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CONTENTS

INGENIOUS Project Special Session: Digital Platform and Green Technologies in VET
Project INGENIOUS: Digitalization and Green Technologies in Education Boris Misnevs, Igor Kabashkin
Project INGENIOUS: Intelligent Transport Systems - Case Study of Green Technologies in Education Igor Kabashkin, Boris Misnevs
Session 1. Computer Problems of the Information Society
New Approach of Web Page Customer Data Optimization and Analysis Vita Odzelēviča
Research of Approaches to Intelligent Automation Integration Sandra Grunde
Development of an Algorithm for Digital Image Processing of a Video Recorder to Reduce the Chance of Accidents during Adverse Weather Conditions <i>Roman Petrov</i>
Development of the Business Intelligence (BI) Adoption Framework for SME Agrita Burša
Comparative Analysis of AUTOML Tools Anna Sergacova
Multi-Attribute Decision Making Approaches for Selecting Information System for Railway Freight Transportation Process Management Sergejs Čigaks
Разработка и исследование модели прогнозирования развития технологии блокчейн и криптовалютной отрасли Уткир Моллаходжаев
Session 2. Innovations and Smart Technologies in Transport and Logistics
Research of Methods of the Automated Control of the Technological Process of Gasoline
Production Vladyslav Volskyi (Vlad Wolsky)
Blockchain Technology for Smart Logistics Processes Srinidhi Malur Sridhar
Cyclical Reliability Prediction of Avionics Modules Olena Kozhokhina, Oleksii Chuzha, Liudmyla Blahaia, Inna Mykhalchuk
Session 3. Market: Research, Projects, Technologies and Problems of the Modern Economy
Intergrated Reporting as a Management Tool for a Company Sustainable Development Ferangiz Abdurakhmonova
Social Media Platforms as a Tool for Relationship Marketing for Customer Satisfaction Nithin Gopalakrishnan Nair

The Impact of Different Types of Advertising Strategies for Multinational Companies Fredy Sharon Pulikkottil Rappai
Assessment of Factors Influencing the Smart Marketing Practices for Performance Enhancements in IT Sector Mahima Jestin
Assessment of Factors Contributing the Green Marketing Innovations in Small and Medium Sized Indian Firms Ashitha Shibu Reshmi
Clusters as a Way of Increasing Efficiency of Production of Agricultural Sector of the Republic of Uzbekistan <i>Marufjon Orzikulov</i>
A Critical Assessment of Chişinău International Airport Development Opportunities Based on the Competitiveness and Performance Analysis of the Black Sea Region Airports <i>Nocilae Ciochină</i>
Evaluation of the Tools Used for Accomplishing Sustainability of an Aviation Company Margarita Slobozanuka
Recruitment Marketing as a Tool in the Human Resource Management System of the Enterprise <i>Nikita Cheick, Abraham Diallo</i>
Non-Governmental Organisations in Youth Sector Field in Latvia Veronika Saulite



RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 9 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

PROJECT INGENIOUS: DIGITALIZATION AND GREEN TECHNOLOGIES IN EDUCATION

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Keywords: Vocational education and training, digitalization, green economy, project INGENIOUS

Currently, there is an active rethinking of traditional forms of higher education. The pandemic, on the one hand, and the increasing digitalization of all aspects of life, on the other hand, are a powerful catalyst for this process. Despite the general understanding of the need to transform education, the use of modern digital tools, especially in vocational education and training (VET), still remains a problem.

Vocational education is characterized by a wide variety of specializations offered. This means that VET teachers also have a wide variety of digital skills. The integration of digital tools into the educational process can become a more creative, flexible, convenient and attractive way to transfer knowledge.

INGENIOUS (strengthenINg diGital pEdagogy skills aNd competencies Of edUcatorS) is an Erasmus+ project aimed at developing a digital platform for vocational education teachers and developing innovative courses based on it, demonstrating the capabilities of modern ICT technologies in the development of open online courses in various application areas.

The main tasks and results of the project are described in the paper.

Acknowledgements

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 10 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

PROJECT INGENIOUS: INTELLIGENT TRANSPORT SYSTEMS -CASE STUDY OF GREEN TECHNOLOGIES IN EDUCATION

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Keywords: Vocational education, intelligent transport systems, green economy, project INGENIOUS

One of the results of INGENIOUS (strengthenINg diGital pEdagogy skills aNd competencies Of edUcatorS) project is focus on the green jobs and their positive impact on different areas as transport, agriculture, industry and others.

Under the "green jobs" in the project refers to new or significantly modernized areas of the economy, aimed at maintaining environmental sustainability and a qualitative change in working conditions, using modern advances in information and telecommunications technologies. For this reason, the project aims at connecting the digital skills for VET educators with the green economy aspects with the scope of making the labour market and the economy more environmentally friendly and respectful of its resources. One of the tasks of the project is to identify green educational topics in order to provide the VET educators with suitable e-tools enabling them to respond to the demands expressed by modern businesses. At the same time the whole society and economy will benefit from the transition to sustainable, smart and inclusive growth while taking into account EU policies.

Each of the project partners proposed the development of a green economy course within their area of expertise.

As part of this activity, the Transport and Telecommunication Institute prepared the course "Intelligent Transport Systems", which includes 4 main modules:

- Introduction to Intelligent Transport Systems (ITS).
- ITS technologies.
- ITS applications and user services.
- ITS architecture.

A brief description of the course and a description of each of the course modules are discussed in this article.

Acknowledgements

This paper has been financially and conceptually supported by the EU grant of ERASMUS+ project INGENIOUS (Agreement No. 2014-2020-1-EL01-KA226-VET-094871).

Session 1

Computer Problems of the Information Society

Informatīvās sabiedrības datorizācijas problēmas

Компьютерные проблемы информационного общества

RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 13 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

NEW APPROACH OF WEB PAGE CUSTOMER DATA OPTIMIZATION AND ANALYSIS

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Keywords: web analytics; data analytics; CRM; A/B testing; website traffic; data collection

Nowadays web and CRM (Customer relationship management) analytics play an important role in business development, administration, and organization. By customers data analysis business managers have possibility to get insights about the clients and develop more effective ways how to interact and communicate with them. Also, using modern technologies a specific software and systems, CRM analytics helps to manage relationships with customers and reach a goal: improve business relationships to grow the business.

The master's thesis topic is customer data collection optimization and analysis by automation of web banners. In this case, the research object is customer data (behavior patterns, web metrics, personal information), and the subject is automatization of web banners. This work aims to study the behavior of web site visitors and by analysis of the customers data (web metrics, indicators, and patterns) provide the model of customers segments for effective automation development. Automation aim is to show for each segment the more applicable banner for email address collection.

In the research is used methods like A/B testing, customer web data analysis and survey. All these methods provided opportunity to setup web marketing campaign that offers to customers two types (right side and body banner) of web banners for subscription purpose. By analysis of results of the web campaign and results of A/B testing were specified conclusions that firstly, design of banners need to be changed and secondly, need to be used different type of advertisement placement, also need to be specified rules or steps that presents combination of all these methods and formulates the approach for web banners implementation.

Based on the research results was defined action plan and was formulated new approach of web banners implementation and attracting new subscribers. The approach is based on customers' statistics, web data analysis and combine analysis of visual and design side of banners.

The research is supervised by Dr.sc.ing. Prof. Dmitrijs Pavljuks.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 14-15 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

RESEARCH OF APPROACHES TO INTELLIGENT AUTOMATION INTEGRATION

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Keywords: Robotic Process Automation (RPA), Intelligent Automation (IA), Business processes (BP)

While Intelligent Automation can offer improvements and make business processes 50-80% (UiPath 2020) more efficient, organizations are reluctant to adopt and implement these new technologies. Intelligent automation is one of the transformative agents now, changing the way enterprises organize their processes. IA is a comprehensive intelligent automation solution that combines robotic process automation (RPA) and artificial intelligence (AI) – it can provide many benefits that help organizations digitally transform (IBM 2021). IRPA-AI Institute defines RPA as "the application of technology allowing employees in a company to configure computer software or a 'robot' to capture and interpret existing applications for processing a transaction, manipulating data, triggering responses and communicating with other digital systems" (IRPAAI Institute 2019).

In the view of Accenture (2021) Intelligent Automation is challenging in many ways "you may have found success by applying automation ad hoc, but most companies haven't been able to scale these benefits across the enterprise. Whether due to a lack of skilled talent or a clear vision from the top, automation investments are proliferating without ever reaching their true potential." It highlights the influencing factors organizations are facing during their journey towards automated processes.

The study focuses on the challenges of organizations to adopt Intelligent Automation and the main impediments the company faces during the implementation of IA in order to optimize their business processes. There is a need to identify the influencing factors of successful and unsuccessful RPA project implementation and suggest the recommendations how to improve the process of IA implementation in practice.

This paper provides an overview of RPA platforms used in the intelligent (process) automation projects and influencing factors that enterprises faces during such projects. The analysis of information sources has confirmed the Accenture's expert opinion on implementation challenges and unrealized potential benefits of IA technologies. As a result, it formulated the hypothesis about the possible reasons of these challenges. Also, there was need to identify how enterprises usually make decisions about RPA platform selection, what kind of practices do they use and how sufficientthey are.

To find the answers on the questions there was used empirical approach which was based on survey. There was created a survey form and collected the answers from the respondents. The conducted survey reflects the criteria by which RPA platforms are selected and the goals organizations set when embarking on their process automation journey. As well as how organizations see RPA/IA technologies evolving in the future. Based on the results there were identified patterns, relationships and difficulties enterprises have faced during the implementation process.

As a result of study there is developed the methodology that could help to avoid issues and problems which enterprises currently have during the adoption of intelligent automation technologies. It includes a set of rules, recommendations, and describes processes that assist in successful implementation. The methodology could help to avoid main issues and difficulties and could make the complicated implementation process easier.

The research is supervised by Dr. sc. ing. Jelena Kijonoka.

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DEVELOPMENT OF AN ALGORITHM FOR DIGITAL IMAGE PROCESSING OF A VIDEO RECORDER TO REDUCE THE CHANCE OF ACCIDENTS DURING ADVERSE WEATHER CONDITIONS

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Keywords: digital images, graphics, process images, computer vision, drive, security enhancement, Drive Video Camera (DVR)

To safely drive a vehicle, the driver needs to carefully observe what is happening on the road, observe a certain speed limit, especially in bad weather conditions, and be able to evaluate everything that happens behind the front of the vehicle. The aim of the study is to reduce the risk of accidents occurring during bad weather conditions. The urgency of the problem lies in the frequency of accidents on the roadway during adverse weather conditions. The subject of the research work will be a video recorder, which should be attached to the front of the upper part of the windshield in the middle of the vehicle. A video recorder is necessary to obtain a digital image, which will be the object of scientific work.

By using the DVR and the internal screen that will display the final image, the driver of the vehicle will be assisted to display the processed image in the best possible way during bad weather conditions, which include thick fog or snowy road. To analyze the digital image, digital image processing methods will be applied (Sandro, 2018).

To achieve the goal of researching scientific work, the following tasks were set: studying the theoretical part of the library of computer vision algorithms OpenCV, studying the practical part of the library of computer vision algorithms OpenCV, considering the creation of such algorithms and implementing the algorithm of the algorithm for digital image processing of the video recorder to reduce accidents during adverse weather conditions.

To implement the algorithm with accurate display of the graphic image on the screen during bad weather conditions, which include thick fog or snowy road, it is necessary to receive data from the DVR in real time for digital video processing.

It should be noted that the first step will be to receive a digital image from the DVR, which will show a section of the road with poor visibility, which creates additional discomfort on the road. For further analysis of the digital image, it was necessary to apply pre-processing of the road to identify areas of the image that the algorithm would focus on (Ayyadevara, 2020).

The second stage after receiving the video from the DVR will be the pre-processing of the image. Pre-processing of a digital RGB image includes the following operations: changing the structure of an RGB image to a black and white Grayscale format, a method for controlling brightness Brightness, Contrast and equalizing (equalizing) the histogram of a black and white image.

The third stage will be the result in the form of a processed image from the DVR, on which two points were built along the left and right road markings using the least squares method for linear interpolation, which create the sides of the trapezoid, inside which a green trapezoid is placed, marking a relatively safe zone. The sides of the trapezoid start from the front of the car and end at the merge of the roadway with fog to mark the safe zone (Avendi, 2020).

As a result of the selection of the sequence and parameters of digital image processing operations received from the video recorder, the author will achieve the effect of improving visibility along the course of the car. The possibility of automating the selection of these parameters for use in a stand-alone software application is also being explored.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 18-19 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

DEVELOPMENT OF THE BUSINESS INTELLIGENCE (BI) ADOPTION FRAMEWORK FOR SME

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Keywords: business intelligence, critical success factor, SME, implementation process

Although business intelligence (BI) tools are available for around two decades they are mostly used in large enterprises. Many business owners have not sufficient information and knowledge on how to adopt BI tools, what are prerequisites for BI adoption and implementation, and what benefit they may get from them. Small and medium-sized enterprises (SMEs) represent majority of all businesses in EU. SMEs need the help of BI as much as large companies for managing large amount of information and making justified decisions. As one of the main reasons for BI project failures is insufficient knowledge of critical success factors and CSFs can be treated as guidelines that companies should follow to succeed in BI adoption (Fatima and Linnes, 2019). Many researchers suggest that the literature on BI adoption within SMEs has remained limited and research which can help promote the adoption rate of BI in SMEs is necessary.

There are many studies that reveal potential benefits from BI adoption and factors that impact successful BI adoption, but little number is dedicated to exploring benefits and BI adoption factors for SMEs. Only few studies are dedicated to developing research frameworks for identifying the critical success factors (CSFs) that influence BI adoption in SMEs. Frameworks (Olszak and Ziemba, 2012; Boonsiritomachai *et al.*, 2014; Puklavec *et al.*, 2014; Kfouri and Skyrius, 2016; García and Pinzón, 2017; Fatima and Linnes, 2019) which were analysed in this research were developed based on IT literature, interviews, surveys with BI professionals in different countries. The new research is necessary to examine current BI adoption factors and update and establish a conceptual framework for BI adoption in SMEs.

The findings of previous research on CSFs are compared, analysed, and summarized and form the basis for the development of a conceptual framework for BI adoption in SMEs. The framework is developed using CSFs of BI adoption. As a result of the literature analysis, seven main CSFs are identified for further assessment with help of a survey of BI experts. The weight of each factor in the framework is calculated using Analytic Hierarchy Process method. The research will help companies to understand BI adoption influencing factors from various aspects and evaluate factors that affect successful BI adoption, state institutions, and BI providers to assist companies in achieving successful BI adoption and all parties to direct resources to necessary fields.

The research is supervised by Dr.sc.ing. Mihails Savrasovs.

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COMPARATIVE ANALYSIS OF AUTOML TOOLS

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Keywords: automated machine learning, AutoML, dataset, tools

Automated machine learning (AutoML) is a recent technology that is becoming popular for the last few years with development of the data science. The purpose of the AutoML is to simplify and make transparent of the machine learning process to none-experts in machine learning field. The AutoML market size is growing rapidly, and there are significant number of the software products available for the usage. Some of the tools are open source, while some requires significant investments.

Goal of the current research is to compare and analyze the characteristics of open-source AutoML. As a part of the research the overview of the AutoML solutions has been conducted, specific attention has been put to the overview of the existing publication dedicated to the comparison of AutoML tools. Based on the literature review the comparison criteria were identified and analysed. Some of the criteria are common to all kind of the software, like GUI etc, but also some are specific to AutoML tools.

There are different ways to approach AutoML, depending on the specific problem that needs to be solved. For example, some methods focus on optimizing a model for a given dataset, while others focus on finding the best model for a given task. We will explore the current state of AutoML tools and try to analyse the characteristics of AutoML tools and describe popular datasets that were used the benchmark. Also, we explore their performance and compare their advantages and disadvantages on test cases. The results of the research will be presented in form of recommendations based on benchmarking results.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 21-22 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

MULTI-ATTRIBUTE DECISION MAKING APPROACHES FOR SELECTING INFORMATION SYSTEM FOR RAILWAY FREIGHT TRANSPORTATION PROCESS MANAGEMENT

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Keywords: ERP implementation, fuzzy logic, decision making, requirements elicitation

Due to the decrease in traditional freight traffic, the railway transport companies of the Baltic countries are looking for ways to enter new markets for their services. To support new business processes, it becomes necessary to implement new IT solutions. For these purposes, the market offers enough ERP solutions, such as SAP, Oracle, and others. Implementation teams face the challenge of assessing whether existing ERPs meet the company's requirements. Practice shows that approximately 70% of all projects for the implementation of ERP systems face failures (Alaskari *et al.*, 2019). One of the key problems associated with the implementation of ERP systems is related to their complexity and modularity, therefore, to identify requirements and assess the compliance of systems with requirements, it is necessary to involve different specialists from different areas. In many cases, the invited specialists lack information technology experience, so a clear and non-IT-oriented approach is needed that can be applied in practice. Therefore, a feasible solution could be to use fuzzy logic as part of the assessment methodology, this allows the collection of expert opinions in a more human-centric way.

The topics is vivid and there are several publications that discusses the feasibility of the AHP and fuzzy logic in the presented domain. As examples following could be mentioned. The study by (Ye *et al.*, 2021) considers two different groups of decision-making methods based on fuzzy coarse sets. The first group of methods allows you to choose the optimal alternative, the second group allows you to rank the alternatives. The study proposed solutions to reduce the existing disadvantages of the methods. The study (Almohammadi, 2020) provides detailed examples of a system that helps determine the best combination of requirements elicitation methods, given the nature of the project and the stakeholders. The study (Egesoy & Güzel, 2021) presents the procedure for creating a knowledge database for project requirements management. The paper (Efe, 2016) presents an example of the practical application of using fuzzy AHP (analytical hierarchical process) and fuzzy TOPSIS (order preference method by similarity to an ideal solution) for solving a practical problem.

It could be seen that there are some publications dedicated to the topic. But the analysis shows that in many publications the approach is discussed only from a theoretical perspective without strong approbation basis. Therefore, in the frame of the master thesis research the framework (for selecting an ERP solution) will be proposed, and its feasibility will be evaluated based on approbation.

The research is supervised by Dr.sc.ing. Mihails Savrasovs.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 23-24 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

РАЗРАБОТКА И ИССЛЕДОВАНИЕ МОДЕЛИ ПРОГНОЗИРОВАНИЯ РАЗВИТИЯ ТЕХНОЛОГИИ БЛОКЧЕЙН И КРИПТОВАЛЮТНОЙ ОТРАСЛИ

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Ключевые слова: блокчейн, криптовалюта, модель, прогнозирование

Эксперты и аналитики, которые анализируют тенденции развития современных технологий, утверждают, что технологии блокчейн очень сильно изменят ведение бизнеса в будущем. Сейчас эта технология находится на начальном этапе развития, тем не менее предполагается, что в сфере оборота денежных средств, на транспорте, в сельском хозяйстве, в меньшей степени в промышленности, эта технология будет очень востребована и продуктивна в ближайшие годы. По отчетам компании Transparency Market Research (Blockchain Technology, 2020), занимающейся анализом современных рынков, прогнозируется, что к 2024 году оборот в сфере технологий блокчейн составит более двадцати млрд. долларов, при этом рост этого рынка будет более 58% в год.

К сожалению нет единой разработанной модели прогнозирования развития рынка блокчейн технологий. Поэтому, в работе будет предложен свой взгляд на проблему прогнозирования.

Целью исследования является разработка модели прогнозирования развития технологий блокчейн в мире, на примере отдельных стран и апробация ее на примере известной статистической информации.

В исследовании делается обзор основных областей применения технологии блокчейн в современном мире. Преимущество технологии блокчейн заключаются в том, что нет единого центра, контролирующего все процессы, и от того, что информация максимально рассредоточена среди множества участников, риск ее потери намного ниже, чем обычно. При этом все процессы автоматизированы и могут быть использованы абсолютно прозрачно, для передачи или сохранения кодированной информации.

Так же в работе рассматриваются различные методы и инструменты прогнозирования, позволяющие наиболее точно сделать прогнозы, на основе имеющейся в наличии информации

Описаны наиболее часто применяемые модели прогнозирования- с учетом внешних факторов и без, интуитивные и формализованные, регрессионные и авторегрессионные, модели экспоненциального сглаживания и т.д. (Леоненков, 2015).

В ходе работы, на основе имеющихся статистических данных о технологиях блокчейн и криптовалютах, разрабатываются модели для прогноза, проводится оценка разработанных моделей и выбор лучшей модели. В качестве инструмента для построения и анализа моделей для прогноза в работе используется профессиональный статистический пакет IBM SPSS. (Наследов, 2013).

Полученные в ходе исследования результаты, позволяют судить о росте объемов использования технологии блокчейн.

Представленный материал отражает ход исследования, которое проводится под руководством Dr.sc.ing., профессора Б, Мишнёва.

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Session 2

Innovations and Smart Technologies in Transport and Logistics

Inovācijas un viedās tehnoloģijas transportā un loģistikā

Инновации и умные технологии в сфере транспорта и логистики

RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 27-28 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

RESEARCH OF METHODS OF THE AUTOMATED CONTROL OF THE TECHNOLOGICAL PROCESS OF GASOLINE PRODUCTION

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Keywords: automation system, control object, butane column, gas fraction installation, substance's quality

The gas fractionation unit is designed for separation in rectification columns of unstable gasoline order to obtain commercial gasoline that meets the requirements.

The existing system of operation of the column does not provide an automated control of the raw materials' supply to the column. Moreover, the presence of indication sensors is not integrated into the automatic control system (Biletskyi *et al.*, 2018).

Automatic Control System increases the productivity and quality of the Gasoline production (Tolstikov, 1997).

The purpose of created automated control system is to maintain the required gas composition at theoutput of the butane column.

The main requirements for ACS are:

- 1) The ACS should have the following quality indicators:
 - readjustment less than 20%;
 - maximum approximation error -2.5%;

2) In turn, the main control and regulation parameters in the isobutane column of the gas fraction aggregate, are as follows (Sementsov *et al.*, 2003a):

- quality of upper and lower products;
- pressure in the column;
- column top temperature;
- temperature and consumption of raw materials entering the column;
- column bottom temperature.

The block diagram of the control object is determined from the point of view of process automation (Sementsov *et al.*, 2003b). The research data are approximated, the Transfer-functions of the object are determined for the main and auxiliary channels.

With mathematical modeling, the system was checked for compliance with the requirements for this type of the system (Singiresu, S. Rao, 2009). To implement the control automated system according to these parameters, two variants of Automated Control Systems were designed – single-circuit ACS and cascade ACS.

Conducted studies on stability and quality characteristics of the single-circuit and cascade ACS. As a result of the experiment, was certain the fact that the both principles of ARS construction satisfy the requirements. Both adjustment channels satisfy the condition in terms of accuracy.

Single-circuit: the maximum error of approximation is $\delta = 2.1\%$ in a point t = 30s. Cascade: the maximum error of approximation is $\delta = 1,4\%$ in a point t = 5 s.

Cascade and single-circuit systems are stable according to the Mikhailov criterion, the ASK, which is described by an equation of the 4-th order, is stable when the Mikhailov hodograph passes through 4 squares and goes to infinity (in our cases).

Cascade ACS has a minor advantage in the speed of process regulation over a single-circuitsystem.

Single-circuit t = 115 > cascade t = 98.

Both variants of system planning can be used to develop an automatic control system on the certain technical supplies.

The quality of the technological process is ensured by the technical solutions of the companies:

- "Mikrol": Controller and Indicator (http://www.microl.ua/).
- "Emerson": Thermoelectric converter, level sensor, pressure sensor (https://www.emerson.com/).
- "ATO": Electric Valve Actuator (https://www.ATO.com)
- "Fisher-Rosemount": External flow meter (https://www.emerson.com/).

The research is supervised by Prof. Krainukovs A. V.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 29-30 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

BLOCKCHAIN TECHNOLOGY FOR SMART LOGISTICS PROCESSES

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Keywords: Blockchain technology, smart logistics, blockchain technology in smart logistics, blockchain technology factors, smart logistics factors

Integration of new technologies into the current processes helps in the ease of operation and thusincreases the efficiency of the organisation.

Blockchain Technology is one of the most reliable technologies in supply chain industry where transactions will be with complete secured data. Implementation of Blockchain technology can increase the transparency between customer and supply chain executives by ensuring datasecurity, reliability, traceability, and authenticity.

The *aim* of the thesis is to identify and evaluate the factors that affect the Blockchain Technologyfor Smart Logistics Process.

The *object* of the thesis is the implementation of blockchain technology.

The *subject* is the factors affecting the implementation of the blockchain technology for smart logistics processes.

Following are the research tasks to accomplish the study:

- To conduct a literature review, to identify and evaluate the factors that affect the Blockchain Technology for Smart Logistics Process.
- To conduct an online survey to identify the factors that affect the Blockchain Technologyfor Smart Logistics Process.
- To perform a Factor analysis for retrieving the factors that affect the Blockchain Technology for Smart Logistics Process.
- A model of Blockchain Technology for smart logistics process to be proposed.

The author has chosen both qualitative and quantitative methods to obtain the final result. The online survey data will be analysed for clear understanding of the improvement and efficiency of the logistics processes by blockchain technology.

The model for factor analysis may be expressed algebraically as follows. If p variables X1, X2, ..., Xp are assessed on a sample of n people, then variable I may be expressed as a linear combination of m factors F1, F2, ..., Fm, where m < p, as previously described.

Thus, $Xi = ai1F1 + ai2F2 + \dots + aimFm + ei 2.1$,

where,

the *ai*'s are the factor loadings (or scores) for variable *i*,

ei is the part of variable,

Xi that cannot be 'explained' by the factors.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 31 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

CYCLICAL RELIABILITY PREDICTION OF AVIONICS MODULES

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Keywords: Avionics, error, reliability model, flight safety, degradation processes

Safety and security remain top issues for commercial aviation companies. One of the key problems in this field is the loss of critical characteristics by avionics. That may have a direct impact on aviation safety, which depends, in particular, on both the degree of reliability of aeronautical equipment and information on its condition.

The aircraft's lifespan can reach 80,000 or more flight hours. The average aircraft is serviceable for approximately 30 years before being taken out of service. The rotation of takeoffs and landings determines the cyclic functioning of all aircraft components. This is a feature of aviation and represents tens of thousands of life cycles (Gribov, 2021).

The objective of this work is to demonstrate that reliability estimations computed based on the reliability model can be overestimated. During avionics operations, forecast errors could be increased significantly between flights (Gribov, 2016).

To reach this objective, the following tasks are defined:

- 1. The characteristics of reliable predictive models should be reviewed and compared(Strelnikov, 2000).
- 2. A program to predict the cyclical reliability of avionics modules should be created with the help of Mathcad software.
- 3. Evaluations of linear reliability prediction errors of avionics modules during flight should be performed.

The research proposes a new approach for predicting the reliability of avionics modules during flight, taking into consideration the loss of resources during the previous flight. This approach is called a cyclical reliability prediction. It is adequately describing how components deteriorate during aircraft operation.

The result of this research is the creation of the Mathcad program to predict and control the residual resources from one flight to another and cyclical reliability. This can allow the degradation process to be predicted for a given number of flights. These research findings could provide a potential mechanism for accounting for residual resources, which substantially supplemented the composition of aircraft component technical condition data and which has the potential to improve the level of aviation safety.

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Session 3

Market: Research, Projects, Technologies and Problems of the Modern Economy

Tirgus: pētījumi, projekti, tehnoloģijas un mūsdienu ekonomikas problēmas

Рынок: исследования, проекты, технологии и проблемы современной экономики

RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 35-36 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

INTERGRATED REPORTING AS A MANAGEMENT TOOL FOR A COMPANY SUSTAINABLE DEVELOPMENT

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Keywords: Recommended Integrated Reporting Framework, performance, evaluation, SME, telecommunication sector

Integrated reporting (further <IR>) is a synthetic tool to present the system of financial and non-financial indicators of a company. Reading an integrated report a company's stakeholders can make an overview on how strategy, governance and organisation create a corporate value using its capital in different periods of time.

The purpose of the Value Reporting or Integrated Reporting is "to provide investors and corporates with a comprehensive corporate reporting across the full range of company value drivers and standards to drive global sustainability performance". (iasplus.com, 2022)

An integrated report of a company includes four different types of information: *financial, environmental, social and corporate governance information,* and explains how they are interrelated.

The integrated report embodies the natural development of a traditional corporate financial report, the models of which could not adapt to an unstable economy and cannot explain the increasing role of intangible assets in creating the corporate value. Traditional metrics for measuring corporate value and economic progress no longer provide a complete picture and cannot provide a company's comprehensive accountability.

The *object of the research* is a small company in the telecommunication sector.

The *subject of the research* is the integrated reporting framework for evaluation of corporate performance in a small telecommunication company.

The *aim of the research* is to develop the recommended Integrated Reporting Framework for evaluation of corporate performance in a small company, which operates in the telecommunication sector and develop recommendations for its practical implementation.

To achieve the aim of the study, the following research tasks are posed:

- 1. To examine evolution of corporate reporting and to describe the essence of the integrated reporting as a logical continuation development of corporate reporting in the context of a company sustainable development in global environment;
- 2. To show the increasing role of intangible assets in a corporate value creation and to identify six types of capital that are drivers of a corporate value;
- 3. To investigate practical experience of application of integrated reporting by the world well-known brands to find out what key performance indicators can be used to assess a company's financial condition both in the current and in the strategic perspective and how effectively the company uses shareholders' investments to generate profit;
- 4. To compare the content of integrated reporting used by the world well-known brands with Integrated Reporting Framework which was developed by the International Integrated Reporting Council (IIRC);
- 5. To identify main types of capital creating corporate value in a small telecommunication company and to develop a set of key performance indicators for measuring the value of every type of capital;
- 6. To develop the content of integrated reporting in the form of framework as a management tool for a small telecommunication company sustainable development.

When considering the essence of Integrated Reporting Framework and their role in assessing the financial condition of the company, the author formulated the following questions, the answers to which will be obtained in the practical part of the study:

To solve the tasks and get answers to research questions, the author uses the following methods of scientific research: a review of scientific, statistical and journalistic literature and its critical analysis; comparative analysis of various evaluation approaches. A systematic approach was applied during forming a set of estimated financial and non-financial indicators, where the author tries to show the relationship and interaction between the selected indicators using statistical methods of research and data processing. It was calculated financial ratios; also it developed questions for interviews with experts with proceed results. Based on the results of the study, conclusions were drawn and recommendations were developed for the application of the system of evaluation indicators developed by the author in the form of a practical framework.

The result of the research is the development recommended Integrated Reporting Framework for performance evaluation of a small company in communication technology industry and development of the practical recommendations for the users, which can be used as a tool to get a full picture for high-influenced decisions on the enterprises and to build the company's sustainable and profitable business activity.

The given materials reflect the research supervised by Dr. oec., Prof. Irina Kuzmina-Merlino.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 37 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

SOCIAL MEDIA PLATFORMS AS A TOOL FOR RELATIONSHIP MARKETING FOR CUSTOMER SATISFACTION

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Keywords: Social media, relationship marketing, business, customers, profitability

The prominence of social media platforms increases customer relationships and bolsters customer satisfaction because they generate a suitable environment that makes customers and businesses interact. Social media platforms are building audiences for businesses while sharing product reviews with customers. Furthermore, customers analyse available information and share their experiences with businesses using various social media platforms. Hence, social media is a great tool to sustain customer relationships in modern business environments. Social media platforms allow marketers to connect and engage with prospective customers, regardless of location or presence.

Moreover, social media puts efforts into managing customer relationships. This makes meaningful sense as it connects the customers with the businesses. Furthermore, relationship marketing approaches are changing with modern solutions or algorithms in social media. Today's markets must manage and cooperate to accomplish established goals such as improving customer services, attracting more customers, maintaining-fostering long-term relationships, promoting enduring relationships, cutting costs associated with marketing, and ensuring longterm profitability. With established social media strategies and the capability to create compelling content, marketers would be conscious of customer tastes and preferences.

Moreover, businesses are demanded to provide efficient customer support and build or promote brand awareness and trustworthiness. Personalized customer experience, creating relatable brand voices, and social media listening all bring valued customer satisfaction to businesses. The research is aimed to explore the influence of diverse social media platforms on customer satisfaction. To achieve the aim of the study, the following research tasks were established: First, to conduct preliminary research to gather data and understand the research topic. Second, to conduct a literature review. Therefore, collecting secondary data to understand the results and findings of previous research in a similar field. Third, to continue and conduct primary research. An online survey was conducted to understand the perception of targeted respondents. Moreover, the interview was conducted with eight experts in relationship marketing. Next, available data was analysed, synthesizing the findings from primary and secondary data. Lastly, results were structured and presented in conclusions. In the research, the central question of to what extent social media platforms influence customer relationships was investigated through the mixed methodology. During the study, the author obtained the results of the leading research question. The research results can be used to understand how to utilize social media platforms as the best tool for relationship marketing for customer satisfaction.

The thesis and research are supervised by visiting Associate Professor Dr. Ioseb Gabelaia.

RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 38 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

THE IMPACT OF DIFFERENT TYPES OF ADVERTISING STRATEGIES FOR MULTINATIONAL COMPANIES

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Keywords: Advertising, strategies, multinational

Every business should have a marketing strategy. Therefore, today, one of the significant issues in strategic marketing is identifying the right platforms to engage with customers or target audiences. Creating a marketing strategy does not just happen out of the blue; it is an art. Creating a strategy ensures that your business target the right audiences and with relevant content. Therefore, each advertising strategy requires specific attention and focus. Every company aims to build brand awareness and drive sales; therefore, advertising strategy is the sum of the outreach efforts to connect with customers. Multinational companies need to gain social media subscribers, have conversion rates, etc. If you are looking for ideal results from advertising campaigns, it might indicate a rethink of your advertising strategies. Besides, the primary goal is to invite existing customers to repurchase and attract new customers. In this environment, correctly selected advertising strategies make a huge splash.

Consequently, the research aims to explore the relevance of advertising strategies for multinational companies and see how they impact their overall business performance. Therefore, to build awareness that advertising strategies are essential to all businesses to continue their business life cycle. Advertising is a set of marketing activities used to communicate information about products, services, and ideas through various marketing channels. The object of research is the trading activity of a multinational company. The research subject is different types of Advertising strategies for multinational companies. The research is conducted with a mixed method using quantitative and qualitative research methods. The knowledge gap is accessing secondary data. Therefore, based on this data, primary data is obtained through a survey study.

Consequently, observed data is analyzed and synthesized with literature analysis. Hence this paper intends to find out how multinational companies can develop their undertaking to reduce the probability of failure using advertising. Expected results are to increase awareness of company products, Analyses changing market, ensure Advertising Communication is improving, and Provide Feedback; evaluation of advertising refers to the activity of comparing the actual results of advertising to the established. standard to know the real value.

The thesis and research are supervised by visiting Assoc. Prof. Dr. Ioseb Gabelaia.

RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 39-40 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

ASSESSMENT OF FACTORS INFLUENCING THE SMART MARKETING PRACTICES FOR PERFORMANCE ENHANCEMENTS IN IT SECTOR

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Keywords: Smart digital marketing, sustainability, property digital technology, smart property management

In recent years, online marketing has been prominent on the internet market. Since its successful launch by Amazon, which pioneered this new marketing technique, many new internet entrepreneurs have made online marketing a primary source of revenue by dedicating themselves to it full time. According to (Hoffman *et al.*, 2018), the influence on the merchandiser has been such that performance-based marketing is now monitored via the internet marketing program. Numerous academics have examined the effectiveness of internet marketing and disclosed the reality behind it in order to accommodate this quick expansion. (Barbero *et al.*, 2018) However, some academics have only grasped the fundamentals of internet marketing as a pure pay-per-performance marketing instrument. No metrics benchmarks have been established for the online promotion of the product using marketing have become widely used in a variety of businesses around the world. These solutions have enabled IT organizations to gain real-time customer data and more efficiently produce and deliver value to customers.

The study's goal is to identify and assess the aspects impacting smart marketing approaches for boosting the performance of India's IT sector. The study intrudes by analyzing the extent to which smart marketing has been implemented, the barriers to its implementation, and measures to improve digital competences for the local context. To establish the groundwork for making the local property development sector smart and sustainable, smart marketing ideas, techniques, and models from other industries are embraced and utilized. Based on the literature review, 22 factors were selected, and factor analysis was performed to gather the relevant aspects affecting the Indian IT sector. A methodology based on the components of factor analysis was proposed for improving the performance of the IT sector through smart marketing practices.

The research is supervised by Professor Sproge Ilze.

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RESEARCH and TECHNOLOGY – STEP into the FUTURE, 2022, Vol. 17, No. 2, 41-42 Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia

ASSESSMENT OF FACTORS CONTRIBUTING THE GREEN MARKETING INNOVATIONS IN SMALL AND MEDIUM SIZED INDIAN FIRMS

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Keywords: Green marketing, small and medium industries, sustainable development, green innovations, marketing practices

Small and Medium-Sized Businesses seek to adapt their working style and diversify their operations in order to survive in this competitive climate by using green marketing methods. These green marketing strategies provide superior outcomes for small and medium-sized businesses and generate a distinct line of green-friendly or eco-friendly products for the consumer market. In "the current research, customers have an eco-friendly perspective and are supposed to choose green products such as energy- efficient appliances, organic products, natural paints, recyclable goods, and detergents without phosphates. Green marketing refers to the practice of doing business with an emphasis on environmental advantages through minimizing environmental destruction. These items are promoted and manufactured in an eco-friendly way. Although a significant amount of study has been undertaken on green trust throughout the world, little academic research has been conducted in India. Indian marketers are also becoming aware of the effect the green service has on marketing. These activities provide chances for businesses in the Indian economy.

Aim- The aim of this master thesis is to assess and evaluate the factors that contributes to the green marketing strategies in small and medium sized Indian enterprises.

Object- The Research Object is the green marketing strategies in Small and Medium sized enterprises in India.

Subject- The research subject is the factors contributing to the green marketing strategies in Small and Medium sized enterprises in India.

Objectives:

- To conduct a thorough literature review based on the topic for identifying the factors that contributes to the green marketing strategies in small and medium sized Indian enterprises.
- To conduct an online survey on Google Forms by using a questionnaire prepared based on the factors identified from the literature review.
- To conduct a factor analysis for gathering specific components or group of factors from the survey results.

To propose a model for enhancing the green marketing strategies for making it beneficial for the Small and Medium Sized enterprises of India.

The research is supervised by Prof. Dr.Oec. Inna Stecenko.

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Without the assistance of numerous people, this endeavor would not have been possible. Huge regards to my supervisor Prof. Dr.Oec. Inna Stecenko who checked at all of my modifications and assisted me in clearing up a little of the ambiguity. I would like to congratulate my advisor for everything. Participants encouraged and supported me.

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CLUSTERS AS A WAY OF INCREASING EFFICIENCY OF PRODUCTION OF AGRICULTURAL SECTOR OF THE REPUBLIC OF UZBEKISTAN

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Keywords: Economy of Uzbekistan, agricultural sector, innovative agriculture, cluster system, productivity improvement, innovative agricultural technologies

The economy of the Republic of Uzbekistan has a complex structure, and agriculture is one of its leading sectors. The development of the agricultural sector is a vital necessity for the country since it is one of the foundations of the living standards of the country's population. The development of the agricultural sector will provide a large part of the country's labour force with permanent jobs and guaranteed income. Agriculture is also a major consumer of products of many economic sectors. In particular, it is the main consumer of industrial fertilizers, plant and animal protection products, agricultural machinery. Hence, the development of these industries is directly related to the state of development of the agricultural sector. Agriculture is one of the reliable sources of increasing the export potential of the economy. The Government of the Republic of Uzbekistan pays special attention to the development of the agricultural sector, which is the largest and the most important sector of the economy.

Therefore, the importance of this sector of national economy is demonstrated, and the goal of this study complies with the trend of the economic development of the Republic of Uzbekistan.

The goal of the research is to consider the impact of agricultural cluster on the performance of cotton industry and to develop recommendations for further progress of clusters in cotton products manufacturing.

The thesis tasks are as follows:

- To present the situation in agriculture development in Uzbekistan;
- To find the theoretical foundation of innovation cluster and to consider how the cluster system works in agriculture around the world;
- To study the cluster system in Uzbekistan;
- To analyze the functioning of the cluster "Ko'kcha tekstil";
- To analyze the work of the "Shavkat" firm within the cluster;
- To make conclusions;
- To make recommendations to the state, to "Ko'kcha tekstil" cluster and to "Shavkat" company as a part of "Ko'kcha tekstil" cluster.

Object of the research: innovative agriculture.

Subject of the research: cluster "Ko'kcha tekstil" as a representative of innovative agriculture.

The following methods have been used in the process of writing the paper:

- Study and analysis of theoretical sources and scientific literature;
- Study of local and foreign practice;
- Methods of comparative analysis;
- Graphical method;
- Analysis and synthesis of data;

- Interviewing the authorities of cluster "Ko'kcha tekstil" and farm "Shavkat";
- Analysis of the author's practical experience.

The given materials reflect the research supervised by Dr. oec., Associated Professor Jelena Popova.

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A CRITICAL ASSESSMENT OF CHIȘINĂU INTERNATIONAL AIRPORT DEVELOPMENT OPPORTUNITIES BASED ON THE COMPETITIVENESS AND PERFORMANCE ANALYSIS OF THE BLACK SEA REGION AIRPORTS

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Keywords: Airport, airline, development, competitiveness

Air transport is considered one of the most progressively growth sectors of the worldwide economy. The last decade of the 20th century, the growth of air transportation sector wasn't sufficient and wasn't acceptable to industry. After recovery from economic crises in 2008, the impressive growth in aviation sectors was noticed worldwide, especially in the EU.

Republic of Moldova wasn't apart of what is happening in the world economy, thus, Moldova also began modernizing and developing its aviation sector (Remus *et al.*, 2009)

The Master thesis will concentrate on the development opportunities at Chisinau International Airport. It contains detailed analyses of the airport infrastructure, passenger flow and main economic factors. In order to make realistic development proposals there will be taken into consideration common factors/denominators of Black Sea Region airports and competitiveness factors such as: infrastructure, main financial performance indicators and geopolitical situation.

The main research tasks are:

- To conduct a theoretical analysis of the current situation in the regional aviation industry.
- To study specific particularities of the regional aviation industry.
- To identify key elements of Chisinau International Airport and compare it with other major airports Black Sea region.

The goal of this research is to perform a competitive and performance analysis of the key elements of performance indicators of Chisinau International Airport and based on them, further suggest recommendations for development of suitable strategies that will improve airports future infrastructural operational basis.

The anticipated results of thesis research are to demonstrate the importance of implementing strategies that will fulfil airport's and passengers' requirements and thus maintaining a high level standard combined with an increasing overall financial status.

Research questions:

- What are the main strategies to be undertaken to optimize local aviation industry performance?
- What are the main factors in local aviation industry competitiveness?
- What are the future opportunities of Chisinau International Airport?
- What are the proposed development strategies to further develop Chisinau International Airport?

Research methodology:

The resources used were collected by the author from: EUROCONTROL, IATA, ICAO, local authorities reports, AVIA INVEST reports and as well as local and international industry practices and forecasts.

Methods used in this paper are, but not limited to:

- Comparison and analyses compare different airport performance.
- Generalization and synthesis for systematization of theoretical position.
- Graphic methods for illustration of schemes, graphs and diagrams.
- A methodology developed by Yongwa Park for analysis of the competitive strength of the main airports.

The current research is supervised by Dr.Sc.Eng., Professor Iyad Alomar.

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EVALUATION OF THE TOOLS USED FOR ACCOMPLISHING SUSTAINABILITY OF AN AVIATION COMPANY

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Keywords: an aviation company, sustainability, emission, tools

Sustainability plays a very significant role in the Aviation Industry. The main long-term task for aviation companies is to achieve net zero carbon by 2050 ("Fly Net Zero" initiative).

On 4 October 2021, at the 77th IATA Annual General Meeting in Boston, USA, a decision was passed by IATA member airlines, applying them to reach net-zero carbon emissions from their operations by 2050. This agreement brings aviation in line with the objectives of the Paris Agreement to limit global warming to 1.5°C. To succeed, it will demand the coordinated efforts of the whole industry (airlines, airports, air navigation service providers, manufacturers), and significant government support (IATA, 2021).

Increased awareness of sustainability and environmental effect from various sectors globally, as well as *airBaltic*'s goal to become a sustainable airline in the European aviation market, guarantee that *airBaltic*'s will focus on the topic long time. Sustainability aspects is an important direction of the Company's future development, as one may confess that between consumers, employees and investors equally, green factors are becoming more dominant criteria next to service quality and punctuality. Therefore, *airBaltic* is also estimating the challenges and possibities about sustainable operations in all areas of the company. To develop different creative decisions connected to sustainability and corporate social responsibility (CSR) *airBaltic* takes into account 17 sustainable development goals (SDGs) set by the United Nations.

Even though *airBaltic* contributes to all of the SDGs, it has decided to focus on the five goals that are most relevant for its business: respectable work and economic growth; industry innovation and infrastructure; accountable consumption and production, climate action, fairness, and strong institutions. *airBaltic* started analysing sustainability aspects more carefully in 2019. The target was to initiate internal and external discussions about sustainability, increase the devotion of the company and its partners to the topic, and collect all expectations and offers for improvements from relevant stakeholders (airBaltic, 2021).

The *aim* of the research is to evaluate the tools used for accomplishing sustainability of an aviation company. The *object of the research* is an aviation company. The *subject* of the research is tools used for for accomplishing sustainability of an aviation company. The following *research tasks* have been formulated: to describe concept of sustainability; to describe main sustainability issues in the Aviation Industry; to discuss and assess the tools used for accomplishing sustainability of an aviation company.

The research *methodology* includes the following: analysis of theoretical literature and secondary sources; analysis of an aviation company's operational documents; analysis of IATA documents (rules and regulations); case studies; a survey; interviews; statistical tools for data processing.

The *results* associated with the study will be to develop some recommendations for an aviation company for improving their operations' sustainability.

The research is supervised by Dr.sc. admin., Prof. Yulia Stukalina.

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RECRUITMENT MARKETING AS A TOOL IN THE HUMAN RESOURCE MANAGEMENT SYSTEM OF THE ENTERPRISE

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Keywords: marketing, human resource, recruiting, management activity

In the digital age, recruitment marketing has emerged as an expected result of a multifaceted and highly competitive job market.

Recruitment marketing is all the activities and strategies used to build an employer brand, increase reach, identify career opportunities, build candidate relationships, and manage communication with candidates. Recruitment encompasses a variety of strategies and tools used by an organisation to attract, engage, and develop potential talent in the pre-application phase (Alashmawy & Yazdanifard, 2019)

Every employer has a personal brand, regardless of whether he or she shapes it with knowledge or not. The relevance of the research topic is that in order to make the most of it, to find talented applicants and to close vacancies faster, it is better to shape the image of the company consciously.

The goal of this paper is to identify and evaluate key marketing tools in recruiting. To achieve this goal, the activities of the travel agency "Innovative Travel Solution" were studied. Also, the author of the paper has developed a survey for business representatives about the practice of recruitment.

The paper used such methods of research as collection and processing of statistical data, interviews and surveys. The results will be recommended to the object of research, travel agency "Innovative Travel Solution" to improve activities in the field of recruitment.

Modern HR is not only a recruiter, an HR manager and an adaptation specialist, but also a marketer. The principles of building an HR recruitment strategy are the same as in marketing: first it is necessary to look at the position as a product and prepare in accordance with this vision a bright and attractive advertising offer for candidates, and then to launch an advertising campaign and competently handle the personnel traffic.

Personnel marketing is a type of management activity aimed at the long-term provision of the organization with personnel. From the point of view of HR-marketing any employee is considered as an external or internal client of the company, and the workplace - as a commodity to be sold. As a result, the desires and needs of personnel are brought to the forefront and the company is focused on them (Figure 1).



Figure 1. The New Rules of Recruitment Marketing (Walker, 2018)

The labor market is moving steadily toward the job seeker's market: it is becoming increasingly difficult to find worthy candidates. To keep and increase the likelihood that a candidate will come in for an interview, more resources have to be deployed and new technologies have to be mastered.

The research supervised by Mg.oec. Oksana Skorobogatova.

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NON-GOVERNMENTAL ORGANISATIONS IN YOUTH SECTOR FIELD IN LATVIA

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Keywords: Non-governmental organisations, youth work, financing, society

NGOs have become a powerful player in the local, regional and international level. The world's biggest NGO is the Bill & Melinda Gates Foundation with an endowment of \$28.8 billion. The 160 international nongovernmental organisations (INGOs) associated with Inter Action have combined annual revenues of \$2.3 billion (Aall, 2000). The belief among donors that NGOs give "value for money" has led to large amounts of official funds being channelled to NGOs for work in the health and education sectors, credit schemes, and small-scale infrastructure, sometimes under "Investment Funds" or "Social Funds" intended to mitigate the social consequences of economic and structural adjustment packages. Every NGO have their own propose and social value. Society can support the work of organisation with donations or being a member of the organisation. Every organisation can choose their own unique way for building their financial stability. According to Lursoft data, on January 1, 2019, they were registered and active in Latvia (not liquidated) 23,838 public organisations, associations and foundations (incl. the register has a wider range of subjects than associations and foundations). However, according to the SRS according to the data provided, in 2018 the number of associations and foundations is 22,869, of which 2,897 or 12.7% of all NGOs are organisations with public benefit status.

In this work author made an investigation of a most popular possible financing sources for the NGOs working in a youth sector. Youth organisations are generally understood to be youth-led, non-profit, voluntary non-governmental associations, and under some circumstances, can instead be part of the state apparatus or be youth worker-led. In Latvia exist more than 200 NGOs working with youth, only 42 from them are registered as official youth organisations. In the work author highlight 6 different financing sources that NGOs working in the youth field can use:

- 1. Membership fees: Organisations can charge membership fees in order to support their operations.
- 2. Donations: Individuals or groups can make donations to organisations in order to support their work.
- 3. International (European) grants: Organisations can apply for grants from European governments or other international bodies in order to support their work.
- 4. Government support: Organisations can receive financial support from government agencies in order to support their work.
- 5. Selling goods or services: Organisations can generate revenue by selling goods or services.
- 6. Partnerships: Organisations can form partnerships with other organisations in order to support their work.

This research is supervised by Asoc.profesor, Dr.sc.administr. Ilze Sproge.

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