

**Varazdin Development and Entrepreneurship Agency and
Faculty of Maritime Studies, University of Split, Croatia**

In cooperation with:

**Maritime department University of Zadar, Croatia
Faculty of Management University of Warsaw, Poland
Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco
Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University, Morocco
GOVCOPP - University of Aveiro, Portugal**



Book of Abstracts

130th esd Split 2025

Shaping the Future of Sustainable Shipping – Green Transition and Technological Developments

Editors:

Ivan Peronja, Ana Gundic, Tomasz Studzieniecki



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October, 2025

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FOREIGN TRADE AND GREEN ENERGY ASPECTS OF ECONOMIC RELATIONS EU WITH AZERBAIJAN AND CENTRAL ASIA COUNTRIES

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ABSTRACT

This study allows seeing the strategic role trade and energy cooperation between EU and Central Asia region. Suggested that trade and energy cooperation may transforming and resulting in regional effects. The approach comprises the three elements of relations (trade, Partnership and Cooperation Agreement and green projects). The economic development for the region countries hinges on the structure of economy, human capital, resource productivity and regional cooperation. The trade and green energy cooperation depend on different factors driving. For Azerbaijan, Kazakhstan and Uzbekistan, the model of economic development demonstrated good forecast for trade, green energy and agreement with EU, indicating positive dynamics for relations with EU. Particularly increased participation around sustainable development. Ensuring green projects initiatives and economic sustainability is crucial for implementing the transregional economic projects between European Union (EU) countries, Azerbaijan and Central Asia. In this article, we provide a summary of the most commonly available economic tendency, especially trade and green aspects of development cooperation EU with Azerbaijan-Central Asian republics nations—Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. The purpose of this paper is to explore the trade, green energy and common interest aspects of the transregional relations with the EU and their economic integration prospect. The aim of the article is to explore the role foreign trade and green energy aspects of economic development of Azerbaijan and Central Asia countries, focusing on tools economic cooperation with EU.

Keywords: *economic relations; green energy; sustainable development; trading partners; transregional projects.*

UPDATING MARINA OPERATIONS AND TRAFFIC FLOW THROUGH DIGITALIZATION

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ABSTRACT

The integration of digital technologies into marina operations presents both notable challenges and promising avenues for advancing nautical tourism. This paper aims to assess the progress in digital uptake among nautical ports, pinpointing key obstacles and prospects for future growth. Nautical ports are cornerstones of the nautical industry, bringing together diverse stakeholders across the manufacturing and service sectors. Data were collected via surveys administered to marina management personnel in Croatia. The results reveal that most marinas have implemented only foundational digital solutions, such as internet connectivity and reservation platforms, whereas more sophisticated technological applications remain underutilized. While user satisfaction with current offerings is broadly favorable, substantial opportunities exist to enhance and expand digital platforms. The insights from this paper offer valuable guidance for shaping strategies that sustain the industry's enduring competitiveness and sustainability.

Keywords: *Nautical ports, Tourism industry, Digital technologies, Traffic flow, Sustainable development*

INNOVATION HORIZONS OF DIGITAL TRANSITION IN MARITIME INDUSTRY

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ABSTRACT

Digital transformation is becoming a key driver of change in global maritime transport, opening new horizons for innovation and shaping the foundations for more competitive, efficient, and sustainable operations. The integration of advanced technologies, including artificial intelligence (AI), the Internet of Things (IoT), big data analytics, blockchain, autonomous systems, and additive manufacturing, is redefining the way shipping and port operations are planned, executed, and monitored. These technologies enable the optimization of logistic chains, increased transparency in information exchange, reduction of operational costs, and more precise resource management, thus creating the preconditions for smart and green shipping of the future. The paper focuses on a systematic presentation of the key innovation directions and development trends of the digital transformation of the maritime sector. Special attention is devoted to the transformation of business models, the development of digital platforms, and the implementation of smart solutions in ports and shipping companies. Digitalization is regarded not merely as technological modernization but as a strategic process involving changes in organizational culture, knowledge management, and data-driven decision-making. An overview of relevant literature and practical examples highlights the increasing importance of digital innovations in strengthening the resilience of maritime systems and promoting sustainable development and the green transition. The need for an integrated approach linking technological, economic, and regulatory aspects is emphasized to unlock the full potential of digital solutions in global maritime transport. This paper contributes to a better understanding of the innovation horizons of digital transition and provides a theoretical foundation for future research aimed at developing efficient, sustainable, and technologically advanced maritime systems.

Keywords: *digital transition, innovations, maritime transport, competitiveness, sustainability*

COASTAL LINER PASSENGER TRANSPORT AS A DETERMINANT OF SOCIOECONOMIC DEVELOPMENT OF CROATIAN ISLANDS

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ABSTRACT

The islands' isolation and poor transport connections are often stated as the main challenges to their economic and social development, however, the aforementioned topic is still insufficiently researched in the academic literature. The Republic of Croatia, with its 1244 islands, islets, rocks and reefs, is the second largest archipelago in the Mediterranean and has significant spatial and development potential. However, the permanently inhabited islands are confronted with numerous socio-economic constraints due to their geographical isolation. A key factor in shaping the socio-economic conditions on the islands is coastal liner passenger transport, which determines the level of connectivity to the mainland on most islands and thus has a direct impact on economic activity, the availability of public services and the general quality of life of the island population. This paper analyses the economic and social trends on the Croatian islands and examines the correlation between transport connectivity and their development. It also provides basic recommendations for improving coastline transport. The research shows that insufficient and unreliable connectivity to the mainland represents a major obstacle to sustainable development, while improving transport infrastructure and route organisation can act as a multiplier for economic and social development. This paper also contributes to the debate on island development policies by emphasising the need for improved transport connectivity as a fundamental prerequisite for long-term sustainability.

Keywords: *coastal liner passenger transport, Croatian islands, development policies, socioeconomic development*

MAPPING SMALL AND MEDIUM ENTERPRISES IN CROATIA'S BLUE ECONOMY: ALIGNMENT WITH SMART SPECIALISATION STRATEGIES (S3)

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ABSTRACT

The Republic of Croatia has seen increasing interest in the Blue Economy as a strategic way to promote sustainable growth, protect the environment, and foster social inclusion in recent years. Its extensive coastline and maritime heritage give its marine industries (such as fisheries, mariculture, maritime transport, and nautical tourism) great potential for job creation and innovation. Nonetheless, these sectors face challenges like vulnerability to external shocks, low digitalisation, and partial alignment with Smart Specialisation Strategies (S3). This study examines the small and medium-sized enterprises (SMEs) within Croatia's Blue Economy, emphasising their contribution to sustainable development and adherence to S3 principles in the South-eastern Adriatic region. A survey among Croatian SMEs across various Blue Economy sectors evaluated employment trends, innovation ability, and participation in digital and green transitions. The findings aim to highlight growth opportunities, foster collaboration, and inform policy measures, supporting cross-border cooperation and transformative pathways. The research was funded by the BLUESLINKS project, which seeks to strengthen innovation networks, develop matchmaking platforms, and encourage sustainable employment in traditional Blue Economy industries through the integration of S3 frameworks and smart services.

Keywords: *Blue Economy, Nautical sector, Marine sustainability, Cross-border cooperation, Innovation*

GENERAL CLASSIFICATION OF CARGO OPERATIONS ON LIQUEFIED NATURAL GAS CARRIERS

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ABSTRACT

Maritime transport, as the most important branch of goods transportation, includes a wide range of cargoes, among which natural gas holds a special role. Due to its low density, natural gas must be cooled to reach a liquid state suitable for transport. Liquefied Natural Gas (LNG) enables the economically viable transport of large quantities of gas over long distances with specially designed LNG carriers playing a key role. These ships perform complex cargo operations that differ significantly from those of bulk or oil carriers, primarily because of the extremely low temperatures and flammability of the cargo. This paper classifies the sequence and characteristics of cargo operations on LNG carriers throughout their service life. All the general and specific cargo operations are identified and grouped into three main categories: standard cargo operations, drydock preparation operations, and gas management operations onboard. The research provides a detailed description of cooling, loading, loaded voyage, discharging, and ballast voyage procedures, as well as heating, inerting, drying, purging, aeration and gas handling processes. The paper emphasises the importance of understanding the properties, technical and technological characteristics of LNG carriers for safe operational handling. Proper management of these operations ensures the safe transport of LNG. This paper contributes to the understanding of LNG carrier operations by providing an overview of cargo-handling procedures.

Keywords: *LNG carriers, liquefied natural gas, LNG management, cargo operations, maritime safety*

NON-STANDARD FORMS OF EMPLOYMENT

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ABSTRACT

Non-standard forms of employment have become one of the defining features of the contemporary labour market. In the context of rapid technological progress and the expansion of artificial intelligence, traditional employment models are increasingly being replaced by flexible but also insecure forms of work. This paper examines the historical and legal framework of the right to work, classifies non-standard employment types, and analyses their impact on the labour market and workers' mental health. Using analytical-descriptive and comparative methods, the paper draws upon data from the Croatian Employment Service and Eurostat between 2017 and 2022, as well as relevant academic studies in sociology, economics, and management. The results show that although non-standard forms of work provide greater flexibility, they simultaneously increase the risks of insecurity, stress, and mental health deterioration. It is concluded that future labour policies should balance labour market flexibility with social security to ensure sustainable and dignified employment conditions.

Keywords: *non-standard employment, labour market, digital economy, mental health, artificial intelligence*

CRISIS MANAGEMENT, INNOVATION AND HUMAN RESOURCES AS THE FOUNDATIONS OF ORGANIZATIONAL RESILIENCE IN HOTEL ORGANIZATIONS

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ABSTRACT

Contemporary hotel enterprises must continuously adapt to global crises, economic instability, technological advancement, and social change. This stems from the growing recognition that organizational resilience is essential for long-term survival and competitiveness. Organizational resilience implies not only the ability to withstand upcoming crises but also the ability to learn from them, adapt, and evolve into a more innovative, stable, and adaptable organization. The aim of this paper is to examine the relationship between crisis management, innovation, and human resource development and to clarify how their synergy promotes the creation of more resilient hotel organizations. Crisis management is a methodical way of identifying, planning, responding to, and recovering from crises. For hotel management to manage a crisis well, it is necessary to plan in advance, anticipate, and respond promptly because it is capable of making quick decisions. However, the structure of crisis management alone is not enough; a hotel organization needs competent employees and their ability to generate new ideas. Innovations are a key way in which organizations adapt during crises. They help hotel organizations create more innovative offerings, services, and processes that meet new market conditions. A crisis often serves as a catalyst for innovation and a driving force for digital transformation and reconfiguration of business models. The most important factor in any hotel business is its employees. Their knowledge, experience, emotional strength, and motivation are extremely important for successful recovery and long-term stability. The difference between organizations that remain the same and those that emerge stronger from a crisis lies in how they manage their employees. They achieve this through continuous learning, skills development, idea sharing, and the cultivation of trust. Based on previous scientific research and published papers, it can be said that the combination of crisis management, innovation, and human resource development creates a framework that helps hotel enterprises cope with uncertainty, ensure business continuity, and gain a long-term advantage over competitors. Organizational resilience thus becomes a dynamic process of learning, change, and growth.

Keywords: *hotel organization, crisis management, innovation, human resources, organizational resilience*

MEDIA CONSUMPTION AND SINGLE-SOURCE MEASUREMENT: LONGITUDINAL EVIDENCE FROM CROATIA

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ABSTRACT

This paper examines the transformation of media consumption in Croatia through the framework of single-source audience measurement. Using data from two national surveys conducted in 2019 (N=1,816) and 2023 (N=1,831), it provides a comparative, longitudinal analysis of media reach, information-seeking behavior, and cross-media engagement. Bivariate statistical tests (two-proportion z-tests) reveal significant shifts in audience habits over the five-year period. Internet and mobile media show the most substantial growth in reach (+12 and +11 percentage points), while television and radio display moderate declines (−3 to −4 pp). The Internet has become the dominant information source (+10 pp), replacing interpersonal channels and partially displacing television. Findings support the reinforcement hypothesis rather than substitution: audiences expand their overall media repertoire by combining traditional and digital platforms. Trust in media remains higher for traditional channels, but daily reliance has shifted decisively toward digital media. The study emphasizes the need for continuous, person-centered single-source measurement to capture convergent media use and guide future policy and advertising strategies in Croatia and similar small markets.

Keywords: *single-source measurement; media convergence; cross-media behavior; digital transformation; media reach; audience measurement; Croatia*

DIGITAL TRANSFORMATION IN THE MARITIME INDUSTRY

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ABSTRACT

Digitalization and emerging developments in the domains of artificial intelligence, blockchain, the Internet of Things, and automation are assuming increasing relevance within the maritime industry. These advancements facilitate the simplification of extant processes, the generation of novel business opportunities, and the reconfiguration of supply chains alongside trade geographies. Notwithstanding the substantial potential, opportunities, and benefits proffered by these technologies, they concomitantly entail risks and prospective costs for maritime stakeholders in developing nations. Consequently, the establishment of equitable conditions is imperative. This paper elucidates the pivotal role of global digital standards, the exigency of fostering technological innovations while averting monopolistic ramifications, and the imperative to align digitalization with the objectives of sustainable development.

Keywords: *digitalization, digital transformation, intersectoral strategy*

THE INFLUENCE OF RETURN LOGISTICS ON THE RATIONALIZATION OF SUPPLY CHAINS IN THE SHIPBUILDING INDUSTRY

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ABSTRACT

In an increasingly globalized business environment and with a plethora of new distribution and supply channels that cross geographical and international borders, managing them has never been more challenging. Intense global competition means that customers are increasingly demanding lower prices, faster asset turnover and higher levels of service. Increasing environmental demands add further complexity to supply chain management. All of these elements have a strong impact on the efficiency of the supply chain in the shipbuilding industry. The wide range of products, semi-finished products and materials that are built into ships necessitates the introduction of reverse logistics as an integrated part of the supply chain. However, the implementation of reverse activities itself can have unintended consequences if not approached systematically and analytically. The criteria for implementation may vary, but the quantity and material value of the goods represent the basis that encourages a company to introduce reverse logistics into its operations. From the point of view of the shipbuilding industry, ferrous metallurgy management is a priority when establishing return activities. By modeling the flow of ferrous metallurgy within the production process, shipyards determine key points where they can implement return, either through purchase, recycling or reprocessing. The result of these activities is valorized by increasing overall competitiveness in the global market.

Keywords: *business environment, shipbuilding supply chain, competitiveness, reverse logistics, ferrous metallurgy, shipbuilding industry*

STRENGTHENING MARITIME EDUCATION: THE STATUS OF MICRO-CREDENTIALS IN MARITIME HIGHER EDUCATION INSTITUTIONS

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Abstract

The research presented in this paper focuses on policies and curricula in maritime higher education institutions across several European countries, with an emphasis on understanding and enhancing micro-credentials. This research is a part of the MICROMET project, funded under the Erasmus+ Programme, Action Type KA220-HED - Cooperation Partnerships in Higher Education. The duration of the project is 30 months, and it is divided into five work packages. The project consortium consists of five partner institutions from Poland, Croatia, and Spain, along with a shipping company as an associated partner. Conducted as a part of the MICROMET project, the study highlights a gap in maritime instructors' understanding of micro-credentials and Bologna tools. The findings have revealed that maritime instructors showed low levels of familiarity with both micro-credentials and Bologna tools, highlighting the importance of providing instructors with the essential competencies. Addressing these gaps is essential for improving curricula and aligning them more effectively with industry demands, thereby enhancing the quality of MET. The insights from this research contribute not only to the objectives of the MICROMET project but also pave the way for future initiatives aimed at increasing the recognition of micro-credentials in the maritime industry.

Keywords: *micro-credentials; short-learning courses; syllabuses; educational practices; faculty policy*

REDUCING THE RISK OF MARITIME ACCIDENTS IN THE MALI ŽDRELAC AND MALA PROVERSA PASSAGES

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ABSTRACT

The Zadar archipelago, as one of the most indented areas of the Adriatic Sea, experiences extremely heavy traffic during the summer months, particularly in the Mali Ždrelac and Mala Proversa passages, which stand out as the most frequented and highest-risk maritime passages. The increased traffic intensity, narrow and shallow sea routes, and limited visibility create conditions in which the possibility of maritime accidents is significantly increased. The aim of this paper is to analyse the frequency and causes of maritime accidents in the area under the jurisdiction of the Zadar Port Authority, with a focus on the Mali Ždrelac and Mala Proversa passages, and to propose a set of preventive measures to reduce risks and enhance navigation safety. The methodology of the paper is based on the analysis of available maritime accident data, categorized by vessel type, type of incident, and the time period in which they occurred. The results indicate that most accidents occur during the summer months and are most commonly associated with small boats, technical failures, and insufficient training of crew members. The proposed preventive measures include improved cooperation between VTS services and ships, installation of smart cameras and information boards, restriction of autopilot use in coastal areas, regular collection of traffic data, enhanced skippers' training, and increased number of inspections during the summer months. In conclusion, the implementation of these measures can significantly contribute to reducing the risk of maritime accidents in the Mali Ždrelac and Mala Proversa passages, thereby enhancing the overall maritime safety system in the Zadar region.

Keywords: *Maritime accidents, Navigation safety, Preventive measures, Mali Ždrelac, Mala Proversa*

INTEGRATED APPROACH TO THE DEVELOPMENT OF CRUISE PORTS: A CASE STUDY OF ZADAR CRUISE PORT

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ABSTRACT

The development of cruise ports is increasingly recognized as a critical component in promoting sustainable tourism and stimulating regional infrastructural improvements, particularly in coastal destinations experiencing continuous growth in cruise traffic. In this context, ports are faced with the rising number of passengers, stricter environmental regulations, and the evolving expectations of contemporary tourists. This paper examines an integrated approach to cruise port development, emphasizing the interrelation between environmental requirements, the quality of the tourist experience, and regional development policies, with the Zadar Cruise Port serving as a case study. Based on analyses of strategic plans, official reports and port authority data, environmental assessments, and secondary sources on tourist perceptions, the study seeks to identify the potential benefits and challenges inherent in this approach. The research also considers the infrastructural connectivity of the region and the role of the port within the broader framework of regional development in Zadar County, highlighting the synergy among port operations, the transport system, urban planning, and tourism services. The main objective of this study is to contribute to a deeper understanding of the role of cruise ports in sustainable tourism and to propose guidelines for formulating effective development policies that harmonize economic growth with sustainability and the enhancement of the tourist experience. The findings are expected to contribute to a more comprehensive understanding of cruise ports as infrastructural hubs that not only support tourism flows but also actively shape the spatial and economic development of coastal regions. Furthermore, the study aims to provide recommendations for other Adriatic ports striving to balance economic growth with sustainable development and improved tourist experience, with particular emphasis on cross-sectoral cooperation and long-term strategic planning.

Keywords: *Environmental standards, Cruise ports, Port of Gaženica, Regional development, Sustainable tourism*

ANALYSIS OF FIRES ON BOATS AND YACHTS IN THE PRIMORJE-GORSKI KOTAR COUNTY

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ABSTRACT

A fire is considered one of the most hazardous types of emergencies that may occur on boats and yachts. During the combustion of flammable materials, elevated temperatures are generated and toxic vapors and gases are released, posing a severe risk to the lives of crew members and passengers, as well as resulting in significant material losses. In addition to the direct threat to human life and property, fires on boats and yachts often result in environmental consequences due to the discharge of fuel, oil, and other hazardous substances into the sea. Given the specific characteristics of the marine environment and the limited possibilities for evacuation, fires on boats and yachts require a prompt and effective response from the crew. Timely reporting, the availability of firefighting equipment, and knowledge of emergency procedures are key elements in ensuring a successful response to such incidents. Regular maintenance of fire protection systems and equipment represents a fundamental factor in reducing risk and mitigating the consequences of these emergencies. The aim of this study is to analyze the frequency, causes, and consequences of fires on boats and yachts in the Primorje - Gorski Kotar County, and to identify the key factors influencing their occurrence. Particular emphasis is placed on preventive measures, technical standards, and organizational procedures that can contribute to reducing the risk of fires and to enhancing the overall level of safety at sea. The results of the research indicate an increase in the number of fires on boats and yachts during the summer months, with the highest frequency recorded in areas of intensive nautical tourism. The most common causes of fires are associated with electrical system malfunctions, improper fuel handling, and inadequate maintenance of engines and cooling systems. The analysis of firefighting interventions has shown that timely reporting and availability of firefighting equipment in local fire brigades significantly reduce both the extent of damage and the number of casualties. It is concluded that systematic preventive activities, crew training, and regular maintenance are of crucial importance for ensuring the safety of people and property, as well as for protecting the marine environment from the consequences of fires on boats and yachts.

Keywords: *Fires; Boats and Yachts; Maritime safety; Preventive measures; Primorje-Gorski Kotar County*

COMPETITIVENESS IN THE SHIPBUILDING INDUSTRY - A CASE STUDY OF CHINA, JAPAN AND SOUTH KOREA

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ABSTRACT

Since its existence, the shipbuilding industry has had a strong influence on the development of world trade throughout history. Today, the global market forces the shipbuilding industry to pay more and more attention to the aspect of competitiveness in the international market because the construction of new ships is increasingly demanding, sophisticated and faster. This paper analyzes the current state of competitiveness of the shipbuilding industry using the example of China, Japan and South Korea, which are currently the three largest and most competitive shipbuilding industries in terms of orders, construction, prices and innovations. The term competitiveness is often identified with the term competitive advantage. However, this is not the same concept. Competitiveness refers to the industry and encompasses a macroeconomic approach, while competitive advantage refers to companies as business entities and is studied from a micro-economic perspective. China has become the dominant world power in the shipbuilding industry through low production costs, while Japan and South Korea have focused on advanced technologies and the construction of high-value vessels such as liquefied natural gas carriers (LNG) and cruise ships with a strategy of focusing.

Keywords: *Competitiveness, shipbuilding industry, market trends, technological innovations*

Contributions in Croatian

THE ROLE OF NAUTICAL PORT DEVELOPMENT IN SHAPING DESTINATION SUSTAINABILITY: A LOCAL COMMUNITY PERSPECTIVE

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ABSTRACT

Seaports are an important factor in the socio-economic development of coastal tourism areas. Planning the construction of new ports entails various positive and negative effects in the context of sustainable tourism development and the local economy, the community's quality of life, and the preservation of the natural environment. The growth of tourist traffic in coastal destinations—reflected in the increasing number of vessels, boaters, and transit passengers, as well as the expansion of complementary nautical-tourism services—affects the frequency of traffic congestion, passenger dissatisfaction, and a decline in the quality of life of local residents. By constructing new ports, tourist destinations establish the prerequisites for sustainable socio-economic development and for the long-term enhancement of competitiveness and resilience. At the same time, the development of complex maritime infrastructure can disrupt the marine environment and threaten natural resources. Therefore, the aim of this paper is to investigate residents' perceptions of the economic, social, and environmental effects of seaport construction in a nautical tourism destination. The study was conducted through an online survey on a sample of residents and non-residents of the city of Omiš (Croatia). Statistical analysis of the collected data was carried out using SPSS. The results indicate a relationship between respondents' level of awareness of the port construction project and their attitudes toward the importance of the port's development, as well as their views on its effects on the local community. Furthermore, differences were identified in the perceived economic, social, and environmental impacts depending on respondents' level of awareness of the project and their age group. The study highlights the importance of timely public communication about all aspects of seaport development projects and the need to consider the socio-economic needs of the local community while protecting natural resources.

Keywords: *seaport, sustainable development, socio-economic effects, environmental impact, nautical tourism*

KAKO IZGRADNJA NAUČIČKIH LUKA OBLIKUJE ODRŽIVI RAZVOJ DESTINACIJA IZ PERSPEKTIVE LOKALNE ZAJEDNICE

SAŽETAK

Morske luke važan su čimbenik društveno-ekonomskog razvoja obalnih turističkih područja. Planiranje izgradnje novih luka pretpostavlja različite pozitivne i negativne učinke u kontekstu održivog razvoja turizma i lokalne ekonomije, kvalitete života zajednice te očuvanja prirodnog okruženja. Porast turističkog prometa u obalnim destinacijama, vidljiv kroz rast broja plovila, nautičara i putnika u tranzitu, te širenje komplementarnih nautičko-turističkih sadržaja utječe na učestalost prometnih gužvi, nezadovoljstvo putnika i snižavanje kvalitete života lokalnog stanovništva. Izgradnjom novih luka, turističke destinacije stvaraju preduvjete za održivi društveno-ekonomski razvoj, te dugoročno povećanje konkurentnosti i otpornosti. Istodobno, izgradnja složene morske infrastrukture može narušiti morski okoliš i ugroziti prirodne resurse. Stoga je cilj rada istražiti percepcije lokalnog stanovništva o ekonomskim, društvenim i ekološkim učincima izgradnje morske luke u nautičkoj destinaciji. Istraživanje je provedeno on-line anketiranjem na uzorku rezidenata i nerezidenata grada Omiša (Hrvatska). Statistička obrada prikupljenih podataka provedena je korištenjem programa SPSS. Rezultati pokazuju da postoji povezanost između informiranosti ispitanika o projektu izgradnje luke i njihovog stava prema važnosti izgradnje luke, te prema učincima izgradnje luke na lokalnu zajednicu. Nadalje, utvrđene su razlike u percepcijama ekonomskih, društvenih i ekoloških učinaka s obzirom na razinu informiranosti ispitanika o projektu i njihovu dobnu skupinu. Istraživanje ističe važnost pravodobnog informiranja javnosti o svim aspektima projekata izgradnje morskih luka te nužnosti uvažavanja društveno-ekonomskih potreba lokalne zajednice, uz zaštitu prirodnih resursa.

Ključne riječi: *morska luka, održivi razvoj, društveno-ekonomski učinci, ekološki utjecaj, nautički turizam*

FINANCIAL PERFORMANCE ANALYSIS IN MARITIME ORGANIZATIONS: THE CASE OF THE PORT OF RIJEKA

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ABSTRACT

The aim of this paper is to analyze the role and application of financial indicators in maritime organizations, with a particular focus on a case study of the Port of Rijeka. The paper explores the theoretical aspects of financial operations and key indicators of liquidity, profitability, efficiency, and indebtedness, along with an analysis of their relationship to operational performance and strategic management. The Port of Rijeka was selected as a representative example of the Croatian maritime industry due to its geostrategic position, diverse revenue structure, and strong investment cycle. An analysis of the financial statements for the period 2020–2024 shows stable revenue growth, improved liquidity, and increased profitability, alongside reduced indebtedness and enhanced operational efficiency. A comparison with competing ports in the region confirms the Port of Rijeka's competitive position in terms of profitability and capital management. The results highlight the importance of systematic monitoring of financial indicators for strategic decision-making, business process optimization, and strengthening resilience to market risks. The paper contributes to a deeper understanding of the financial dynamics within the maritime sector and may serve as a foundation for further research on sustainable development and port competitiveness within European transport corridors.

Keywords: *Competitiveness, Efficiency, Financial indicators, Liquidity, Maritime organizations, Port of Rijeka, Profitability*

ANALIZA FINANCIJSKIH POKAZATELJA U POMORSKIM ORGANIZACIJAMA: STUDIJA SLUČAJA LUKE RIJEKA

SAŽETAK

Cilj ovog rada jest analizirati ulogu i primjenu financijskih pokazatelja u pomorskim organizacijama, s posebnim naglaskom na studiju slučaja Luke Rijeka. U radu se istražuju teorijski aspekti financijskog poslovanja te ključni pokazatelji likvidnosti, profitabilnosti, učinkovitosti i zaduženosti, uz analizu njihove povezanosti s operativnim rezultatima i strateškim upravljanjem. Luka Rijeka odabrana je kao reprezentativan primjer hrvatske pomorske industrije zbog svog geostrateškog položaja, raznovrsne strukture prihoda i snažnog investicijskog ciklusa. Analiza financijskih izvještaja za razdoblje 2020.–2024. pokazuje stabilan rast prihoda, poboljšanje likvidnosti i porast profitabilnosti, uz smanjenje zaduženosti i povećanje operativne učinkovitosti. Usporedba s konkurentskim lukama u regiji potvrđuje konkurentnu poziciju Luke Rijeka u pogledu profitabilnosti i upravljanja kapitalom. Rezultati naglašavaju važnost sustavnog praćenja financijskih pokazatelja za strateško odlučivanje, optimizaciju poslovnih procesa i povećanje otpornosti na tržišne rizike. Rad doprinosi razumijevanju financijske dinamike pomorskog sektora i može poslužiti kao temelj za daljnja istraživanja održivog razvoja i konkurentnosti luka unutar europskih prometnih koridora.

Ključne riječi: Pomorske organizacije, Luka Rijeka, Financijski pokazatelji, Likvidnost, Profitabilnost, Učinkovitost, Konkurentnost

ECONOMIC ASPECTS OF MARITIME HEALTH: A LITERATURE REVIEW

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ABSTRACT

Maritime health, which encompasses medical care for seafarers, fishers, offshore oil platform workers, and passengers, represents an important yet often overlooked component of global health. This literature review summarizes the available evidence on the clinical, economic, and regulatory aspects of healthcare at sea. Particular attention is given to the costs of providing medical services, the economics of preventive medicine, and the impact on global trade and maritime regulations. The findings emphasize that effective maritime health systems should be regarded as an essential factor in the economic sustainability and resilience of global supply chains.

Keywords: *Maritime health, Seafarers, Telemedicine, Preventive medicine, Health economics*

EKONOMSKI ASPEKTI POMORSKOG ZDRAVSTVA: PREGLED LITERATURE

SAŽETAK

Pomorsko zdravstvo, koje obuhvaća medicinsku skrb za pomorce, ribare, radnike na naftnim platformama i putnike, predstavlja važnu, ali često zanemarenu komponentu globalnog zdravstva. Upravo ovaj pregledni rad sažima dostupne dokaze o kliničkim, ekonomskim i regulatornim aspektima zdravstvene zaštite na moru. Posebna pažnja posvećena je troškovima pružanja zdravstvene skrbi, ekonomici preventivne medicine te utjecaju na globalnu trgovinu i pomorske propise. Zaključci ističu da se učinkoviti pomorski zdravstveni sustavi moraju promatrati kao neizostavan čimbenik ekonomske održivosti i otpornosti globalnih opskrbnih lanaca.

Ključne riječi: *Pomorsko zdravstvo, Pomorci, Telemedicina, Preventivna medicina, Zdravstvena ekonomika*

ECONOMIC AND LEGAL ASPECTS OF PROTECTING AI-ASSISTED INVENTIONS

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ABSTRACT

The protection of intellectual property—particularly patent protection as one of its key forms—significantly contributes to stimulating investment in research and development, and thus to economic growth. Patent protection, especially in the context of inventions created with the help of artificial intelligence (AI), is becoming increasingly important, and the protection of such inventions requires an approach that incorporates economic, legislative, and ethical considerations. The development of legal frameworks and intellectual property protection strategies is crucial for fostering innovation in the field of AI and related technologies. The aim of this paper is to examine and explain the economic and legislative aspects of protecting inventions generated using AI, as well as their impact on economic growth and competitiveness. The analysis is based on secondary data drawn from relevant databases of Eurostat, WIPO, and the EPO, while data on AI were sourced from the “AI Index Report.” The analysis was conducted at the macroeconomic level and includes selected highly developed EU member states. The results indicate a positive impact of patent protection for AI-related inventions on countries’ economic growth and competitiveness, observed through increases in GDP per capita, the number of granted AI-related patents, R&D expenditure, and the number of newly established AI-driven companies. The findings also point to the need for continuous alignment and harmonization of the legislative framework governing the application of AI and the protection of AI-generated inventions, with particular emphasis on questions of inventorship and ownership. Future research should focus on analyzing the correlation between the growth of AI-related patenting and increases in GDP per capita, taking into account variations among EU member states and factors such as economic size, the specific characteristics of individual industrial sectors, and levels of development within the EU. Such an approach would provide a deeper understanding of the influence of AI technology development on the economic growth and competitiveness of EU countries.

Keywords: *economic growth, artificial intelligence, intellectual property protection, patent*

EKONOMSKI I PRAVNI ASPEKTI ZAŠTITE IZUMA STVORENIH POMOĆU UMJETNE INTELIGENCIJE

SAŽETAK

Zaštita intelektualnog vlasništva, osobito zaštita izuma patentom kao jednim od oblika zaštite, značajno doprinosi poticanju ulaganja u istraživanje i razvoj, a time i gospodarskom rastu. Patentna zaštita, posebno u kontekstu izuma stvorenih uz pomoć umjetne inteligencije (UI), postaje sve važnija, a zaštita takvih izuma zahtijeva pristup koji obuhvaća ekonomske, zakonodavne i etičke aspekte. Razvoj zakonskih okvira i strategija zaštite intelektualnog vlasništva ključan je za poticanje inovacija u području UI i srodnih tehnologija. Cilj ovog rada jest istražiti i objasniti ekonomske i zakonodavne aspekte zaštite izuma nastalih pomoću UI te njihov učinak na gospodarski rast i konkurentnost. Za potrebe analize korišteni su sekundarni podaci preuzeti iz relevantnih baza podataka Eurostata, WIPO-a, EPO-a, dok je za analizu podataka o UI korišten „AI Index Report.“ Analiza je provedena na makroekonomskoj razini i uključuje odabrane visokorazvijene zemlje članice Europske unije. Rezultati provedenog istraživanja ukazuju na pozitivan utjecaj patentne zaštite izuma povezanih s UI na gospodarski rast i konkurentnost zemalja, promatrano kroz povećanje BDP-a po stanovniku, broj odobrenih patenata vezanih uz UI, izdvajanja za istraživanje i razvoj te broj novoosnovanih tvrtki koje koriste UI. Također, rezultati upućuju na potrebu kontinuiranog usklađivanja i harmonizacije zakonodavnog okvira primjene UI i zaštite izuma stvorenih pomoću UI, s naglaskom na pitanja izumiteljstva i vlasništva nad takvim izumima. Fokus budućih istraživanja trebao bi staviti naglasak na analizu korelacije između rasta broja patenata vezanih uz UI i rasta BDP-a po stanovniku, uzimajući u obzir varijacije među državama članicama Europske unije te čimbenike poput veličine gospodarstva, specifičnosti pojedinih industrijskih sektora i stupnja razvijenosti zemalja unutar EU-a, kako bi se bolje razumio utjecaj razvoja tehnologija UI na gospodarski rast i konkurentnost zemalja EU-a.

Ključne riječi: *gospodarski rast, umjetna inteligencija, zaštita intelektualnog vlasništva, patent*

PREDICTIVE ANALYSIS OF COMPANY PROFITABILITY USING ARTIFICIAL NEURAL NETWORKS

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ABSTRACT

Early identification of unprofitable companies is a key element of financial risk management, as it allows timely loss mitigation and informed business decision-making. The aim of this study was to develop a predictive model based on artificial neural networks to classify Croatian companies according to their profitability. The sample included indicators of liquidity, profitability, capital structure, and financial stability, while redundant variables were excluded to improve model accuracy. The model was evaluated using precision, recall, F1-score, and the area under the ROC curve (AUC), with particular emphasis on recall, which measures the model's ability to correctly identify unprofitable companies. The results indicate that neural networks can effectively distinguish between profitable and unprofitable companies, with financial stability ratio, credit rating, and quick liquidity ratio identified as the most important predictors of unprofitability. The findings contribute to the development of early warning systems and the enhancement of data-driven financial decision-making.

Keywords: *Neural networks, Company unprofitability, Financial risk management, Predictive analysis*

PREDIKTIVNA ANALIZA PROFITABILNOSTI PODUZEĆA PRIMJENOM UMJETNIH NEURONSKIH MREŽA

SAŽETAK

Rana identifikacija neprofitabilnih poduzeća važan je element upravljanja financijskim rizicima jer omogućuje pravovremeno ograničavanje gubitaka i donošenje informiranih poslovnih odluka. Cilj ovog istraživanja bio je razviti prediktivni model temeljen na umjetnim neuronskim mrežama za klasifikaciju hrvatskih poduzeća prema njihovoj profitabilnosti. Korišteni uzorak uključivao je pokazatelje likvidnosti, profitabilnosti, kapitalne strukture i financijske stabilnosti, dok su redundantne varijable isključene radi poboljšanja točnosti modela. Model je evaluiran pomoću metrika preciznosti, odziva, F1-mjere i površine ispod ROC krivulje (AUC), uz poseban naglasak na pokazatelj odziva koji mjeri sposobnost modela da pravilno prepozna neprofitabilna poduzeća. Dobiveni rezultati ukazuju da neuronske mreže mogu učinkovito razlikovati profitabilna i neprofitabilna poduzeća te da su koeficijent financijske stabilnosti, kreditni rejting i koeficijent ubrzane likvidnosti najvažniji prediktori neprofitabilnosti. Rezultati istraživanja doprinose razvoju sustava ranog upozoravanja i unapređenju financijskog odlučivanja temeljenog na podacima

Ključne riječi: *Neuronske mreže, Neprofitabilnost poduzeća Upravljanje financijskim rizicima, Prediktivna analiza*

THE RELATIONSHIP BETWEEN FINANCIAL PERFORMANCE MANAGEMENT AND ENERGY COSTS

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ABSTRACT

In recent years, numerous global events have had significant consequences worldwide. Among them, the energy crisis caused by the military conflict between Russia and Ukraine stands out, resulting in financial repercussions for businesses across the globe. Companies in many sectors, such as construction—which is the focus of this study—are particularly exposed to the risks associated with fluctuations in energy prices. In such an environment, businesses may resort to manipulative practices to present their financial performance as more stable than it actually is. More specifically, financial difficulties act as an incentive for companies to engage in earnings management. The primary aim of this study is to analyze the relationship between earnings management and the share of energy costs in the assets of companies. The sample includes joint-stock companies operating in the construction sector in Croatia from 2021 to 2024. Statistical modeling was performed using panel regression analysis. The intensity of earnings management was estimated using the modified Jones model. Descriptive statistics indicate that in the year the war began, the share of energy costs in the assets of the companies under review increased significantly. This trend is likely due to rising energy prices, which affected the companies' financial positions. Two years later, the share of energy costs in assets declines sharply, which may be attributed to reduced business activity or earnings management. Regression analysis results suggest a positive relationship between earnings management and changes in the share of energy costs. Based on these findings, it can be concluded that rising energy prices incentivize earnings management.

Keywords: *Earnings management, Energy costs, Financial reporting quality*

POVEZANOST UPRAVLJANJA FINANCIJSKIM REZULTATOM I TROŠKOVA ENERGIJE

SAŽETAK

Posljednjih godina nastali su brojni događaji čije posljedice je osjetio čitavi svijet. Među njima se može izdvojiti energetska kriza uzrokovana ratnim aktivnostima između Rusije i Ukrajine koja je rezultirala financijskim reperkusijama za poslovne subjekte diljem svijeta. Poslovanje trgovačkih društava u mnogim djelatnostima, poput građevinarstva koje je analizirano u ovom istraživanju, znatno je izloženo rizicima promjene cijena energenata. U takvom okružju poslovni subjekti mogu pribjeći manipulativnim aktivnostima kako bi vlastito poslovanje prikazali stabilnijim nego što jest. Preciznije rečeno, financijske poteškoće djeluju kao poticaj poslovnim subjektima za upravljanje financijskim rezultatom. Temeljni cilj ovog istraživanja je analiza odnosa upravljanja financijskim rezultatom i udjela troškova energije u imovini trgovačkog društva. U uzorak istraživanja uključena su dionička društva koja su poslovala u građevinskoj djelatnosti na području Republike Hrvatske u razdoblju od 2021. do 2024. Statističko modeliranje provedeno je s pomoću panel regresijske analize. Intenzitet upravljanja financijskim rezultatom procijenjen je s pomoću modificiranog Jones modela. Deskriptivna statistika upućuje na to da se tijekom godine u kojoj je rat započeo udio troškova energije u imovini razmatranih društava znatno povećao. Za pretpostaviti je da su takva kretanja uzrokovana porastom cijena energenata koje su se reflektirale na financijsko stanje društava. Dvije godine nakon toga dolazi do intenzivnog pada vrijednosti udjela troškova energije u imovini, što se može pripisati padu poslovne aktivnosti ili upravljanju financijskim rezultatom. Rezultati regresijske analize upućuju na postojanje pozitivne povezanosti upravljanja financijskim rezultatom i promjene udjela troškova energije. Temeljem toga moglo bi se zaključiti da porast cijena energenata poticajno djeluje na upravljanje financijskim rezultatom.

Ključne riječi: upravljanje zaradom, trošak energije, kvaliteta financijskog izvještavanja

THE IMPACT OF DIGITAL INNOVATION ON BUSINESS COMMUNICATION AND MANAGEMENT

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ABSTRACT

This research examines the impact of digitalization on business communication, focusing on the use of tools and platforms such as email and social media. It explores how these technologies enhance communication efficiency, support decision-making, and foster collaboration, with particular attention to the changes driven by digital transformation and the COVID-19 pandemic. The study aims to identify the benefits and challenges associated with these tools in professional contexts. An anonymous survey was conducted among IT professionals and students in informatics and computer science to collect data on usage patterns, effectiveness, and challenges of digital communication tools. Participants reported their experiences during routine operations and under the unique circumstances of the pandemic. Key areas of focus included the frequency of tool usage, productivity improvements, and adaptations in workplace communication. The findings highlight significant adoption of digital tools, with participants emphasizing improved collaboration, faster decision-making, and increased workplace flexibility. The pandemic accelerated these trends, reinforcing the critical role of digital technologies in ensuring operational continuity. However, challenges such as security risks, technological limitations, and user adaptation were also identified, affecting the efficiency and reliability of these tools. This research contributes to understanding contemporary trends in business communication, particularly in the IT sector, and offers practical recommendations for optimizing digital tools. It provides a basis for future studies on the long-term implications of digitalization on work processes, organizational culture, and communication strategies, emphasizing the transformative role of digital platforms in modern professional environments.

Keywords: *Business communication, COVID, digitalization, influence, informatization, organization, technology*

UTJECAJ DIGITALIZACIJE NA POSLOVNU KOMUNIKACIJU I MENADŽMENT

SAŽETAK

Ovo istraživanje ispituje utjecaj digitalizacije na poslovnu komunikaciju, s posebnim naglaskom na uporabu alata i platformi kao što su elektronička pošta i društvene mreže. Analizira se na koji način navedene tehnologije povećavaju učinkovitost komunikacije, podupiru donošenje odluka i potiču suradnju, uz poseban fokus na promjene uzrokovane digitalnom transformacijom i pandemijom bolesti COVID-19. Cilj istraživanja jest identificirati prednosti i izazove povezane s uporabom digitalnih komunikacijskih alata u profesionalnom okruženju. U svrhu prikupljanja podataka o obrascima korištenja, učinkovitosti i izazovima digitalnih komunikacijskih alata provedena je anonimna anketa među IT stručnjacima te studentima informatike i računarstva. Sudionici su iznosili svoja iskustva u redovitom poslovanju, kao i u posebnim okolnostima tijekom pandemije. Ključna područja analize obuhvaćala su učestalost korištenja alata, poboljšanja produktivnosti i prilagodbe u komunikaciji na radnome mjestu. Rezultati istraživanja ukazuju na značajno prihvaćanje digitalnih alata, pri čemu sudionici ističu unaprijeđenu suradnju, brže donošenje odluka i povećanu fleksibilnost radnog okruženja. Pandemija je dodatno ubrzala navedene trendove, potvrđujući ključnu ulogu digitalnih tehnologija u osiguravanju kontinuiteta poslovanja. Međutim, identificirani su i izazovi poput sigurnosnih rizika, tehnoloških ograničenja i potrebe za prilagodbom korisnika, koji mogu utjecati na učinkovitost i pouzdanost tih alata. Ovo istraživanje doprinosi razumijevanju suvremenih trendova u poslovnoj komunikaciji, osobito u IT sektoru, te nudi praktične preporuke za optimizaciju uporabe digitalnih alata. Također predstavlja temelj za buduća istraživanja dugoročnih učinaka digitalizacije na radne procese, organizacijsku kulturu i komunikacijske strategije, naglašavajući transformativnu ulogu digitalnih platformi u suvremenom profesionalnom okruženju.

Ključne riječi: poslovna komunikacija, COVID-19, digitalizacija, utjecaj, informatizacija, organizacija, tehnologija



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