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INNOVATION AND SUSTAINABILITY AS A CRUCIAL TREND IN ENERGY SECTOR PROJECT MANAGEMENT – LITERATURE REVIEW

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Purpose: Project management is a universally recognized methodology for business and project activities. Organisations are increasingly using project activities to achieve strategic benefits. It is purposed to optimize the time, human and financial resources, without deviating from the planned quality of the final product of the project and while maintaining the principles of sustainability. The energy sector is no exception. The purpose of this paper is to determine trends in energy sector project management.
Design/methodology/approach: To present the research concerning project management in energy sector innovations the literature review process was carried out. The analysis of keywords, abstract, and on this basis further deeper analysis of scientific texts allowed to identify trends in project management in the energy sector. There is a research gap in research summarizing trends in the description of the issue of project management in the energy sector.
Findings: The literature analysis presented indicates that the interest of scientists is largely directed towards sustainable projects in the energy sector. This has to do with global trends not only in the energy sector but in every sector of the economy. Energy project management should continue to focus on becoming more sustainable, especially when more and more organizations are aware that their strategy should include ecological sustainability, such as eco-innovation and environmental innovation.
Originality/value: It is one of the few scientific texts that touches on the problem of project management in the energy sector. In terms of implications, studies have shown that particular emphasis should be placed on the aspects of project teams creating sustainable innovations for the sector, as well as neutralizing the carbon footprint of the project teams themselves.

Keywords: project management, energy sector, sustainability, review.

Category of the paper: Literature review.

1. Introduction

Nowadays we, as humanity, have to face crises in climate, food, biodiversity, and energy which are critical to deal with not only on a local but also on a global scale (Leach et al., 2012). Therefore, one of the key challenges of the modern global economy is to reduce environmental pollution and save limited natural resources (Wolniak et al., 2020). The use of renewable energy is seen as a major strategy to reduce greenhouse gas emissions, fossil fuel imports, and create a sustainable energy system, which is bound to have a profound socioeconomic impact on society (Xue & Yue, 2020).

Today's companies and organizations, regardless of their size or their location, are under obligation to look for and implement sustainable innovations at, preferably, every step of providing their products or services (Kern et al., 2019). It strongly applies to their carbon footprint and use of green energy. More and more organizations are aware that their strategy should include ecological sustainability, such as eco-innovation and environmental innovation (Carrillo-Hermosilla et al., 2010) or sustainable innovations defined as the process of developing new ideas, behaviour, products, and processes that contribute to a reduction in environmental burdens or to ecologically specified sustainability targets (Rennings, 2000). Noppers et al. (2014) convince that a key strategy is a transition to innovative products and services that use less energy or rely on renewable energy sources since reducing fossil energy use and the emission of greenhouse gases is one of the major (environmental) challenges.

It must be stressed, that today we can observe the increasing importance of project-based undertakings which stem from the fact that business activities are more complex and flexible (Jarosz et al., 2020; Jarosz & Zakrzewska, 2020). Kerzner (2017) define project as series of multifunctional activities with specific goals, defined start and end dates, limited budget, defined resources. According to the same author (Kerzner, 2017) "project management is the application of knowledge, skills, and tools necessary to achieve the project's requirements". This truth also applies when it comes to broadly understood energy area. Energy as economy sector can be defined as "a complex and inter-related network of companies, directly and indirectly, involved in the production and distribution of energy needed to power the economy and facilitate the means of production and transportation" (Chen, 2021). By using the phrase "energy project management" in the article, the authors mean project management in the energy sector.

Moreover, the changes which stand behind the fourth industrial revolution have increased the need for innovative, sustainable, and ecological solutions in energies area. Due to this fact project management in the energy area has attracted the interest of academia and practices all around the world but we still find the topic of its impact on project management in the energy sector is unexplored enough. Wu et al. (2012) propose the identification of energy projects in two ways:

1. According to the project-level in the organization:
   a. dependent projects and emergency projects,
   b. operational projects,
   c. strategic projects.
2. According to the type of energy:
   a. traditional energy projects,
   b. new energy projects,
   c. intermittent energy projects,
   d. non-intermittent energy projects.

Especially since renewable energy projects have to face many challenges (Xue & Yue, 2020) and the problems associated with investments in alternative energy projects are not sufficiently developed (Rostova et al., 2019), this is the area that requires urgent attention from researchers and practitioners. Renewable energy projects are described by three characteristics (Chang, 2013):

- the cost disadvantage of renewable energy makes it highly dependent on government subsidies to compete with traditional energy,
- one of the greatest appeals of renewable energy is its ability to tap into free natural resources as fuel, such as solar and wind power,
- the technological know-how needed to produce renewable energy is often controlled by a small group of vendors.

Project management has a fundamental influence on the implementation of projects in enterprises (Vrchota et al., 2021), including for instance sustainability principles, Industry 4.0, or energy projects. When it comes to energy projects, they are often using large land areas and may change landscape and fauna along with it (Rolstadås & Johansen, 2021). Because of its impact, energy project management should focus on becoming more sustainable, since projects are about value. The value is defined as not only successfully delivering a complex project in terms of time, cost, and quality, but also as a value that connects projects with a long-term effect on society and organizations (Rolstadås & Johansen, 2021). Sustainability requires ecological or environmental sustainability matters to be addressed, but also requires economic (e.g., competition, costs, and construction time), social (e.g., health and safety, local community needs), and technical sustainability (Kiani Mavi et al., 2021). Taking all this into consideration it is claimed that distinguishing three traditional dimensions of project efficiency—time, budget, and scope - is very important aspect especially in energy sector (Shenhar et al., 1997). The project scope has the largest role, because it also has an impact on customer satisfaction, which more and more often rely on project sustainability.

The main goal of this article is to present the results of literature review according to the recent phenomena and scientific trends of project management in energy sector. In the light of the literature review, there is a research gap in research summarizing trends in the description of the issue of project management in the energy sector. Accordingly, this article is compiled

to fill this gap. The novelty of this study is manifested in the fact that the article can provide guidance to the project management in energy sector. The paper is organized as follows. In the next section, we present the steps of the methodology of the literature review. Then, it presents a descriptive analysis that covers identified trends in papers that have been studied. After that, the conclusions are presented that stemmed from the study and discussion, which contains recommendations for further studies in this field.

2. Methodology

Concerning the current research on project management in the energy sector, a systematic review of the literature, especially bibliometrics, was carried out. Literature review was used because it allows to analyse the current effects of scientific work related to the discussed problem and indicate the main areas of interest of researchers around the world. This method has been used for a long time in business and management studies (Smith, 1977) and it can help evaluate research characteristics, status, trends, and hotspots (Xie et al., 2018).

The first step was to launch a query in chosen database. When it comes to search strategy, the selection of databases is critical. There are claims that for the biomedical field (Bramer et al., 2017) and also for management studies (Kosch & Szarucki, 2020) it is well known that one database is not enough to perform a comprehensive study. Due to this fact, a search was conducted within two databases: Scopus and Web of Science.

The following queries were run on 12 April 2021 and rerun on 24 April 2021:

- WoS: TOPIC: ("project management") Refined by: WEB OF SCIENCE CATEGORIES: (ENERGY FUELS) Timespan: 2010-2021. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC.
- Scopus: TITLE-ABS-KEY ("project management") AND (LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIM-IT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2012) OR LIMIT-TO (PUBYEAR, 2011) OR LIMIT-TO (PUBYEAR, 2010) AND LIMIT-TO (SUBJAREA, "ENER").

The search in the WoS database yielded 160 results, in Scopus resulted in 2,085 results. Figure 1 shows the publication of articles each year for Scopus and WoS databases.

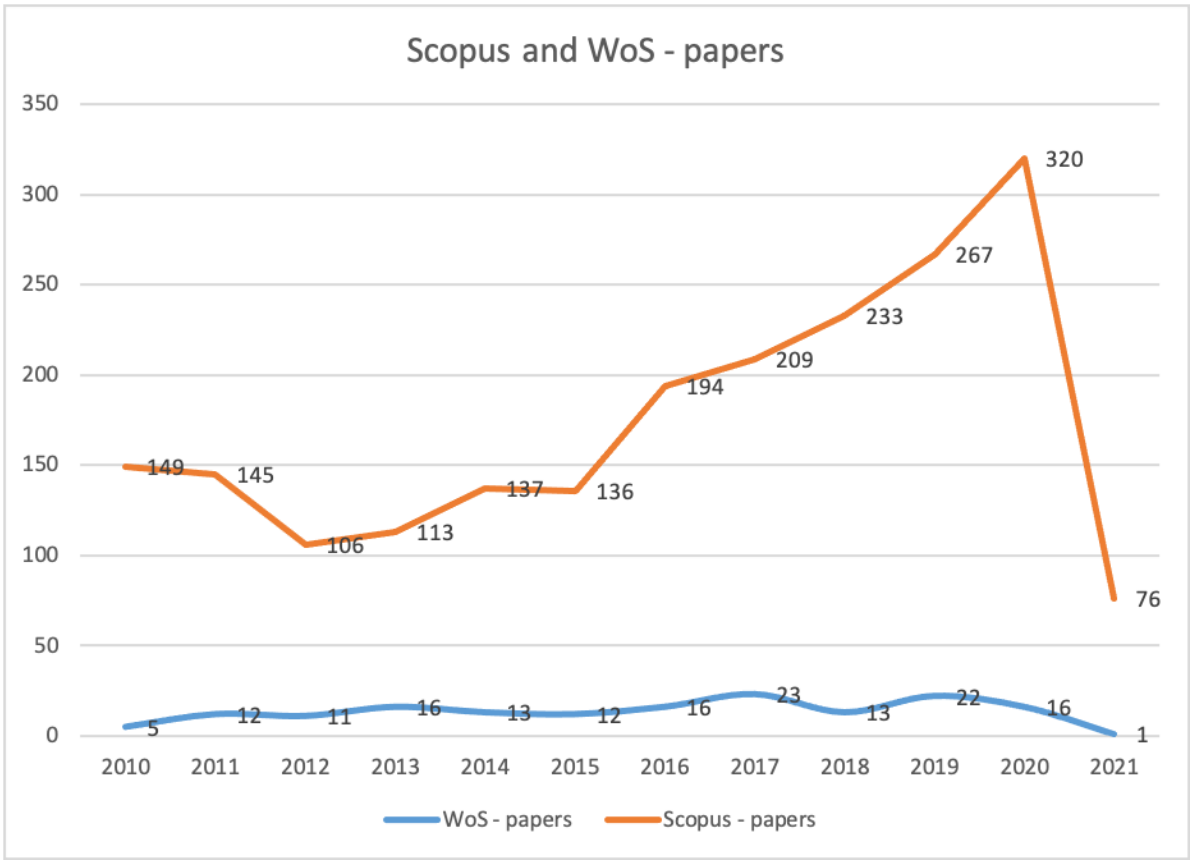

Figure 1. Publication of articles in each year for Scopus and WoS databases. Source: own study.

3. Results

This resulted in creating a database of scientific articles, among others, amounting to 2139 publications. A quantitative analysis of the keywords was then carried out, a summary for all years 2021-2010. Quantitative keyword analysis consisted in counting all keywords that were used in the researched scientific research. For obvious reasons, keywords were excluded from the analysis such as project management, management, energy. Figure 2 shows the most common keywords occurring in texts more than 10 times.

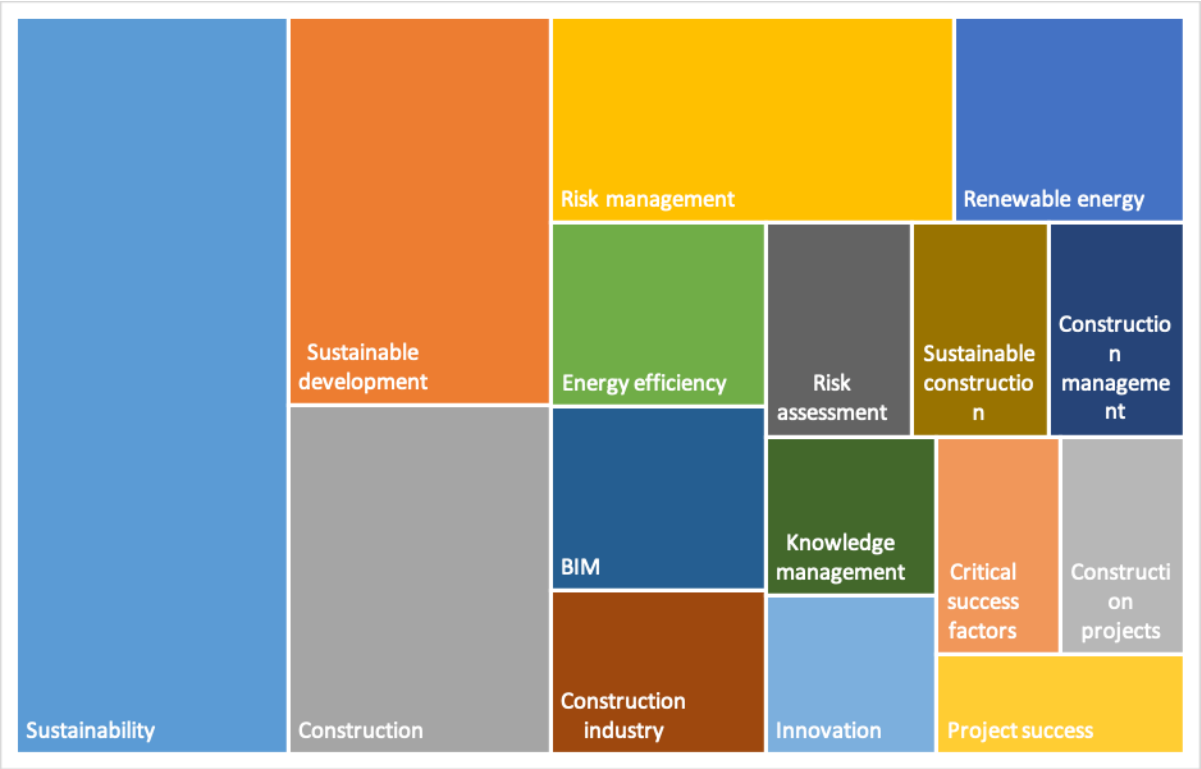

Figure 2. The most common keywords in years 2021-2010. Source: own study.

As we can see, the most common topic keyword concerns Sustainability and it occurred 97 times. Next in terms of occurrence were, among others: sustainable development 49 times, Construction 44, Risk management 40, Renewable energy 23, Energy efficiency 19, BIM 19, Construction industry 17, Risk assessment 15 times.

The final step was to search and select articles from created database to further qualitative, literature analysis. These articles were very thoroughly verified based on abstracts. Issues related to the most common topic emerging from the analysis of keywords and abstracts such as *Sustainability, sustainable development, Construction, Risk management, Renewable energy, Energy efficiency, BIM, Knowledge management, Innovation, Critical success factors,* the text was selected for further, profound analysis.

Sustainability. Integrating sustainability aspects into project management can help an organisation choose the best plan and meet the requirements of its business strategy and stakeholders (Sanchez, 2015). Furthermore, it may allow an organisation to fulfil its goal while making a massive contribution to the environmental and social dimensions (Chen et al., 2019). Sustainable project is seen as a "total design", able to find moments of compatibility with other structural dimensions of the environment (Consuelo, 2020).

Thus, organisations transition towards more sustainable products, services, assets, business practices, and methods (Van Tulder et al., 2013), the project management process is also involved (Armenia et al., 2019). Sustainable project management is emerging as a new paradigm in project management (Armenia et al., 2019; Silvius, 2017). Project managers may be seen as organisational change agents. They are also increasingly recognised as playing

a critical position when it comes to the change towards further sustainable business methods (Marcelino-Sádaba et al., 2015). The crucial role of the project manager in this process (Maltzman et al., 2014) is l recognised in recent industry standards for project management, which equal sustainability to a view to be considered when managing and controlling projects (Silvius, 2017). Nevertheless, there are claims that project management and sustainability are not natural friends (Silvius et al., 2012), so it should be still examined the difference between theory about sustainability in project management and what is done in the practical project management life (Marnewick et al., 2012; Økland, 2015).

Sustainable development. Sustainable development takes many forms, referred to as the Brundtland Report (WCED, 1987), it is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

For sustainable development, scholars often assume that economic development should lead to higher social coherence (which includes decreasing social stratification, equal opportunities, and combating marginalisation and discrimination) and enhance the overall quality of the environment by limiting the adverse effects of production and consumption on the state of the environment and the protection of natural resources (Kuraszko, 2017).

It should be also noted that sustainable development relates to the social and economic development of a company that enables it to implement its strategy and operational activities and achieve its objectives while not compromising future implementation (Witek-Crabb, 2005). Therefore, a company's development must be conducted in a way that does not compromise its future development potential, including based on creating a competitive advantage.

Construction. It is estimated that the construction ecosystem contributes 13% of the global gross domestic product (Ribeirinho et al., 2020; Bamgbade et al., 2017). Simultaneously, the construction sector is responsible for 36% of global energy consumption and 39% of energy-related carbon dioxide (CO2) emissions (UNEP and IEA, 2017). Not surprisingly, sustainability in the construction industry is at the top of the plans of government, experts, and the scientific community (Mavi et al., 2021). The emergence of this trend in the description of project management in the energy sector is further evidence that project management today's reality revolves around sustainability and reducing environmental impact.

Consideration of sustainable construction often focuses only on environmental or ecological sustainability issues. Nevertheless, it should be broadened also on economic (e.g., competition, cost, construction time) and social (e.g., health and safety, local community needs) (Hill, Bowen, 1997). It is believed that trust, open communication, and a common vision are vital for successful contractor-owner relationships (Suprapto et al., 2015).

Yang et al. (2019) indicate that construction and infrastructure can be described as especially high-risk industries. In reply to the increased project risk and complexity, as well as timetable and budget limitations, there are many calling for a shift in the way contracts are managed in construction (Chan et al., 2011). Worldwide, there has been a growing interest in cooperative business arrangements and cooperative forms of contracting in infrastructure and

construction projects. These patterns are frequently referred to as alliances or partnerships (Larsson and Lasson, 2020). This tendency is particularly effective during the age of new public management (Klakegg et al., 2021), where governments and private actors are anticipated to be working together in ever more sophisticated, or complicated contractual arrangements (Hodge and Greve, 2010; Baxter, Casady, 2020).

Risk management. Energy retrofitting of residential properties has been recognised as an essential measure to save energy, reduce emissions, and improve people's quality of life. To ensure efficient risk management, it is essential to understand the major risks throughout the entire process of upgrading projects and their stakeholders (Jia et al., 2021). Risk management is regarded as an important area of project management (PM). Rodriguez-Rivero et al. (2019) highlighted the integration of risk management as the most highly regarded improvement of the log frame approach. Hekala (2020) likewise noted that the risks associated with IDPs have their influence and pointed out that even though these risks are unavoidable, they might be better controlled through improved project planning and the development of project managers' abilities. A successful project can be interpreted in two respects: project management success and project impact success. Following two versions of success may also be independent of each other. (Klakegg et al., 2021) Usually, project management literature associates successful project management with effectiveness particularly in terms of the recognised golden triangle (scope, cost, and time) and efficacy is based upon customer satisfaction (Berssaneti, 2015).

Renewable energy. Global energy demand has doubled over the past 50 years and is anticipated to increase by a further 45% by 2030 (US DOE, 2009). The major energy supply to satisfy this demand is fossil fuels (Edenhofe et al., 2011). Given the significance of diverting the world's energy supply farther from fossil fuels, various renewable energy sources are being used to fulfil people's energy needs and it is safe to say that the effort will be made to get rid of fossil fuel.

Fossil fuel subsidies persist and have been identified as public enemy number one during the transition to renewables and have proven themselves difficult to eliminate (Casey, 2013). When a subsidy has been put in place, financial investments and commercial interests are more likely to sustain its continuation (Victor, 2009). This interaction is extremely efficient and runs counter to the 2009 commitment by G20 leaders to reduce subsidies (REN21, 2013). Victor (2009) analysed fossil fuel subsidies in developed and developing countries and found deep-seated interdependencies between social and political dimensions that hinder the removal of subsidies.

The environmental impact of lock-in on the diffusion of renewable electricity is well known. Still, there is a lack of knowledge about the strategies required to prevail over the complex economic, political, regulatory, and social factors responsible for its persistence. Systems analysis and social science studies are important elements to fill this knowledge gap (Gottschamer, Zhang, 2016).

Energy efficiency. The energy efficiency market concept as a foundation for energy efficiency policy design provides a clearer awareness of the general environment in which the policy will be applied. Established upon the market assessment, decision-makers are facing the challenge of developing a policy instrument that addresses the identified barriers to energy efficiency. Under the market assessment, it is necessary to define the framework for the shape of policy instruments and policies.

Energy efficiency is acknowledged as a major strategy to address three energy-related challenges: energy security, economic development, and climate change at the lowest possible cost to society (Bukarica, Tomsic, 2017). Nevertheless, notwithstanding this official acknowledgment, it is still the very least understood and the most overlooked feature of global energy policy.

BIM. Building information modelling (BIM) enables simulation and analysing performance, mathematical optimisation, and automation processes as well as in the initial design phase and throughout the project. In a virtual environment, all stakeholders will be able to participate to test real-world conditions before implementation and enhance the total success of the project (Sanhudo, Martins, 2018). This allows for greater transparency in the management of all stakeholders' interests (Paiva et al., 2017). Using automation, procedures are simplified, and data errors, conflicts, and loss are minimised. (Höft et al., 2021) A standardised design method allows objective quality control and offers architects or engineers additional time for creative advances (Khairulzaman, Usman, 2018). BIM may be used to improve decisions on materials, components, and design and compare them towards each other in terms of potential energy savings or cost impact before construction begins (Starynina, Ustinovichius, 2020).

Knowledge management. The practical context for the implementation of knowledge management is provided by making sure that the post-project phases are carried out properly and effectively, including the system for analysis and the collection of a bunch of suggestions for improvement for the next project management.

Nevertheless, practitioners are under obligation to bear in mind that knowledge management is not just about ensuring its evaluation, accumulation, and subsequent use, but also organising and requiring continuous training for those proposing sustainability projects and managing their implementation. Simply put, the assessment of the causes of problems with sharing the experience should be advised and the identified causes should be targeted (Doskočil & Lacko, 2018). One of the main reasons for success in project management, mainly in the energy sector, is to make use of the experience of project management practitioners.

Innovation. The existing research on sustainability transitions argues that further technological and social innovations are required to address growing challenges including resource shortages and climate change (e.g., Hoogma et al., 2002; Geels et al., 2008). Although incremental innovations are typically backed by settled socio-technical systems, mostly disruptive innovations are developing in niches (Schot and Geels, 2008).

Even though systems innovations (Martiskainen & Kivimaa, 2018) potentially face more general barriers to innovation due to their disruptive nature, systems innovations can require extra support compared to modular innovations from intermediary actors to join diverse innovations and actors, especially in the diffusion phase (Van Hal, 2000).

Innovation intermediaries are key actors in innovation processes (Howells, 2006). The term intermediary is defined differently in various research methodologies (Kivimaa et al., 2018), but we see intermediaries as actors who create spaces and opportunities for others (Stewart and Hyysalo, 2008) and meditate, working in the middle, making connections, enabling a connection between different people or things (Hodson et al., 2013). Intermediaries, whether individuals, organisations, or platforms, are greater than knowledge brokers (Geels and Deuten, 2006) or networks (Hamann and April, 2013). They may enable innovation processes by training, pooling, and allocating both financial and manpower resources, assessing new technologies/practices, forming alliances, and influencing rules and regulations (Stewart and Hyysalo, 2008; Kivimaa, 2014). Alternatively, they might shape (e.g., configure) how innovation appears as it comes at the user, and establish linkages and negotiate (e.g., mediate) for the benefit of other actors (Stewart and Hyysalo, 2008).

It must be stressed that the energy sector, given its key role in the fight against climate change, global warming, and emission reductions, is forced to constantly seek innovation – especially when it comes to innovation related to low- or non-carbon energy sources.

Critical success factors. Business activities are more complex and flexible due to technological progress which is base for Industry 4.0 (Jarosz et al., 2020; Jarosz & Zakrzewska, 2020). The single most significant factor for the sustainability of Industry 4.0 projects is funding, which determines whether projects can be implemented. The sustainability gains of Industry 4.0 were found in projects that implement new energy sources. The research found out that enterprises see the gains of Industry 4.0 particularly in projects that implement new energy sources (Vrchota et al., 2021).

Back in the 1980s, Peters and Waterman (Peters, Waterman, 1982) examined management using the Critical Success Factors model. Alias, Zawawi, Yusof, and Aris (Alias et al., 2014) classified these factors into project management activities, project processes, people factors, project factors, and outer environmental variables. Several studies have focused on identifying critical success factors in project management in scientific writings (Walker, Vines, 2000). The phrase "project success" is specified as a concept that includes budget, time, and quality (Bryde, 2011; Fortune et al., 2011; Turner, 2009). Standards for assessing the project success differ according to the size, uniqueness, and complexity of the project (El-Saboni et al., 2009; Mueller, Jugdev, 2012; Mueller, Turner, 2007; San Cristobal et al., 2018) Nevertheless, the long-term success of projects is associated with sustainability.

Silvius and Schipper (2014) conclude that sustainable project management is the transition of critical success factors from time, quality, and budget to long-term social, environmental, and economic priorities. Van der Brink (2009) refers to sustainable project management in a wider context as a shift in the timing of project stages to support future generations, and a shift in the scope of project components to the well-being of the overall society.

There is a shortage of research on how the critical success factors of Industry 4.0 influence project sustainability. Research on the integration of Industry 4.0 technologies in project management has mainly concentrated on the skills and competences of human resources (Cerezo-Narváez et al., 2017; Bauer et al., 2019). Human resources play a key role in project management and therefore influence the success of projects.

Identifying the success and risk factors that an organization will face during the execution of projects have a significant impact on enhancing readiness to deal with risk factors and minimize the likelihood of project failure (Alavi & Mirmohammadsadeghi, 2021). Chan et al. (Chan et al., 2004) split the critical project success factors into five parts: human factors, project factors, project work processes, project implementation, and factors of the organisation's external environment. Following factors have become applicable in many scientific kinds of research over the past few years (White, Fortune, 2002). A further breakdown of these factors looks like the following: environmental factors affecting the project (Hyvaeri, 2006; Jha, Iyer, 2006), human resource factors (Tishler et al., 1996), procedures, methods, tools (Khang, Moe, 2008; Shenhar et al., 2002) and project contextual issues (Sauser et al., 2009).

4. Discussion

Project management in the energy sector must keep up with the trends that dominate the global energy sector. It must be emphasized that markets for new and renewable energy and electric vehicles grow rapidly, and the limitations of fossil fuels and energy problems continue to emerge, the importance of high-capacity energy storage technologies for efficient energy use and response to climate change is greatly emerging (Lee et al., 2020). The recognition of the human impact on the environment and particularly, the huge increase in CO2 emissions and ozone layer depletion caused by the use of fossil-derived energy has made nation governments decide that something must be done to change behaviour and the current evolution trends (Caetano et al., 2017). Efforts are being made to develop new technologies, which, in turn, can reduce the impact on climate change, replace natural gas with renewable energy sources, enhance resource efficiency, bring a competitive advantage in the market, and improve living standards (Dobrovolskienė et al., 2021).

Schaeffer (2015) indicates that the global energy sector currently is in turmoil because of different and often conflicting drivers and reasons:

- growing energy demand from emerging economy countries,
- the global economic crises,
- climate change policies,
- peak oil phenomena,
- the sudden increase of shale oil and shale gas production in the United States,
- geopolitical tensions,
- the demise of nuclear energy,
- the plummeting costs of renewable energy technologies.

The "green" economy includes those activities that, in addition to modernizing and improving production efficiency, contribute to improving the quality of life and the living environment (Rostova et al., 2019). The result of these factors is a strong trend in the sector to become more sustainable. Sustainability should, as Danish and Senjyu (2020) claim, go beyond basic statistics and has to cover multi-dimensional aspects. These dimensions include energy production, distribution, delivery, and consumption and consider technological efficiencies; the pillars of sustainability are economic, social, institutional, technological, and environmental. The energy sector, in its crucial role in the effort to reduce the impact of climate change, global warming, and emission reductions, is under obligations to constantly look for innovations – especially when it comes to innovation related to low- and non-carbon energy sources.

Renewable and low-carbon energy technologies are considered as a major alternative route towards sustainability and–consequently–there are major political and industrial efforts to increase their share in the global energy consumption (Raven et al., 2009). A goal of many governments worldwide is to invest substantially in renewable energy to reach the reducing fossil-fuel energy goals committed in the Paris Agreement. While power generation has always been an asset-heavy industry, capital intensity is even higher for most renewable energy sources as compared to fossil fuel-based plants (Schmidt, 2014; Steffen, 2017). Due to this fact, the authors anticipate intensification of the use of the project approach for investments and innovations related to the use of renewable energy sources. Moreover, current renewable energy projects, especially those dealing with the use or the storage of wind, solar, or water energy, are increasingly afflicted with the challenge of an alternating acceptance by the parties concerned (Hitzeroth, Megerle, 2013), which is also vital issue to deal with when it comes to stakeholders in renewable energy projects.

5. Conclusions

Project management as an internationally recognized methodology for business and project activities is purposed to optimize the time, human and financial resources, without deviating from the planned quality of the final product of the project (Oskolkova, 2020). Organisations are increasingly using project activities to achieve strategic benefits (Cabała et al., 2020). Project management can be viewed as a proper answer to challenges of today for instance by using project management in order to obtain innovative solutions in organization. There are claims that project management, in the understanding of processes taking place in energy enterprises, can tackle many key issues for the company (Kinelski, 2020). Moreover, managing innovation projects requires the implementation of certain standards of competence, which will guide project teams and enhance the effectiveness of achieving the objectives that, when creating innovation, have a very high intellectual and market value (Zakrzewska et al., 2020).

The studies presented in this article may be a guide to the direction in which projects in the energy sector are going. The literature analysis presented indicates that the interest of scientists is largely directed towards sustainable projects in the energy sector. This has to do with global trends not only in the energy sector but in every sector of the economy. Organizations have shown a great interest in incorporating sustainability into managerial concepts, both at the strategic and operational levels (Toljaga-Nikolić et al., 2020).

Taking into consideration that in this day and age consumers are more and more aware and demanding, and it is thanks to modern technologies such as blockchain, etc. can make use of these tools to control the sustainability of the products or services they purchase and to influence producers. People more often pay attention to their environmental impact and the consequences of their decisions, while paying attention to the origin and sustainability of the goods and services they acquire. Furthermore, when one of the key challenges of the modern global economy is to reduce environmental pollution and save limited natural resources (Wolniak et al., 2020), project management is forced to be greener and more sustainable by itself and also to seek sustainable innovations which contribute to increased use of renewable energy to reduce greenhouse gas emissions, fossil fuel imports and create a sustainable energy system. Unfortunately, the authors' own observations show that attempts to maintain the principles of sustainable development are very cost-intensive, especially for the lower social classes.

It is one of the few scientific texts regarding the problem of project management in the energy sector. This work has both practical, theoretical, and research implications. When it comes to the practical implication, project management practitioners in the energy sector have the opportunity to learn about trends in the use of project management methodology in the energy sector. Projects in this sector focus on innovation, in particular as regards innovations that can contribute to greater sustainability and reduction of harmful greenhouse gas emissions. However, a critical aspect is too much focus on the ecological pillar of

sustainable development and the neglect of social factors in energy projects. When it comes to the theoretical aspect, the article can be an example of bibliometric analysis, using both quantitative analysis of keywords and qualitative analysis of texts, to study trends in the description of project management issues.

The article also has research implications. It provides a possible path for further research into project management in the energy sector. The authors of this publication believe that further research into project management in the energy sector should move towards a uniform principle of sustainable project management specific to the energy sector. The future scope of work includes, inter alia, analysis of case studies and empirical research on the challenges and problems of managing energy projects. Particular emphasis should be placed on the aspects of project teams creating sustainable innovations for the sector, as well as decreasing the carbon footprint of the project teams themselves

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