B.-C. (2001). Document management-a key IT technology for the construction industry. Access via the Internet https://www.researchgate.net/publication/228790882_Document_Management-a_key_IT_technology_for_the_construction_industry

Bloomfield, J., & Steward, F. (2020). The Politics of the Green New Deal. *Political Quarterly*, 91(4), 770–779. https://doi.org/10.1111/1467-923X.12917

Bonney, R., Shirk, J. L., Phillips, T. B., Wiggins, A., Ballard, H. L., Miller-Rushing, A. J., & Parrish, J. K. (2014). Next steps for citizen science. Science (T. 343, Numeris 6178, p. 1436–1437). *American Association for the Advancement of Science*. https://doi.org/10.1126/science.1251554

Cheba, K., Bąk, I., Szopik-Depczyńska, K., & Ioppolo, G. (2022). Directions of green transformation of the European Union countries. *Ecological Indicators*, 136, 1470–160. https://doi.org/10.1016/J.ECOLIND.2022.108601

Consumer PRO. (2021). Theoretical foundations of sustainability. *Sustainability – Lithuania*, 1, 1–64.

Dilienė J., Sabutis H., Butkevičienė A., Petkevičiūtė E., G. T. (2021). Lithuania's readiness to implement sustainable development goals 2021. Access via the Internet www.valstybeskontrolė.lt.

Dupont, C., Oberthür, S., & Von Homeyer, I. (2020). The Covid-19 crisis: a critical juncture for EU climate policy development? *Journal of European Integration*, 42(8), 1095–1110. https://doi.org/10.1080/07036337.2020.1853117

European Commission. (2020). European Commission - Press release EU budget : European Commission welcomes the adoption of the EU's long- term budget for 2021-2027. 1–2.

European Commission. (2021a). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM (2021) (550 final), 1–16. Access via the Internet https://ec.europa.eu/clima/citizens/support_en.

European Commission. (2021b). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Faster implementation of the Single European Sky initiative. *COM (2021) 82 final.* Access via the Internet https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN

European Green Deal | European Commission. Gauta 2022 m. kovo 21 d., https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_lt

evelopment cooperation platform - Issuu. (2021). Survey of the opinion of the country's population on development cooperation and sustainable finance. Access via the Internet https://issuu.com/vbadmin/docs/ataskaita_-_vystomojo_bendradarbiavimo_platforma_2

FCCC. (2015). Conference of the Parties: Twenty-First Session. United Nations - Framework Convention on Climate Change (T. 01192, Numeris November). Access via the Internet https://unfccc.int/process-and-meetings/conferences/past-conferences/paris-climate-change-conference-november-2015/cop-21

Fisun, I., Kucher, M., Stebliuk, N., Saihak Y., & Prokopenko, O. (2022). Modeling development strategy of tourism companies under the influence of external and internal environment: Evidence from Ukraine. *Tourism and Travelling, 4*(1), 1-15. https://doi.org/10.21511/tt.4(1).2022.01

French, A. M., Shim, J. P., Larsen, K. R., Risius, M., & Jain, H. (2021). The 4th industrial revolution powered by the integration of AI, blockchain, and 5G. *Communications of the Association for Information Systems*, 49(1), 266–286. https://doi.org/10.17705/1CAIS.04910

Gavkalova, N., Lola, Y., Prokopovych, S., Akimov, O., Smalskys, V., & Akimova, L. (2022). Innovative development of renewable energy during the crisis period and its impact on the environment. *Virtual Economics, 5*(1), 65–77. https://doi.org/10.34021/ve.2022.05.01(4)

Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems Insights about dynamics and change from sociology and institutional theory. *Research Policy*, 33, 897–920. https://doi.org/10.1016/j.respol.2004.01.015

Geels, F. W. (2020). Transformative innovation and socio-technical transitions to address grand challenges. https://doi.org/10.2777/967325

Georgescu, I., Kinnunen, J., & Androniceanu, A.-M. (2022). Empirical evidence on circular economy and economic development in Europe: a panel approach. *Journal of Business Economics and Management*, 23(1), 199–217. https://doi.org/10.3846/jbem.2022.16050

Hazudin, S.F., Sabri, M.F., Kader, M.A.R.A., Saripin M.S., & Ridzuan, M.R. (2022). Social capital, entrepreneurial skills, and business performance among rural micro-enterprises in times of crisis. *Knowledge and Performance Management, 6*(1), 75-86. https://doi.org/10.21511/kpm.06(1).2022.07

Hicks, B. J., Culley, S. J., & McMahon, C. A. (2006). A study of issues relating to information management across engineering SMEs. *International Journal of Information Management*, 26(4), 267–289. https://doi.org/10.1016/j.ijinfomgt.2006.03.006

IEA. (2021). Empowering Cities for a Net Zero Future: Unlocking resilient, smart, sustainable urban ebergy systems. International Energy Agency.

Ipsos. (2019). United Nations Sustainable Development Goals. Global attitudes towards its use and regulation. Ipsos Survey for the World Economic Forum Conducted in August 2019 Wave of Global Advisor.

Ismagilova, E., Hughes, L., Dwivedi, Y. K., & Raman, K. R. (2019). Smart cities: Advances in research—An information systems perspective. *International Journal of Information Management* (T. 47, p. 88–100). Pergamon. https://doi.org/10.1016/j.ijinfomgt.2019.01.004

John B. Anderson, & Johannesson, R. (2005). Understanding information transmission. Understanding Information Transmission. the Institute of Electrical and Electronics Engineers, Inc. https://doi.org/10.1515/9783110950007

Kirchherr, J., & Urban, F. (2018). Technology transfer and cooperation for low carbon energy technology: Analysing 30 years of scholarship and proposing a research agenda. *Energy Policy*, 119, 600–609. https://doi.org/10.1016/j.enpol.2018.05.001

Koskela, L., & Dave, B. (2008). Editorial: Process and IT. Construction Innovation (T. 8, Numeris 4, p. 244–249). https://doi.org/10.1108/14714170810912635

Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business and Information Systems Engineering*, 6(4), 239–242. https://doi.org/10.1007/s12599-014-0334-4

Liem, V. T., & Hien, N. N. (2020). The impact of manager's demographic characteristics on prospector strategy, use of management accounting systems and financial performance. *Journal of International Studies, 13*(4), 54-69. doi:10.14254/2071-8330.2020/13-4/4

Naumenkova, S., Mishchenko, V., and Mishchenko, S. (2022). Key energy indicators for sustainable development goals in Ukraine. *Problems and Perspectives in Management, 20*(1), 379-395. https://doi.org/10.21511/ppm.20(1).2022.31

Oliinyk, O., Bilan, Y., Mishchuk, H. (2021). Knowledge Management and Economic Growth: The Assessment of Links and Determinants of Regulation. *Central European Management Journal, 29*(3), 20-39. https://doi.org/10.7206/cemj.2658-0845.52

Ozturk, I., Aslan, A., & Altinoz, B. (2021). Investigating the nexus between CO2 emissions, economic growth, energy consumption and pilgrimage tourism in Saudi Arabia. *Economic Research-Ekonomska Istrazivanja*. https://doi.org/10.1080/1331677X.2021.1985577

Pauliukevičienė, G., & Stankevičienė, J. (2021). Assessing statistical link between FinTech PEST environment and achievement of SDGs. *Public and Municipal Finance, 10*(1), 47-66. https://doi.org/10.21511/pmf.10(1).2021.05

Pazarskis, M., Galanis, S., Gkatziou, M., & Kourtesi, S. (2022). Examining governance and performance of utility companies after mergers: a case from a municipal water company in Greece. *Public and Municipal Finance, 11*(1), 90-100. https://doi.org/10.21511/pmf.11(1).2022.08

Pee, L. G., & Pan, S. L. (2022). Climate-intelligent cities and resilient urbanisation: Challenges and opportunities for information research. *International Journal of Information Management*, 63, 102446. https://doi.org/10.1016/j.ijinfomgt.2021.102446

Petrushenko, M., Burkynskyi, B., Shevchenko, H., & Baranchenko, Y. (2021). Towards sustainable development in a transition economy: The case of eco-industrial parks in Ukraine. *Environmental Economics, 12*(1), 149-164. https://doi.org/10.21511/ee.12(1).2021.13

Pisar, P., & Mazo, M. E. (2020). Controlling, communication and corporate culture – the opportunity for SMEs. *Economics and Sociology, 13*(3), 113-132. doi:10.14254/2071-789X.2020/13-3/8

Rajagopalan, P., Andamon, M. M., & Paolini, R. (2020). Investigating thermal comfort and energy impact through microclimate monitoring- a citizen science approach. *Energy and Buildings*, 229, 110526. https://doi.org/10.1016/j.enbuild.2020.110526

Ravichandran, T., & Giura, S. I. (2019). Knowledge transfers in alliances: Exploring the facilitating role of information technology. *Information Systems Research*, 30(3), 726–744. https://doi.org/10.1287/isre.2018.0823

Resolution on the approval of the National Climate Change Management Agenda, 1 (2021). Access via the Internet https://www.teisesakturegistras.lt/portal/lt/legalAct/abae1620db3311eb9f09e7df20500045

Robertson, J. (2005). 10 Principles of Effective Information Management. Step Two Designs November 12005, November, 1–8. Access via the Internet https://www.steptwo.com.au/papers/kmc_effectiveim/

Ruse, A., & Pubule, J. (2022). The Boundaries of Scientific Innovation in the EU Green Deal Context. *Environmental and Climate Technologies*, 26(1), 115–128. https://doi.org/https://doi.org/10.2478/rtuect-2022-0010

Samoliuk, N., Bilan, Y., & Mishchuk, H. (2021). Vocational training costs and economic benefits: exploring the interactions. *Journal of Business Economics and Management. 22*(6), 1476-1491. https://doi.org/10.3846/jbem.2021.15571

Sharif, A., Baris-Tuzemen, O., Uzuner, G., Ozturk, I., & Sinha, A. (2020). Revisiting the role of renewable and non-renewable energy consumption on Turkey's ecological footprint: Evidence from Quantile ARDL approach. *Sustainable Cities and Society*, *57*, 102138. https://doi.org/10.1016/J.SCS.2020.102138

Shevchenko, H., Petrushenko, M., Burkynskyi, B., & Khumarova, N. (2021). SDGs and the ability to manage change within the European green deal: The case of Ukraine. *Problems and Perspectives in Management, 19*(1), 53-67. https://doi.org/10.21511/ppm.19(1).2021.05

Singh, M., & Sahu, G. P. (2020). Towards adoption of Green IS: A literature review using classification methodology. *International Journal of Information Management* (T. 54). Elsevier Ltd. https://doi.org/10.1016/j.ijinfomgt.2020.102147

State control. (2021) only every fourth Lithuanian has heard about the goals of sustainable development State control of the Republic of Lithuania. Access via the Internet

https://www.valstybeskontrole.lt/LT/Post/15793/valstybes-kontrole-tik-kas-ketvirtas-lietuvis-yra-girdeje-apie-darnaus-vystymosi-tikslus

Streimikiene, D. (2021). Challenges of Approaching Climate Neutral Society in V4 Countries. *Montenegrin Journal of Economics*, 17(3), 181-191.

Streimikiene, D. (2022). Afordable and Clean Energy for all: Challenges in Balkan Countries. *Montenegrin Journal of Economics*, 18(3), 57-66.

Supreme Audit Institution. (2022). Review of research and experimental development. Access via the Internet https://www.valstybeskontrole.lt/LT/Product/24067

Sustainable Development Report 2021 - Sustainable Development Report. (s.a.). Gauta 2022 m. balandžio 11 d., Access via the Internet https://www.sdgindex.org/reports/sustainable-development-report-2021/

Ton A.D., & Hammerl, L. (2021). Knowledge management in the environment of cross-functional team coopetition: A systematic literature review. *Knowledge and Performance Management, 5*(1), 14-28. https://doi.org/10.21511/kpm.05(1).2021.02

Warkentin, M., Goel, S., & Menard, P. (2017). Shared benefits and information privacy: What determines smart meter technology adoption? *Journal of the Association for Information Systems*, 18(11), 758–786. https://doi.org/10.17705/1jais.00474