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INNOVATIONS IN PUBLISHING, PRINTING AND MULTIMEDIA TECHNOLOGIES 2025

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18th International scientific-practical conference
Pramones pr. 22, Conference Hall 1-57, Kaunas, Lithuania

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VISUALIZING INCLUSION: AI AS A CREATIVE TOOL FOR ENHANCING COGNITIVE ACCESSIBILITY IN PUBLISHING

Augustinas Balaišis
Vytautas Magnus University, Lithuania

Relevance and aim of the presentation: Cognitive accessibility is becoming increasingly important in modern publishing due to the need for equal opportunities for individuals with cognitive impairments such as autism, dyslexia, and mental disabilities. More than 40% of people with disabilities face difficulties in absorbing information. Traditional methods fall short in addressing these diverse cognitive needs. This presentation aims to highlight how artificial intelligence (AI) technologies can enhance cognitive accessibility by adapting, simplifying, and formatting textual and visual content to meet diverse user needs.

Methodology: The presentation is based on literature reviews, data analysis, and practical examples involving simulations of cognitive impairments. AI-driven text adaptation and visual generation tools were explored and illustrated through specific examples and cases. AI tools show significant potential in reducing cognitive overload and improving information absorption. Language adaptation algorithms and machine learning models effectively customize content for targeted audiences. Additionally, AI-generated visuals help reduce information rejection, facilitating better understanding and engagement.

Results: The adaptation of books into easy-to-read language for individuals with cognitive disabilities is crucial for inclusive education and accessibility. However, one of the most time-consuming and resource-intensive stages in this process is the evaluation of adapted texts by the target readers themselves. Their feedback is essential for ensuring that the simplified text is truly comprehensible but organizing and conducting these testing sessions can be demanding for both the participating individuals and the professionals overseeing the process. To address this challenge, this study introduces a simulation-based methodology designed to support the adaptation process through the use of artificial intelligence and synthetic data. By generating predicted reader responses and simulating cognitive processing, AI can identify potential comprehension difficulties before human testing. This makes the workflow more efficient, reduces fatigue for test participants, and still preserves the critical role of human evaluators.

Conclusions & practical implications: AI technologies represent a meaningful advancement in the publishing industry, particularly in enhancing cognitive inclusion. They offer new opportunities for publishing and design professionals to innovate inclusive content solutions, while also streamlining the complex processes that underlie content adaptation. Addressing the ethical considerations and challenges associated with AI usage is essential for maximizing its positive impact.

Keywords: AI technologies, cognitive accessibility, inclusive publishing, information adaptation, visual communication

FINE ART PRINT: TRANSFORMATION IN ARTISTIC PRESENTATION AND AUDIENCE PERCEPTION

Yeter Beris
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Relevance and aim of the research: This study explores the impact of digital fine art prints on artistic presentation practices and audience perception. By examining the historical evolution of printmaking, it investigates how digitalization has transformed both the production and reception of art. The research aims to analyze how digital technologies, including computer-aided design, and inkjet printing, influence the aesthetic and technical quality of contemporary printmaking, and how these changes shape audience engagement with art.

Methodology: The research employs a mixed-method approach, combining historical analysis and a quantitative survey. A survey was conducted with 506 participants to assess their perceptions of digital fine art prints. The questionnaire collected demographic data and examined participants' views on the artistic and technical qualities of digital prints, their accessibility, and their role in contemporary art.

Results: The findings indicate that digital fine art prints have reached a quality comparable to traditional printmaking techniques such as engraving, serigraphy, and lithography. The study also reveals that digitalization enhances the accessibility of art, broadening audience engagement. Furthermore, digital platforms play a crucial role in reshaping artistic perception, allowing new modes of interaction with artworks. The results suggest a parallel between the 15th-century printmaking revolution and the current digital transformation in art.

Conclusions & practical implications: The study concludes that digitalization has led to the diversification of artistic production, encouraging artists to adopt new media arts, NFTs, and virtual performances. The increasing audience interest in digital prints signifies a shift in how art is consumed and experienced. This transformation not only democratizes art but also creates new opportunities for artistic expression and exhibition, making artworks more accessible to a global audience.

Keywords: Fine Art Print, Art and Digitalization, Audience Perception, Art Production Methods.

KEY PERFORMANCE INDICATORS FOR SUSTAINABLE GRAPHICS PRODUCTION IN AN AI ENVIRONMENT

Diana Bratić[1], Suzana Pasanec Preprotić[1], Denis Jurečić[1], Jana Žiljak Gršić[2]

[1]University of Zagreb, [2]Zagreb University of Applied Sciences, Croatia

The graphic industry, including printing, packaging, bookbinding, and digital media, faces sustainability challenges due to high levels of waste, inefficient resource management, and excessive energy consumption. Key Performance Indicators (KPIs) enable the monitoring and optimization of production processes with the aim of reducing the environmental footprint and increasing operational efficiency. However, the lack of precise industrial data often limits quality analysis and data-driven decision-making. Artificial intelligence (AI) provides a solution to this problem through predictive analytics and process automation, enabling smarter resource management and waste reduction.

This paper explores the application of the Extreme Gradient Boosting (XGBoost) model for the analysis and optimization of key KPI indicators in the graphic industry, with a focus on sustainability and resource efficiency. The model includes relevant indicators, such as percentage of material waste, energy efficiency, number of defective prints, machine efficiency, and equipment downtime. Given the limited availability of real industry data, this research employs simulated datasets based on industry standards to evaluate the accuracy of AI-based predictions and the potential for process optimization through AI technologies.

The methodological approach involves the generation of synthetic KPI data and the application of the XGBoost algorithm, which outperforms traditional machine learning methods due to its ability to analyze large datasets faster, detect complex patterns, and provide more accurate predictions for variations in production processes. Additionally, XGBoost enables the simultaneous optimization of multiple variables, improving decision-making in dynamic production systems. The model evaluation is conducted using metrics such as mean absolute error (MAE), mean squared error (MSE), and coefficient of determination (R^2). The expected results demonstrate how AI can significantly enhance resource efficiency, reduce waste, and optimize production parameters.

Beyond waste prediction, AI allows for the identification of patterns that contribute to waste and automatically suggests adjustments to the produc-

tion process. By implementing machine learning and analyzing data from various sources, XGBoost models can continuously refine their accuracy and adapt to changes in the production environment. Furthermore, the integration of AI systems with Industry 4.0 enables the connection of data from sensor systems and production management software, allowing for real-time decision-making and improved operational flexibility.

Moreover, the implementation of AI technologies in the graphic industry can introduce a system for automatically adjusting KPI thresholds, allowing for proactive optimization of production processes. This approach contributes not only to cost reduction but also to achieving industry ESG goals, such as carbon footprint reduction and more efficient resource management. The research findings are expected to provide the foundation for the broader integration of AI tools into sustainable production, along with guidelines for the further development of smart KPI management systems.

This paper contributes to the development of an AI-supported system for managing sustainable KPI indicators in the graphic industry, facilitating more precise production planning, material utilization optimization, and environmental footprint reduction. The results obtained can serve as a basis for further research and industrial application of AI technologies in the context of sustainable graphic production.

Keywords: artificial intelligence, sustainable graphic arts production, key performance indicators (KPIs), process optimization, Industry 4.0, predictive analytics, XGBoost, ESG framework

ETHICAL DIMENSIONS OF ARTIFICIAL INTELLIGENCE IN GRAPHIC DESIGN: CHALLENGES, OPPORTUNITIES AND THE FUTURE OF CREATIVE PRACTICE

Sandra Dedijer, Nemanja Kašiković, Magdolna Pál, Ivana Jurič, Živko Pavlović, Saša Petrović, Gala Golubović
University of Novi Sad, Serbia

Relevance and aim of the research: The research is relevant in light of the rapid integration of Artificial Intelligence (AI) into the graphic design sector, which is fundamentally reshaping creative workflows, tools and professional roles. The growing use of AI-driven design tools has introduced new possibilities for automation and creativity, but it also has raised relevant ethical, legal, and professional concerns. This paper aims to provide a comprehensive and critical analysis of the benefits, challenges and ethical considerations associated with the application of AI in graphic design. By exploring current practices and theoretical perspectives, the paper seeks to contribute to ongoing academic discussions on responsible AI use in creative industries.

Methodology: This study employs a systematic literature review as its primary research method. The paper synthesises current knowledge about AI's role in graphic design by analysing various academic sources, industry reports and case studies. The review focuses on identifying common themes in the application of AI while examining key ethical concerns. The methodology allows for a structured and critical examination of both technological and ethical dimensions.

Results: The findings reveal that AI significantly enhances graphic design processes' efficiency and creative potential. It enables the automation of repetitive tasks and the generation of high-quality visuals and supports innovative personalization and content creation approaches. However, the study also identifies substantial ethical challenges, including concerns about originality, authorship, algorithmic bias and the potential displacement of human labor. Furthermore, it highlights the lack of clear ethical guidelines and legal frameworks addressing AI-generated content in professional practice.

Conclusions & practical implications: The study concludes that while AI offers transformative benefits to the graphic design industry, its implementation must be cautiously and ethically sensitive. Developing comprehensive ethical frameworks and updated legal regulations is essential to ensure responsible AI use. The research emphasizes the importance of fos-

tering AI literacy, rethinking the role of human designers, and promoting transparent, inclusive and ethical design practices. Future research should explore further interdisciplinary solutions that align technological advancement with human-centered design values.

Keywords: Artificial Intelligence, authorship, ethics, graphic design, intellectual property

AN OVERVIEW OF MULTIMEDIA INNOVATION IN THE WESTERN BALKANS

Petrit Dollani
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Relevance and aim of the research: The Western Balkans are increasingly becoming a fertile ground for multimedia innovation. With rapid advancements in technology and a growing interest in digital transformation, the region is witnessing significant developments in multimedia, digital content creation, and innovative digital solutions. This study aims to explore the extent of multimedia innovation in the Western Balkans by addressing the following research question: How are multimedia industries developing in Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia, and what factors influence their growth?

Methodology: The methodology of this research is based on a qualitative approach, incorporating an extensive review of academic literature, policy documents, and industry reports. Secondary sources, such as reports from international organizations like the European Commission, World Bank, UNESCO, and UNDP, were analyzed to understand regional trends in multimedia innovation. Additionally, information from official government websites, film festivals, and multimedia industry stakeholders was included to ensure a comprehensive assessment of the sector.

Results: Numerous initiatives and institutions are driving multimedia innovation in the Western Balkans. The Marubi Academy of Film and Multimedia in Albania stands out as a premier institution offering education and training in film, television, and digital media. Similarly, the Faculty of Dramatic Arts in Belgrade, Serbia, provides comprehensive programs in multimedia arts. Additional institutions such as the Academy of Arts in Novi Sad and the University of Sarajevo's Faculty of Performing Arts also contribute significantly to training future multimedia professionals. Sarajevo Film Festival and the Anibar International Animation Festival in Kosovo have become prominent platforms for showcasing multimedia works. Technological advancements such as augmented reality (AR), virtual reality (VR), and artificial intelligence (AI) are being integrated into multimedia projects in the Western Balkans.

Conclusions & practical implications: Despite advancements, challenges remain, particularly in areas such as infrastructure development, access to high-quality equipment, and the need for more specialized educa-

tion programs in multimedia fields. Addressing these gaps will be crucial to unlocking the full potential of the region's creative economy. Governments across the Western Balkans have made significant strides in creating a favorable environment for digital innovation, but continued support, both financially and in terms of policy reforms, will be necessary to overcome existing barriers. Additionally, collaboration between countries in the region, as well as with international partners, will be key to creating a more sustainable and competitive multimedia ecosystem. Investment in digital education and training will be critical in nurturing talent and ensuring that the region will remain competitive in the future.

Keywords: multimedia innovation, digital transformation, Western Balkans

BUILDING A BUSINESS INTELLIGENCE ENVIRONMENT THROUGH THE APPLICATION OF BIG DATA AND IoT TECHNOLOGIES

Bogomil Ivanov, Desislava Petrova
Technical University of Gabrovo, Bulgaria

Relevance and aim of the research: With the increasing penetration of digital technologies and their growing significance for businesses, Big Data and the Internet of Things (IoT) are becoming key concepts at the core of business transformation. Big Data and IoT technologies provide new opportunities for collecting, processing, and analysing vast amounts of data in real time, thereby enabling the development of intelligent business environments.

Methodology: The study employs a mixed-method approach, integrating both qualitative and quantitative research techniques. The qualitative aspect involves a comprehensive theoretical review of specialized literature from sources like Google Scholar, ScienceDirect, and ResearchGate. This review establishes the foundational concepts of Big Data and the Internet of Things (IoT) and their role in intelligent business environments.

Results: The research confirms that integrating Big Data and IoT enhances business efficiency, process automation, and data-driven decision-making. However, the key challenges include data security concerns, the lack of standardized IoT integration protocols, and significant initial investment costs. Businesses recognize the potential of these technologies but struggle with practical adoption due to infrastructure limitations and regulatory issues.

Conclusions & practical implications: The study concludes that integrating Big Data Analytics (BDA) and IoT is crucial for the digital transformation of Bulgarian enterprises. These technologies enhance efficiency, automate processes, and support data-driven decision-making, fostering intelligent business environments. However, challenges such as the lack of integration standards, data security concerns, and system compatibility issues hinder widespread adoption.

Keywords: Big Data Analytics (BDA), digital transformation, intelligent business environment, Internet of Things (IoT)

ECONOMIC EVALUATION OF THE DESIGNED FACILITY – MULTISPORT FLOORS

Bogomil Ivanov, Preslav Petkov, Desislava Petrova
Technical University of Gabrovo, Bulgaria

Relevance and aim of the research: The presented work is dedicated to the economic evaluation of Multisport floors, using the calculation method for evaluation and linear depreciation of the asset. The project is for the flooring of a sports facility basketball court with standard dimensions of 420 square meters, but it can also be used for other types of sports (volleyball, tennis, handball, futsal and others), which are provided as an option in the technical project. A rate of return of 40% is adopted. And a payback period is sought for the investment made of over 2 million BGN for a period of up to 4 years.

Methodology: ASB GlassFloor's methodology includes rigorous product certification and continuous innovation. Its products meet high competition standards set by international sports federations and have received multiple awards for innovation and design. The economic evaluation of its multisport flooring projects is based on an efficiency-driven approach, ensuring optimal resource utilization and profitability.

Results: ASB GlassFloor GmbH's financial results demonstrate a strong focus on profitability and efficiency. The company's total production cost for a unit of their multi-sports flooring project is 1,201,800 BGN, with the wholesale price set at 1,682,520 BGN. After including VAT, the final price for customers is 2,019,024 BGN. The company's profit margin is set at 40% of the full production cost, resulting in a profit of 480,720 BGN per unit.

Conclusions & practical implications: ASB GlassFloor GmbH achieves economic efficiency through the optimal use of resources and innovative technologies, such as the ASB LumiFlex floor system. The company stands out for its technological innovations, including interactive glass sports floors with changeable markings. Effective cost management ensures competitive pricing, while the company's achievements are confirmed by industry awards and certifications. These recognitions highlight ASB's commitment to quality and innovation. The successful implementation of advanced production techniques and efficient resource management underpins the company's market leadership and economic success, making it a prime example of strategic optimization in business.

Keywords: calculation method, investment, redemption period.

LIGHT TRAPPING ON PAPER – AN UNDERESTIMATED PHENOMENON

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Relevance and aim of the research: In the graphic arts industry, it is assumed is that light hits a paper surface and is reflected from there in a different way by the printing ink. In reality, the light does not stay on the surface of the paper, but penetrates the paper to some extent, which can be seen if holding a printed paper up to the light. It is visible that light even passes through the paper. However, the light is strongly scattered in paper. This scattering ensures that a large proportion of the light is first bounced back and forth in the paper several times before it emerges from the paper again. Some light sticks to the back of the printing ink, thus a smaller proportion of the light is reflected than would actually be expected from the surface coverage of the screen. It can be said that the printing ink has a stronger effect known as light trapping which is difficult to measure directly. Theoretically, it could amount to up to 25 percentage points for a grid with 50% area coverage.

Methodology: A few years ago corresponding measurements were carried out regarding the abovementioned issue. Based on the criticism of the measurement methods, the methodology of the study has been improved by introducing computational effort. This has led to more reliable measurement results even with simple measuring equipment. A densitometer has been used in the study since it can handle both incident and transmitted light, and a graphic film with measuring fields of different area coverage so that a gradation curve can be measured and calculated, and a test print with corresponding halftone fields and the same screen ruling. A pure incident light densitometer has been used to check the values of the combined densitometer.

Results: Four measurements have been carried out. As the result, the measurements of the prints where the film is still between the print and the measuring device will show a higher dot gain than the direct measurements on the print, simply because light can escape sideways through the distance between the measuring head and the paper and is not captured. The difference between these two different measurements on the print describes the pseudo tone value increase due to the film between the print and the measuring device. By measuring the transmitted light on the film, it is possible

to determine precisely what area coverage is actually present. If the film is now placed on the paper with the coating side down and we measure the area coverage densitometrically with incident light, it gives a measurable difference. The reflected light measurement on paper shows a clear increase in tone value.

Conclusions & practical implications: now previous measurements can be used to determine how much of this dot gain is generated by the film alone. This must then be subtracted from the very high dot gain between the transmitted light and reflected light measurements. The tonal value increase reduced in this way must result solely from light trapping.

Keywords: Dot gain, light scattering, light trapping, tonal value increase

DESIGN DEVELOPMENT FOR THE BOARD GAME "THE WORSTEST PRESIDENT"

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Kauno kolegija Higher Education Institution, Lithuania

Relevance and aim of the research: Visual design decisions have significant impact to the attractiveness, functionality and success of the final product. The goal of the visual design development for the board game «The Worstest President» was to find out solutions to make the game attractive and informative for the user and reveal the specifics.The game is provocative – focused on choosing the worst candidate, intended for an adult English-speaking audience. The publishers wanted connections with the US presidential election, distinguished, witty, charismatic characters and a dynamic design that reflects the mood of the debate, while not losing the solidity of the election theme. The aim was to create personages vividly and comically, emphasizing the specific negative traits associated with animals, often seen in politics, too.

Methodology: Board Game «The Worstest President» visual development process: generation, sketching and discussion of ideas, analysis and visualization of personages' characters, facial expressions, gestures, typical clothing, accessories, election environment and debates, analysis of games with a similar theme, creation of a solid visual style, design of individual game elements. The creation process included information collection, systemisation, sketching on paper, use of Procreate, Adobe Photoshop, Adobe Illustrator and Adobe InDesign programmes.

Results: For the color palette, the dominant colors of the US election debate environment, Democratic and Republican party members' outfits were chosen: dark blue, blue, light blue, white and red as an accent. The title «The Worstest President» deliberately uses the word «Worstest» in an irregular form, which is intriguing and reflects the game's controversy. The cover of the box depicts two main characters: animals with sarcastic facial expressions, expressive gestures and accessories. This decision allows users to realize the humorous and possibly cynical nature of the game. The font chosen for the title is easy to read, creates a fun, warm, inviting atmosphere and reflects a witty and absurd mood. The design of the cards is consistent, separating different types of cards with easily recognizable images and symbols. The layout of the rulebook is structured by topics, separated by different colored backgrounds, which are repeated throughout the visuals of the

game and create a mood of debate. Fun and dynamics are created by inserted unexpected fragments of characters on the pages. The design of the rulebook includes descriptions and visual examples to better understand the gameplay and options. Colors, characters, fonts and graphic elements are repeated in proportionally and form the general stylistic pattern of the design.

Conclusions & practical implications: a detailed analysis of the context and goal helped to choose the most suitable visual solutions to make the game attractive, functional and user-friendly. The design process is iterative – further user testing and refinement will lead to a design that meets the expectations of real users, creating funny and discussion-provoking playtime.

Keywords: Board game, visual design, funny personages, controversial election game

KEY DRIVERS OF THE FUTURE EUROPEAN PACKAGING MARKET

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The printed packaging market continues to evolve, driven by several macro factors. Concern for the environment and a commitment to protecting it has reached an all-time high, resulting in sustainability becoming the primary driver of change for key players in the supply chain. The influence of consumer expectations on the development of printing and packaging is now very significant. There are also accelerating developments in printing processes, smart packaging and communication devices.

Digital printing is an increasingly common process for printing labels, corrugated, carton, flexible, rigid, plastic, metal and glass packaging. Although printing is perceived to be going through difficult times, it is in fact a highly competitive and dynamic business, especially in the packaging sector. In 2020, as the global Covid pandemic disrupted all aspects of human life, the volume of digitally printed packaging has skyrocketed as suppliers have been able to respond quickly to changing demands.

Sustainability is also a key driver in the packaging industry. All stakeholders in packaging: raw material suppliers, converters, distributors, brand owners, retailers and consumers are increasingly focused on aligning their packaging and products with the circular economy. The Circular Economy Action Plan requires EU countries to ensure that packaging placed on the market complies with the essential requirements of the Packaging and Packaging Waste Directive.

The growth of e-commerce, which has accelerated significantly since 2020, has increased demand for transit packaging proportionally and substantially. This has been coupled with external pressure on retailers from consumers, NGOs and government regulation to reduce the environmental impact of e-commerce packaging. Efforts have focused on: reducing weight; reducing raw material use; increasing recycled content.

Automation and digitisation are driving significant changes in several areas. One of the most significant impacts on the global market for track and trace packaging is blockchain technology, the uptake of which is likely to continue to grow in the future. The emergence of technologies such as the Internet of Things (IoT) and artificial intelligence (AI) has given rise to an entire portfolio of digital services that cover the whole printed packaging

process. Smart packaging technologies will be used to add value to product offerings.

Consumer attitudes are changing. Consumers dislike single-use plastic packaging, oversized packaging and are encouraging the demand for recyclable and compostable packaging.

Packaging format innovation. Three trends appear to be the dominant developments in this area. Paper packaging bags are replacing plastic in e-commerce. Paper bottles are being introduced in the beverage and household products sectors. Use of dry moulded cellulose in the food and pharmaceutical markets.

The authors describe and analyse the above trends and drivers in detail, explaining their impact on future packaging, which are already focused on the implementation of Printed packaging 5.0.

Keywords: printed packaging, sustainability, digital printing, consumer attitudes in packaging, packaging innovation

ANALYTICAL INVESTIGATIONS OF CUTTING FORCE IN BOOK BLOCK TRIMMING USING AN ECCENTRICALLY MOUNTED DISC KNIFE

Serhii Komarov[1], Georgij Petriaszwili[2], Piotr Janicki[3]
[1]Lviv Polytechnic National University, Ukraine,
[2]Warsaw University of Technology, Poland,
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Relevance and aim of the research: The traditional «guillotine» method of cutting books with a flat knife results in three-knife trimmers being subject to significant dynamic loads and relatively low efficiency. In recent years, extensive research and practical testing have explored the use of vibratory cutting tools for various materials, including paper. To reduce the cutting force required for trimming book blocks, rotating disc knives with a small eccentricity were proposed for trimming the edges of book sides. This research aimed to calculate the vibratory cutting force and to perform analytical studies on the influence of various process parameters on the cutting force when using an eccentrically mounted disc knife.

Methodology: An analysis of the kinematics of vibratory cutting revealed that the process can occur in two distinct modes: continuous cutting and intermittent (impulsive) cutting. Variations in the knife's speed, direction, and position cause fluctuations in the cutting force, which also depends on the transformed sharpening angle of the blade. Based on previous studies, the vibratory cutting force can be determined using an empirical relationship that accounts for changes in the transformed sharpening angle and other processing parameters. Experimental studies measured the longitudinal and transverse components of the total cutting force. By analyzing changes in the kinematics of the cutting process and experimental results, a mathematical model was developed, enabling computer-based calculations of the vibratory cutting force.

Results: This research presents findings on a novel method for vibratory cutting of book blocks using a disc knife mounted with a slight eccentricity. Analytical studies revealed that the key factors influencing the components of the vibratory cutting force include: the feed speed of the book block, the rotational speed of the knife, the direction of the disc knife's rotation, the magnitude of the eccentricity, and the distance of the cutting point from the knife's rotation axis. The analytical studies were further validated through experimental results.

Conclusions & practical implications: A comparison of the calculated vibratory cutting force values for an eccentrically mounted disc knife with experimental results demonstrates a good match within a specific range of parameters. The developed mathematical formulas enable a theoretical analysis of the influence of various parameters on the vibratory cutting of a book block with a disc knife, providing results with sufficient accuracy.

Keywords: book block, calculation of cutting force, disk knife, eccentricity of the knife, vibratory cutting

AI-BASED SYSTEM FOR AUTOMATED PROJECT ESTIMATION IN THE PRINTING INDUSTRY

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Relevance and aim of the research: Modern printing companies face increasing demand for personalized, short-run, and fast-turnaround orders. In such a dynamic environment, accurate and rapid estimation of project cost, production time, and required materials is critical for maintaining profitability and customer satisfaction. Traditional estimation methods rely heavily on manual input and expert judgment, which are time-consuming and often inconsistent. This paper presents the adaptation of the AI-powered system Flex Estimate AI for use in the printing industry. Originally developed for IT project assessment, the system has been successfully tailored to evaluate printing jobs, offering fast, transparent, and data-driven estimates.

Methodology: The system integrates several artificial intelligence techniques, including regression analysis, clustering, and natural language processing (NLP). In the printing domain, these technologies enable automatic extraction of job parameters (e.g., print size, paper type, binding method) from technical documentation or client briefs. Historical job data and production parameters are used to train the system's models, allowing for predictive estimation of production time, costs (materials, machine usage, labour), and required resources. A modular architecture includes a data pre-processing module, an analytical engine, a user-friendly interface, and a document generation module.

Results: Flex Estimate AI has been tested in a pilot implementation at two mid-sized printing firms. The system reduced average estimation time by over 65%, and preliminary cost deviations decreased from 20% to under 10% in real orders. Clients reported increased trust due to transparent breakdowns of cost components and expected delivery terms. Internally, the system facilitated better scheduling, resource allocation, and material planning.

Conclusions & practical implications: The integration of Flex Estimate AI into printing workflows enables faster response to client inquiries, more accurate cost estimation, optimization of material use and equipment load, reduced dependency on expert estimators, and improved overall production planning. Its AI-driven logic makes it adaptable to various printing formats, finishing techniques, and equipment setups. Future developments

include integration with ERP systems and supplier databases for end-to-end digital job planning.

Keywords: AI estimation system, cost optimization, printing industry, production planning, project management

3D CAD AND 3D PRINTING-BASED PRODUCT DESIGN: CASE STUDY OF ARMCHAIR

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Relevance and aim of the research: Digital design is an efficient way of implementing furniture concepts. Advanced tools for rendering have an effect of increasing their visibility via the use of sophisticated software that simulates the final appearance of furniture using appropriate textures, colours and environment. Although colour plays an important role in the product's promotion, additional use of textures creates a more realistic appearance. In addition to the digital models created, prototyping plays a crucial role, when it comes to evaluate the concept presented. Alternative solutions can be generated in a short time and a more effective design process is achieved. The goal of this study was to develop an armchair using digital designing and physical prototyping.

Methodology: A variety of methodological and digital tools have been used to create a unique product, with effective application of 3D CAD and 3D printing technology in the design of armchair.

Results: The paper deals with the design of an armchair for children and analyses a number of parameters and issues. Anthropomentric shapes were used in the design process, thus digital skeches helped to model the armchair using an advanced Computer Aided Design (CAD) system. These models were enriched with colours and textures in order to convey the design concept, while providing a realistic view of the final solution.

Conclusions & practical implications: The prototype was built based on the CAD models created, in order to verify the incorporated specifications. The prototype was detachable and could also be used as a stool for easier use and transportation. Combining not only an effective geometry of the armchair but also its colorful appearance, a very attractive product for children was developed. The creative approach to the design of the armchair opens up new possibilities for its application.

Keywords: 3D modelling, sculpting, CAD, product design, prototyping, 3D printing.

CINEGAME UKRAINE: INTEGRATING GAMIFICATION IN FILMMAKING EDUCATION THROUGH INTERACTIVE STORYTELLING

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The integration of gamification in education is reshaping how students engage with learning materials, particularly in creative disciplines such as filmmaking and multimedia production. Traditional film education often relies on passive learning, where students primarily analyze theoretical concepts without fully engaging in practical application. However, with advancements in interactive media, new educational approaches are emerging, emphasizing experiential learning and digital interactivity. One such approach is CineGame Ukraine, an educational virtual game designed to enhance students' understanding of cinematic storytelling, storyboarding techniques, and media production workflows through interactive, game-based methodologies.

CineGame Ukraine provides an immersive environment where students actively experiment with visual storytelling, shot composition, and narrative development. By engaging with gamified challenges and hands-on digital exercises, learners can explore the principles of audiovisual storytelling in an interactive way. The incorporation of multimedia elements, including video, audio, animation, and textual content, enhances their ability to structure and sequence visual narratives effectively. This method fosters problem-solving, creative decision-making, and collaborative teamwork – key competencies for future professionals in media production, publishing, and multimedia industries.

The development of CineGame Ukraine is grounded in cognitive learning theories, media studies, and UX/UI design principles, ensuring that the educational experience remains both engaging and pedagogically effective. Its adaptability allows it to be implemented across various educational contexts, from higher education to vocational training and professional development programs in creative industries. Initial pilot implementations indicate that students who engage with CineGame Ukraine demonstrate improved critical thinking, increased motivation, and a deeper understanding of visual storytelling techniques.

Beyond its direct application in filmmaking education, CineGame Ukraine also highlights broader possibilities for gamification in digital

publishing and multimedia content creation. The interactive storytelling approach embedded within the platform offers valuable insights into how serious games and digital narratives can enhance user engagement in digital books, online magazines, and immersive educational platforms. The integration of game mechanics in content creation may lead to innovative methods for designing and distributing multimedia materials in both academic and professional settings.

By examining the potential of CineGame Ukraine as an innovative teaching tool, this research contributes to the ongoing transformation of audiovisual education and digital media production. The findings presented in this study will offer valuable insights into how gamified storytelling can be leveraged to bridge the gap between traditional cinematic techniques and emerging digital learning technologies. Furthermore, it will explore potential interdisciplinary collaborations, technological advancements, and future applications of interactive storytelling in the evolving landscape of multimedia education.

Keywords: Gamification in Education, Interactive Storytelling, Digital Media and Filmmaking, Multimedia Learning Technologies, Storyboarding and Visual Narratives

AI'S ROLE IN SHAPING 3D MODELS AND VIDEO PRODUCTION

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Relevance and aim of the research: In the ever-evolving world of multimedia, artificial intelligence has opened up innovative avenues for creativity and efficiency. With the help of artificial intelligence, it is possible not only to perform information searches, but also to generate artistic images, create three-dimensional models, image animation and even generate videos. These tools significantly increase the speed of work and help to make the necessary decisions faster and achieve the desired result. The purpose of this study was to analyse the capabilities of different image and video generation tools and apply them in the implementation of projects.

Methodology: During this work, analytical and practical-experimental research methods were used. For image and video generation, such programs as Adobe Firefly Video (beta), ComfyUI, Rodin Gen-1.5 V1.0 were applied.

Results: Adobe Firefly Video (beta) is an innovative generative AI tool designed to revolutionise video creation. It enables projects to effortlessly generate high-quality video content by transforming text prompts or images into videos with customisable styles and camera angles. The tool is a part of Adobe's Firefly suite, which seamlessly integrates with Adobe Creative Cloud apps. ComfyUI is an intuitive node-based interface that allows users to create 3D models from simple text prompts or input images. This process simplifies traditional workflows and allows creators to transform ideas into detailed 3D objects without requiring extensive technical knowledge. With Rodin Gen-1.5 V1.0, we aimed to transform the content creation process. By integrating this tool into our workflow, it was possible to create intricate 3D models for animation, gaming, and virtual reality projects with incredible speed and accuracy. Its ability to customise parameters such as polygon counts and textures allowed it to meet a variety of customer requirements while maintaining creative flexibility.

Conclusions & practical implications: The analysis of the possibilities of artificial intelligence tools conducted during the study showed that the use of AI tools can help to achieve the desired goal significantly faster and obtain original results. During this study, the 3D images and video files were generated, analysed and applied for the projects. AI application not only

increased work productivity, but also ensured exceptional results for clients, distinguishing the company Tikras vaizdas in the competitive multimedia industry.

Keywords: artificial intelligence, image generation, 3D models, video creation.

IMPLEMENTING THE TOOLS OF THE PRODUCT DESIGN METHODOLOGY: CASE STUDY OF DESK LAMP

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Relevance and aim of the research: The product design process is used to develop new innovative products or to improve existing ones. The category of space decoration covers items that are mainly designed mainly based on aesthetics and thus help users to enjoy an easier and more efficient lifestyle. Desk lamps are designed for either functional or aesthetic aspects. A large part of their use is in the workplace and they aim to increase productivity. The goal of this work was to design a prototype of the desk lamp.

Methodology: The present paper aims to combine both the functional and aesthetic characteristics in the design of a desk lamp. In order to achieve this goal, a number of methodological and technological tools have been implemented in the development of the product itself i.e. mind-map, sketches, colour selection process, a 3D Computer-Aided Design (CAD) modeling and assemble, a high-quality rendering tool, and prototyping.

Results: A step-to-step approach was taken, starting with a search for similar works published, developing the design concept from the scratch and finishing a prototype using 3D printing technology available. The developed prototype provided a solid basis for an early evaluation of the users' perception of the designed product.

Conclusions & practical implications: In this work, the 3D Computer-Aided Design (CAD) has been used to achieve the aim of this study. Combining functionality and aesthetics, a design concept has been developed and finally a 3D printing prototype has been produced.

Keywords: design thinking, design product, CAD, prototyping.

EFFECTIVE TESTING OF WEBSITE'S NAVIGATION

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Relevance and aim of the research: Navigation is an important part of the user experience (UX) while moving through a digital interface. Having a good navigation system on a website or mobile app allows users to find information quickly and easily. The aim of this research is to study the combination of usability and functional testing methods for effective evaluation of the web products' navigation in use.

Methodology: In order to identify the most critical navigation errors on websites or mobile applications, it is recommended to use a combined approach that includes usability testing and some functional testing methods. Initially, it is necessary to identify the most critical navigation functions of the website. It is recommended to conduct testing on different types of devices to identify responsivity issues. Heuristic usability testing allows to perform a quick analysis of the issues in interface, by having 5–7 experts that develop a separate set of Nielsen's heuristics for the navigation function. Those questions are covered by a set of survey questions and then are added to a Google Form. Task based usability testing allows to get valuable insights from users and development team. A set of tasks and related questions are created to evaluate the convenience of navigation for users. To obtain accurate results, it is necessary to gather a sufficient number of participants to ensure a representative sample. Functional testing allows to identify issues with dynamic website content and not working paths during navigation. Test techniques such as state transition testing, positive and negative testing, and scenario testing should be used in order to find such issues. Then a test suit is created in table form. The results of the surveys and functional testing are analyzed and then priorities are assigned to the issues found.

Results: The developed testing methodology has been successfully applied for testing of education and e-commerce websites. For simple websites, where minor changes in design are expected it will be effective to apply heuristic testing and AI heatmap analysis, which identify critical defects in usability and website's design. Task-based usability testing should be conducted for websites of medium complexity, where significant changes in design are planned. Combination of heuristic testing and functional testing will allow to check quickly main usability scenarios and find critical integration defects between interface, API, and services. It is better to apply

for websites of medium and high complexity, when changes in design and server-side of the website are expected.

Conclusions & practical implications: The proposed testing approach allows to identify critical navigation issues on the website from both usability and functionality perspectives. Additionally, this approach ensures effective testing of the website in use, depending on its complexity and the availability of resources for testing. The test results provide valuable recommendations for improving the website's usability and quality.

Keywords: usability, UX, heuristics, functional testing, heatmaps, website

DEVELOPMENT OF A MODIFIED TECHNOLOGY FOR FOUR-COLOUR FLEXOGRAPHIC PRINTING ON NAPKINS

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Relevance and aim of the research: Specialised printing machines using flexographic printing technology are usually used to print decorative napkins. Due to the specific properties of the printing substrate –tissue paper– the implementation of this technology is often results in the inability to obtain smooth tonal transitions in images between light and dark tones, which significantly compromises the quality of the print on napkins. The aim of the research was to assess the quality of flexographic printing on tissue paper using innovative screening and printing technology and to compare prints made using the innovative technology with prints printed using traditional screening technology.

Methodology: In order to improve the quality of the printing on napkins, a modified four-color flexographic printing technology was proposed, allowing smooth tonal transitions using hybrid SambaFlex screening for the separation of Cyan and Magenta colours in combination with differentiated ink transfer for individual parts of the image. The following parameters of print quality on napkin prints were tested: optical density, range of reproduced tones, print contrast, colour range, print transparency, and increase of raster tonal value.The test copies were printed on a nine-colour flexographic napkin printing machine, model Omega Plus 500/9 with a maximum roll width of 500 mm. As a printed material, the hygienic tissue paper was used as a substrate for the production of printed napkins. Two-ply and three-ply tissue paper was used. The fibre composition of the tissue paper was eucalyptus fibre (30 %) and pine fibre (70 %).

Results: To implement this modified technology, the image with the separation of Cyan and Magenta colours on printing plates was divided into two forms: one printing plate contains light tones (0-5%), while the other plate contains tones in the range above 5%, and each of the printing plates has its own ink transfer. A smaller amount of ink is applied to a form containing an image in the light tone range using an anilox cylinder with a capacity of approximately 5.3 cm^3/m^2, while a larger amount of ink is applied to a form

containing an image in the tone range above 5% using an anilox cylinder with a capacity of approximately 5.7 cm^3/m^2. Based on the conducted tests, it can be concluded that hybrid screening with the separation of the Cyan and Magenta image into two forms, one of which was characterized by lower ink loading and second by higher ink load, has led to an improvement in some of the quality parameters of the print such as the optical density, colour range, increase in the screening tonal value in light tones.

Conclusions & practical implications: The use of a modified flexographic printing process using the SambaFlex screen improved the following printing parameters: optical density of the prints, colour range, increase in the tonal raster value in the light tone range and tone reproduction range compared to the standard four-colour printing process using the AM screen. For the practical implementation of the proposed method of napkin production a prototype of a technological line was built based on the obtained European patent EP 2395740 A1, in which all processes take place in one production cycle and tests were carried out to assess the quality of printing. Research was carried out as part of the project of Zakład Poligraficzny POL-Mak Sp. z o.o. entitled «Development of an automated prototype integrating the flexographic and digital printing process in the area of decorative paper products», co-financed under the Polish project "Projekty B+R przedsiębiorstw", Poddziałanie 1.1.1 "Badania przemysłowe i prace rozwojowe realizowane przez przedsiębiorstwa".

Keywords: flexography, napkin, print quality, screening, tissue paper

DESIGN AND MANUFACTURE OF MULTI-SPORTS FLOORING

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Relevance and aim of the research: The subject of the design is a multi-sports flooring and its production, using LED technologies, LumiFlex and Multisport floors. The technical documentation for a real project in Dresden is presented. The development includes a specification of the sports facility and options for the layout of the floor of the sports ground.

Methodology: The methodology for constructing a MultiSport flooring involves a structured process that encompasses planning, financing, preparation, development, and post-construction operations.

Results: Once funding is secured, the project moves to the design and preparation phase. Architects and a project manager oversee the creation of architectural drawings and specifications. This is followed by procurement and contract negotiations, ensuring the project meets all technical and budgetary requirements. During construction, the project manager supervises progress, manages subcontractors, and ensures quality checks are in place. The flooring structure is then assembled and levelled, and electrical systems are installed according to the design. After construction, the project is tested for compliance with standards and readiness for operation. Finally, an operations and maintenance plan are developed to ensure long-term functionality, covering preventive maintenance, staffing, and energy efficiency. The goal is to ensure the facility remains safe, operational, and continuously improved, providing a high-quality sports environment for years to come.

Conclusions & practical implications: The construction of a Multi-Sport floor is a complex process requiring careful planning, expert involvement, and efficient resource management. Success depends on navigating key stages, from research and financing to installation and maintenance. Attention to detail and strict adherence to schedules ensure a modern, safe, and durable facility. Additionally, a well-developed maintenance plan guarantees long-term efficiency. Ultimately, the project's successful completion not only delivers a functional sports space but also promotes sports development and an active lifestyle within the community, making it a valuable and sustainable investment in public health and recreation.

Keywords: innovation, multi-sports flooring, technology.

DIGITAL TRANSFORMATION IN FINANCIAL AND MANAGEMENT ACCOUNTING: THE IMPORTANCE OF HIGHER EDUCATION

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Relevance and aim of the research: The rapid growth of information technologies, especially AI and digitalization, is reshaping accounting. This study examines AI's impact on accountants' roles and how higher education can contribute to skill development. A survey of 32 Lithuanian accountants was conducted and the results were analysed using t-tests, factorized boxplots, and regression analysis. The findings indicate a shift in the profession, highlighting the need for AI-related skills in cost allocation and transaction registration. Accountants demonstrate strong interest in learning AI tools. These insights suggest that higher education should provide more training in automation, data analysis, and AI to help accountants stay competitive in a digitalized industry.

Methodology: The study investigates the impact of AI on the accounting profession and accountants' interest in learning AI tools. A survey was conducted in Lithuania in 2024, with 32 professional accountants who had used accounting software for three years. The survey assessed shifts in the accounting profession due to AI (Index A) and accountants' willingness to learn AI applications (Index B). Responses were rated on a five-point Likert scale.

Results: The study's results indicate that accountants acknowledge a shift in their profession due to AI, but their interest in learning AI tools is even stronger. The average response for questions related to the impact of AI on the accounting profession (Index A) was 9.38, while interest in learning AI applications (Index B) scored higher at 10.75. The highest-rated question was about interest in AI training (3.75), while the lowest was about productivity risk without AI tools (3.03).

Conclusions & practical implications: This study examines AI's impact on accounting and how higher education can support skill development. The findings indicate a noticeable but relatively small shift in the profession due to AI, while interest in learning AI tools is significantly high. Private sector accountants show greater enthusiasm for AI training, particularly in transaction registration and performance analysis.

Keywords: accounting digitalization, artificial intelligence, accountant role, digitalization.

COMPERATIVE ANALYSIS OF THE QUALITY OF ACCURATE PRINTING USING ELECTROPHOTOGRAPHIC TECHNOLOGY

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Relevance and aim of the research. Among the various types of modern printed production, it is common to find images with fine graphic details, grids, micro-lines or micro-text. These may include printed special-purpose documents, letterheads, protected packaging, etc. These products can be printed using different printing methods, including one of the most prevalent digital printing methods, electrophotography. However, in the case of fine image micro-elements, such as 50 – 150 μm wide micro-lines or screen dots of the same diameter, the reproduction is not always stable, even in offset printing. Nevertheless, the processes of offset printing have long been standardised and image quality is ensured by compensating mechanisms to ensure both colour and micro-line reproduction accuracy.

Digital printing processes, including electrophotography, are difficult to standardise due to the diversity of the processes: each equipment manufacturer, such as Xerox or Canon, has its own patented technologies, and use different inks, mainly dry toners, in addition to liquid inks, such as in the ElectroInk HP Indigo printers. This, together with the use of alternative printing materials and ink curing technologies and modes, and different data preparation, leads to different results in the reproduction of the image of micro-elements. The accuracy of the reproduction of image micro-elements is not only important for the evaluation of special purpose accurate printing micro-images, but also has an impact on colour reproduction and colour management in terms of the screen micro-dots found in the image halftones.

Methodology. This study compares the accuracy of image micro-element reproduction using the original digital variable information scale. This scale contains individual and grouped micro-lines from 10 to 150 μm in width, in vertical, horizontal and at 45˚ angle, as well as 1 – 6 pt. micro-font. The samples were printed on different electrophotographic presses, a Xerox using dry toner and an HP Indigo using liquid ElectroInk inks. Different screening (lpi) and print resolution (dpi) settings were selected for printing. The prints printed on the different paper types with a variable image information scale were examined under a microscope to compare the accuracy of the reproduction of the micro-images.

Results. Measurements of the reproduction accuracy of monochrome micro-line images showed that the reproduction accuracy and stability of micro-line images printed on different digital electrophotographic presses varies and depends not only on the parameters of the printing system, screen dots, and resolution, but also on the printing material and the direction of the micro-image arrangement on the print. In all cases, the reproduction of micro-lines up to a width of 50 μ on electrophotographic prints can be considered unstable.

Conclusions & practical implications. Despite the limited range of reproduction of micro-lines and other micro-images, electrophotography can be applied effectively to prints with micro-images, such as thin monochrome micro-lines of 0.05 – 0.2, micro-fonts, screen dots and other image details forming micro-image systems of various codes or other uses on the print. The accuracy of the reproduction of the micro-image details is very important for the quality printing of micro-imaged products, and the results of this study can therefore be used for the selection of a specific printing system, following a prior assessment of the parameters of the micro-image to be printed, the orientation and positioning of the micro-image details on the print, etc. The results of the study can be used for future standardisation of digital printing.

Keywords: Electrophotography, digital printing, control wedge, micro-lines.

STUDY OF OPTIMAL CONDITIONS FOR THE PRODUCTION OF PAPER BARRIER PACKAGING BY THE FLEXOGRAPHIC PRINTING METHOD

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Relevance and aim of the research: Increasing environmental pollution from plastic packaging, especially multi-layer films that are difficult to recycle, necessitates the search for effective ecological alternatives. Simultaneously, modern packaging requirements include enhanced barrier properties to meet global logistics needs and long-term product storage. A promising solution is the creation of paper packaging with functional coatings, particularly barrier coatings and heat seal varnishes. The study aimed to determine the optimal technological conditions for creating such packaging using flexographic printing.

Methodology: The research was conducted on an Optima 2 flexographic printing press manufactured by Soma Engineering, using an additional IPU (Intelligent Printing Unit) section. Two types of paper with grammage of 70 g/m² and 80 g/m² from different suppliers were tested. A water-based heat seal varnish based on copolymer dispersion and a barrier primer were used to provide the paper with barrier and heat-sealing properties. The study included experiments with various combinations of functional varnishes, printing speeds (100–300 m/min), types of ink pumps, and forms of anilox roller cells. Parameters such as dry residue content, oil resistance, and heat-sealing strength at different temperature regimes and sealing conditions were evaluated.

Results: It was determined that the best results are achieved with the combined application of barrier varnish followed by heat seal varnish at a speed of 100 m/min. Measurements showed that paper with lower grammage (70 g/m²) and lower smoothness can accept more varnish during printing (2.8 g/m² vs 2.3 g/m² for barrier varnish and 5.9 g/m² vs 5.4 g/m² for heat seal varnish). The barrier varnish provided excellent oil resistance (5 points after 1 hour of exposure), which remained high (3 points) even after 24 hours of exposure. Heat sealing studies showed that optimal sealing is achieved at temperatures of 130–210 °C with a clamp width of 25 mm and a clamping time of 0.5 seconds.

Conclusions & practical implications: It was established that using an anilox roller cell produced with GTT technology and a peristaltic pump sig-

nificantly reduces foam formation and improves varnish transfer in the printing unit's ink system. It was determined that the quality of paper packaging sealing is significantly affected by the clamp width and sealing time, with an increase in both factors improving adhesion strength. The practical result of the research is the developed technology for creating environmentally friendly paper packaging with enhanced barrier properties against moisture and fats, which can also be effectively heat sealed. This approach allows for the replacement of multi-layer plastic packaging materials with ecological paper alternatives without losing functional properties.

Keywords: barrier coating, flexographic printing, paper packaging, varnish.

INNOVATIVE PROJECTS IN SOFTWARE ENGINEERING

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Relevance and aim of the research: This paper presents the innovations used in software engineering and the entry of design into it. Through its programmes and funds, the EU enables companies to develop their Research and Development departments and to use the financial resources to boost the economic competitiveness. The essence of innovations, types and stages of their development are presented. The need for the introduction of innovative technologies and their implementation in the industry is proven, which in turn leads to the search for loan capital and servicing of the investment made.

Methodology: Innovation is crucial for companies to stay competitive in today's market. Without it, businesses struggle to offer high-quality products or services. Small or start- up companies often face significant financial challenges in developing and implementing innovative projects. However, successful innovation can lead to new or improved products and services, enhancing profitability. Innovation refers to the process of creating, distributing, and applying new ideas to improve business efficiency. It involves scientific, technical, economic, and social changes, with an emphasis on quickly integrating innovations into practice. The process is influenced by the socio-economic environment, ensuring that innovation drives economic recovery.

Results: The results of implementing innovative projects show that innovation is essential for businesses to remain competitive and profitable. Small or start-up companies can leverage innovation to establish themselves in the market despite financial challenges. Successful innovation results in new or improved products and services, which help businesses meet consumer needs and generate economic profit. The innovation process involves the transformation of scientific knowledge into practical applications, and it is driven by market demands, technical, economic, and social changes. Different types of innovation projects can emerge, ranging from large-scale scientific advancements to the application of existing technologies in new fields. To assess the effectiveness of these projects, methods such as Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR), and Payback Period (PP) are employed.

Conclusions & practical implications: Innovation is essential for developing functional and practical projects. In software engineering, com-

panies strive to create innovative products that enhance user experience. Successful software innovations require significant investment and involve risks, but they also offer substantial rewards. When a software project is both innovative and functional, it generates high profitability, ensuring business growth and sustainability. Companies that invest in innovation can maintain their projects and continue developing new solutions.

Keywords: engineering project, innovation, software.

EFFECTIVENESS OF A SOCIAL MEDIA ADVERTISING OF A FOOTBALL CLUB

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Relevance and aim of the research: It is necessary to use modern advertising and effective brand promotion tools, such as social media to compete successfully. With algorithms it is possible to interact with specific groups, such as sports fans, members of football communities or residents of a particular region. This defines the relevance and aim of the work – to increase the effectiveness of FC Metalist brand through its social media promotion.

Methodology: A concept of promoting FC Metalist brand on the most relevant social media platforms has been developed and then promotional products for each platform have been created. Special focus has been paid to provision of relevant, interesting, and useful information on the social media pages. The design and content have been developed based on the interests of the target audience, ensuring better conversion rates. By placing ads on current platforms, there is an opportunity to reach a larger audience. When using the Analytic Hierarchy Process (AHP) method, the main types of social media advertising have been identified and the most optimal advertising formats for promoting the football club's brand have been determined, along with an evaluation of the advertising effectiveness.

Results: The advertising materials and brand book have been developed in accordance with the requirements formulated as a result of the research. The final stage was the development of conclusions and making recommendations for improving the promotion of FC Metalist on social media, as well as creating an advertising offer for potential sponsors and advertisers.

Conclusions & practical implications: The practical value of the research is in the development of a comprehensive online promotion strategy for FC Metalist that easy adapts for social media implementation. This includes creating advertising content for these platforms, evaluating its effectiveness and preparing proposals for collaboration with the club's sponsors. The effective use of social media will not only allow the football club to strengthen its brand but also build an active fan base, increasing their loyalty and engagement.

Keywords: digital marketing, social media, design, content, Instagram, Facebook, FC Metalist.

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