ABSTRACTS

Development of a hybrid artificial neural network method for evaluation of the sustainable construction projects

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Keywords: construction management, sustainability, materials, artificial neural network, construction projects.
Abstract: Planned methods may be developed to improve the efficiency of building construction. The construction business is profoundly impacted by the prevalence of inaccurate cost and schedule prediction. The main strategy to improve the project performance is to evaluate the hybrid sustainable materials using the artificial neural network (ANN) method based on the effective factors in construction projects in Iraq. This strategy needs an effective method to classify the project input representation and specify the accurate activity of each factor. This paper uses a hybrid artificial neural network to correlate and classify the sustainable hybrid of construction projects to evaluate their performance. The contribution of this method is the selection of the Multi-Criteria Decision-Maker method (MCDM) based on time and cost-effective factors correlated with the artificial neural network method. A dynamic selection procedure for project materials may be created using the existing technique as an evolutionary model for successful project completion. The MCDM observed that the appropriate sustainable material was considered as the main factor with a rank of 0.823 for cost effect and 0.735 for time effect and the main influence factor in Iraqi projects was the building height. The results present superior functional cost evaluation results correlated with the selection of hybrid sustainable materials.

Supplying aid products to affected regions by a natural phenomenon in Chiapas, Mexico

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Keywords: natural phenomena, supply network, Chiapas, vehicular routing problem.

Abstract: Natural phenomena affect differently in the world. It comes first from the geographical location, followed by the economic characteristics of each region. The objective of the case study presented is to design a supply network of essential products to victims in the state of Chiapas, located within the Mexican Republic, which is one of the states most affected by the appearance of natural phenomena. The vehicular routing problem with capacity is applied as a solution for the supply of aid products to 120 of 124 municipalities impacted by natural phenomena of a hydrometeorological type during the period 2015-2022. Evaluating the different municipalities that are home to the state under study through various Infrastructure and service factors, the municipality of Tuxtla Gutiérrez is determined as the origin of the routing, obtaining with it a total of 44 routes with an average of 2.7 municipalities to be supplied per route and an average of 402 km travelled. A second municipality is located, Tapachula, which obtains a second place in evaluating factors, providing the longest route in the distance travelled.

Categorization of urban logistics stakeholders
(pages 363-374)

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Keywords: stakeholders, categorization, decision graph, urban logistics.
Abstract: The main challenge for urban logistics is to shift towards a system, working under the guidance of a competent authority working in collaboration with all the stakeholders involved, whether near or far. The ultimate goal of this coordination is to optimize resources and durations while maximizing benefits in a sustainable urban context. The choice of the route to be preferred is to be justified at the level of this article. This is the purpose of this document, which aims to prioritize the most important players in the field of goods transport at the urban level to highlight the areas of action. In this article, we recall several notions by providing several definitions related to the actors of urban logistics, including last-mile delivery and standardized categorizations. We then propose our own classification based on a questionnaire, which provides the necessary data for the development of three decision-making graphs based on the results of our analysis. By highlighting the most important stakeholders in urban logistics, we hope to provide a framework for more efficient and sustainable urban goods transport in the future.

On the relationship between cash flow bullwhip and the company performance: study of the Moroccan detergent products branch
(pages 375-388)

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Abstract: The COVID-19 pandemic had a significant bullwhip effect, which resulted in a cash flow bullwhip (CFB) in the Moroccan FMCG industry. As illustrated by a previous study, some companies were more affected by CFB than others. This indicates that CFB could be correlated to some specific aspects or characteristics of these companies. The objective of this article is to thoroughly examine the connections between CFB control and the company's internal control performance, financial performance, and supply chain performance. Therefore, a field study is conducted on the producers of detergent products. The results confirm that some performance criteria are directly correlated to the degree of exposure to CFB. In fact, a firm is able to regulate CFB when it has an effective internal control system, a reliable supply chain, and strong financial efficiency. However, the relative importance of these performance criteria is not evident. This opens the opportunity to develop a multi-criteria model that could hierarchize the different performance criteria.

Role of meteorology in logistics planning
(pages 389-392)

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Abstract: Meteorology affects every part of life. We need to know the weather conditions for our everyday life, but also for the work activities of the company. Transport is a very sensitive area that is very responsive to changing weather conditions. Each type of transport is sensitive to different weather phenomena. The article provides basic information about weather, its role in transportation, and the fact that hazardous weather phenomena can significantly affect the speed of delivery, safety and quality of transportation.

Management of the grain supply chain during the conflict period: case study Ukraine
(pages 393-402)

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Abstract: The paper highlights the main aspects of designing safety supply chains for grain cargoes and other agricultural commodity delivery. The study's relevance is caused by the fact that periodic port blockades do not allow Ukraine to carry out reliable exports of agricultural products along classical routes. Therefore, there was a need to find new alternatives for exporting agricultural commodities, primarily grain. The study aims to substantiate, describe, structure, and mathematically formalize proposed delivery options and choose the best. The research justifies picking supply chains using automobile and railway transport from Ukraine to the European Union countries. According to three proposed technologies, grain cargoes are exported in batches using containers. The advisability is justified for using each considered delivery option regarding technological aspects. Mathematical modeling, particularly regression analysis, is used to design supply chains. In this case, selecting the best technology is confirmed by corresponding calculations according to designed regression models. The presented option for supplying agricultural commodities is the safest and most reliable but more expensive. However, such logistics will be an excellent solution to reduce the negative consequences of a possible food crisis for the global economy.

Current state and improvement prospects of warehouse workers health and safety practices in Bulgarian manufacturing and trading organizations

(pages 403-412)

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Abstract: Occupational health and safety (OHS) of warehouse workers is a crucial issue for warehouse managers. The importance of OHS practices has increased over recent years due both to high levels of fatal accidents in the logistics industry, and chronic shortage of labor in the sector, which requires systematic efforts to reduce absenteeism and increase warehouse employee motivation. This article aims to address the current state of some fundamental OHS practices of warehouse workers in Bulgarian manufacturing and trading organizations, and to outline some recommendations for their future improvements. The data were collected using the questionnaire survey method among 91 manufacturing and trading organizations in Bulgaria, which operate warehouses, and were processed using Chi-square analysis. The results show that the share of trading organizations, which implement OHS practices is lower, in comparison with surveyed manufacturing organizations. In addition, small organizations lag behind medium and large regarding the use of fundamental measures to protect warehouse workers. The main research findings indicate that there is a need to expand the frequency of OHS practices applied in trading organizations through a wider implementation of joint firefighting drills with fire and emergency safety authorities, adaptation of warehouse infrastructure, clear designation of emergency exits and placement of signs/work instructions for safe work at workplaces. Furthermore, it is critical to increase the use of appropriate work clothing and personal protective equipment (PPE), as well as to provide regular safety briefings in trading warehouses and small organizations.

Predicting crash injury severity in road freight flows with association rules algorithms
(pages 413-422)

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Keywords: Association rule mining, Apriori algorithm, crash risk prediction, road freight transport.
Abstract: The purpose of this study is to evaluate the use of the Apriori association rule mining algorithm to classify and predict the severity of the 718,565 accidents involving freight transport vehicles in Mexico, which occurred between 2009 and 2018. The accidents were classified into those in which there was only material damage or injured people {Severity=0} and in those in which people died {Severity=1}. 115 association rules were obtained, 79 corresponding to non-fatal accidents, and 36 to fatal ones. The main factors associated with the severity of the accident belong to male subjects, involved in accidents that occur on weekends and in suburban areas, and where the probability of the accident being fatal is 1.69 times greater. Thus, the results of using the association rules to relate demographic and circumstantial characteristics of the accident with the severity of the injuries show an accuracy of just over 65%. Therefore, despite the limitations that may occur due to the omission of relevant variables, and the fact that the results show little precision, the feasibility of using machine learning techniques and, specifically, the association rules as promising tools to help analyze accidents and help launch road safety interventions more effectively is manifested.

Telework and the limited impact on traffic reduction –
Case study Madrid (Spain)
(pages 423-434)

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Keywords: telework, telecommute, traffic impact, traffic occupancy.
Abstract: Teleworking has been proposed by organizations and policymakers as a key strategy to help reduce the number of commutes and boost employee satisfaction. Since telework may be linked to a tool to reduce traffic in urban areas, this

research aims to determine the impact that telework has on traffic congestion in Madrid (Spain), given a post-Covid19 context in which many organizations have implemented teleworking in the long term. This study provides evidence that teleworking has had a limited favourable impact on traffic in the city of Madrid based on the correlation between telework implementation and the traffic data collected from 7.365 traffic sensors located in Madrid that are distributed and managed by the Madrid City Council. Covid19 represents an influx point with regard to telework implementation, allowing this kind of research to interpret the answer to the question. The results of our research, through regression calculations and Pearson's correlation coefficient, show that telework in the city of Madrid does not generate a positive impact on traffic during peak times proportional to the increase of telework, as expected based on the existing literature. However, there are other elements that influence the modal choice that may affect this correlation, considering that teleworking allows people greater residence flexibility and that residence location and distance to the workplace are factors that significantly influence the modal choice of transport.

Evaluation of the efficiency of internet marketing in electronic business
(pages 435-444)

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Keywords: e-logistics, e-business, efficiency, internet marketing.

Abstract: The interactivity of information flows is becoming a major success factor and leading to significant changes in the field of e-business. The main purpose of the study is to evaluate the effectiveness of Internet marketing in e-business. It has been determined that ensuring business efficiency is inextricably linked with the use of Internet technologies in building communications with the target audience, logistics and supply chain management. The need for the introduction of Internet marketing in electronic business is highlighted to achieve and ensure efficiency, profitability and fulfillment of key KPI indicators. The method of economic and statistical analysis and evaluation of the effectiveness of Internet marketing in the context of e-business sectors in the world was applied. The key theoretical aspects of e-business development and its main directions are considered. The main indicators for evaluating the effectiveness of Internet marketing in e-business are identified, which allow determining the final structure of Internet marketing effectiveness indicators by industry. The organization of electronic business based on the proposed KPI indicators will provide a function to control the effectiveness of marketing, logistics, which is achieved by increasing conversion, reducing costs and improving competitive positions. A statistical analysis of world sales volumes in the field of e-business was carried out using Internet marketing tools. The results of the study, in contrast to existing approaches, made it possible to substantiate the need to apply in practice the formed methodology for the formation of KPI indicators their further control to ensure the effectiveness of Internet marketing.

Increasing the efficiency of warehouse analysis using artificial intelligence
(pages 445-451)

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Keywords: artificial intelligence, artificial neural network, warehousing, ABC XYZ analysis, black hole algorithm.

Abstract: Logistics in companies is a necessary process that has high costs with mostly no added value. Lowering this cost is vitally important for companies to stay competitive. Nowadays, storage systems are a critical part of any company's logistic system, and many of them try to reach an optimum level where they can operate with little freedom of movement of goods declared by the changing market. There are several manual and automated methods to achieve this. However, we hear quite little about the use of artificial intelligence in the field. This study focuses on the implementation of AI technology into warehousing, especially in categorizing goods. After an overview of the recent literature on AI

technologies and their application in the field of logistics, the introduction of an AI application follows. The main goal of the application is to categorize each good stored in a warehouse into ABC-XYZ groups, which determines the place of the good in the warehouse and the ordering frequency with the quantity. After acquiring and cleaning the training data from a real company, the determination and selection of the least input parameters is an important and challenging task, which is demonstrated. The effectiveness of the supervised learning can be seen as an ANN (artificial neural network) can output, with the aid of a non-conventional metaheuristic approach - the black hole algorithm - as the learning agent is demonstrated by an example, which also shows the result of an ABC-XYZ categorization run on a dataset from a multinational company.

Cold warehousing services from the perspectives of logistics providers: the mediating role of cost and organizational readiness
(pages 453-462)

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Keywords: intention to provide cold warehousing services, TOE framework, mediator, smart PLS 4, logistics service provider.
Abstract: Despite the importance of the cold supply chain in preventing food waste worldwide, there are only a limited number of cold chain providers in Malaysia. This study investigates the factors influencing the intention to provide cold warehousing service logistics providers in Malaysia. Employing a purposive sampling method, data were gathered via an online survey of logistics companies in Malaysia. 184 usable datasets were valid for further analysis. Owing to concerns regarding predictive purposes, structural equation modelling with SMART-PLS 4 was applied to test the hypotheses of this study. The analysis found all direct hypotheses were supported. The relationship between CEO innovativeness and intention, and government support toward intention, is positively mediated by organizational readiness. Meanwhile, cost failed to mediate the relationship between CEO innovativeness and intention. The study developed a new model with two mediators for a better understanding of the factors influencing the intention to provide cold warehousing services in Malaysia from the perspective of logistics providers. The findings will provide meaningful information for the government to craft a better policy to enhance the number of cold service providers.

Employee engagement in logistics industry: a perspective in Indonesia
(pages 463-476)

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Abstract: Indonesia has a lower employee engagement rate than other nations in Southeast Asia, and this phenomenon applies to all industries, including the logistics sector. The logistics industry generally contributes a critical portion of a nation's economy, so further study of the management effectiveness in logistics companies is essential. Any company requires a reliable workforce to function at its best. This research investigates some variables influencing employee engagement in the Indonesian logistics industry. The first variable is corporate governance; the second variable is internal control; corporate reputation is the third, where all these three are set as independent variables. The research also examines whether leadership style moderates the influences of the three independent variables on employee engagement. This study collected data research by distributing questionnaires to 742 respondents from 353 logistics firms. Statistical results came from the Partial Least Square-Structural Equation Modelling (PLS-SEM) method used in this study. The findings revealed that the three independent variables positively and significantly impacted employee engagement. The leadership style functioned as the moderating role in corporate governance's impact and the corporate reputation's effect proven in this research; in contrast, it did not apply to internal control's impact. These results suggest that logistics companies in Indonesia can improve employee engagement by ensuring exemplary implementation of the three independent variables while adopting a leadership style that supports these efforts.

The use of mobile applications in logistics of services

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Abstract: The article focuses on the importance of mobile applications in enterprises with a focus on logistics in the service sector. In the theoretical part, individual software applications in the field of occupational health and safety, fire protection, which are used in Slovakia and the Czech Republic are clearly described. The article contains a brief overview of the legislative regulations on the basis of which the obligations for management decisions in enterprises arise. A telephone survey was conducted in 110 micro, small and medium-sized enterprises between 2022 and 2023 in order to determine the use of software solutions in ensuring the fulfilment of obligations in the field of occupational safety and health and fire protection. To collect data, research questions were set and a questionnaire was developed, which included 6 merit questions, identification questions and a specific question aimed at finding out the prioritisation of the most preferred mobile application features in the study area. The questions were closed-ended, with options where the respondent could choose only one answer. SPSS for Windows version 21.0 was used for statistical analysis and processing of the collected data. We used methods of statistical description, analysed using relative abundance, arithmetic mean, standard deviation and median. At the level of statistical inference, we used chi-square goodness-of-fit tests to analyse categorical variables. We also used nonparametric tests, Friedman analysis of variance, 3D pie charts, and 3D group bar

charts. We found that business representatives had a significantly higher preference for the functionality "record of initial and recurrent BOZP and PO training", followed by the second most preferred functionality "OSH inspections and fire prevention inspections". The research focused on logistics enterprises.

Combination of FTA and FMEA methods to improve efficiency in the manufacturing company
(pages 487-495)

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Keywords: failure mode and effect analysis, fault tree analysis, toroidal inductor, continuous improvement.
Abstract: Toroidal is an inductor with an O-ring core. In 2021 there was an increase in the percentage of toroidal disability, namely the highest percentage of disability at 2.78%, while in 2020 the highest percentage of disability was only 1.33%. Therefore, companies need to make improvements to the quality of their products to prevent a continuous rise in the percentage of defects over time. This study aims to propose an enhancement to reduce/prevent defects in toroidal inductor products. The method used is the Fault Tree Analysis (FTA) and Failure Mode and Effect Analysis (FMEA). The FMEA method is utilized to reduce flaws that occur by considering the value of the risk priority number (RPN). The FTA method is used to identify possible defects by applying analysis of the fault tree description. The results of this study are that improvements should be focused on the failure mode of the wound wire because it gets the highest RPN value of 216 with the cause being less focused workers, while the lowest RPN value is on the red pin failure mode of 56 with the cause of no sandpaper changing schedule. From the results of the study, several suggestions for improvements were made in the form of increasing supervision for workers, increasing rest periods, conducting training, installing display limits for stripping, repairing stripping machines, replacing vise, repairing worktables, and making a schedule for sandpaper replacement prevents the defect. Companies must make improvements to human flows and ensure tools and materials are in optimal condition.