



Petr David, Hana Vránová (eds.)

ECONOMIC COMPETITIVENESS AND SUSTAINABILITY

26th International Conference

March 21st-22nd, 2024

Abstracts

- MENDELU
- Faculty
- of Business
- and Economics

**Mendel University in Brno
Faculty of Business and Economics**

**Petr David
Hana Vránová (eds.)**

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AND SUSTAINABILITY**

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**March 21st-22nd, 2024
Mendel University in Brno
Czech Republic**

International scientific conference Economic Competitiveness and Sustainability 2024 was organized by the Faculty of Business and Economics, Mendel University in Brno.

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Open-Source Compliance: A Tactical Approach

Ashish Bakshi^a, Andreas Kotulla^b, Oldřich Faldík^c
and Oldřich Trenz^d

Abstract

As open source becomes increasingly prevalent, understanding the intricacies of various license types, including permissive and copyleft licenses, becomes essential for developers and organizations alike (Tourani, Adams, & Serebrenik, 2017). This paper not only explores these license types but also examines the implications of copyright laws and Export Control Compliance (ECC) on open-source software. A significant portion of the paper is dedicated to evaluating key tools used in open-source compliance, such as SW360, FOSSology, OSS Review Toolkit (ORT), and Software Bill of Materials (SBOM).

Keywords

opensource compliance, sw360, fossology, ORT, SBOM

JEL Classification

L8, O3

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Performance Comparison of HTTP/3 Server Implementations

Jiří Balej^a and Tomáš Sochor^b

Abstract

The paper opens the question of comparison published open-source web-servers with support of HTTP/3. This is brand new protocol standardised in 2022 was developed with aim to speed up web communication and instead of TCP uses UDP with new QUIC protocol. There is summarized current state of HTTP protocols development and studies, where is compared performance of various HTTP versions. The aim of paper is to compare different open-source web server implementations with HTTP/3 support in laboratory. Five different scenarios were presented to test ordinary real-life situations. The results of all three servers with different content and HTTP/1.1 or HTTP/3 protocols are presented. Main result would be better performance of Caddy and nginx server in bad connection conditions, but without speed limit, large delay or loss the Open-LiteSpeed was fastest.

Keywords

HTTP/3, QUIC, Caddy, Nginx, OpenLiteSpeed, webserver

JEL Classification

L86, C88, O31

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Health Management in the Workplace – An Empirical Study on Health Risks

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Abstract

Technological change has reduced physical activities in the workplace. The activity level needs to be known to make recommendations for health-promoting behaviour. Therefore, the physical activities of 122 police officers were measured objectively using an accelerometer. For the comparison groups, 13 persons from the public service and 10 from the canteen kitchen could be recruited. The physical activities were measured over 14 days during duty hours. In addition, the number of kilocalories (kcal) consumed per hour and day due to the activities was determined. Police officers spent 91.3% of their time in sedentary or light activity. The measured values of the public servants are almost identical. In the category of light activity, police officers spend more time. They also consume more kcal per hour. There are highly significant differences in all variables between police officers and kitchen employees. During a working day in the canteen kitchen, kcal consumption is eight times higher than that of the police officers. Strong characteristics can be found in the vigorous activity categories. The difference is up to 14 times higher in the category of strenuous activity level. Low physical activities during working hours were found among police officers on guard duty. The activity times and intensity of police officers are predominantly similar to sedentary work. This state is interrupted by short, high-intensity activities. The results allow conclusions about the low guard and rotating duty activity level. Reviewing the measures to promote physical activities in the departments is recommended to prevent musculoskeletal and cardiovascular complaints.

Keywords

health management, health risks, technological change: choices and consequences

JEL Classification

I12 M12 O33

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Nature of Internal Communication among e-Workers, Case Study

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Abstract

Research background: COVID-19 caused a rapid shift to full-time remote work. Workforce productivity, engagement, and success are affected by how the company interacts with its workforce. Human-to-human connection without clear communication is impossible. Communication is essential for a stable, engaged company. Purpose of the article: the purpose of this study is to investigate real e-employees' perceptions of the flow of information in a remote work environment, their communication preferences, and their sense of community. Methods: a quantitative study (web-based survey) in a Greek multicultural company has been used. Authors tried to find answers to research questions: How do e-employees perceive internal communication methods in their organization? Which of the internal communication channels were used most effectively? Findings & Value added: Based on the created questionnaire, a total of 7 hypotheses were determined, all of which were statistically confirmed. Obtained data confirms the raising importance of internal communication, in times of crisis as employees considered as a homogenous. We can underline the sample based in Greece but located various European countries in a context of unprecedented crisis. English as predominant spoken language. Finally, this research only explores the role of internal communication in an organizational context (formal, casual, organized, or unplanned). The survey was conducted during pandemics and has some interesting implications for communication professionals and researchers in the field of internal communication. The present study examines internal communication in e-working settings. Previous studies have excluded the situation for e-employees. The results provide new insights into internal communication behaviour in e-work.

Keywords

internal communication, e-work, methods, channels, multiculturality

JEL Classification

D83, M12, M21, M54, J21

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Foreign Trade of Wine and Fresh Grapes in the Visegrad Countries

Katarína Bírová^a and Patrik Rovný^b

Abstract

The Visegrad countries, as countries of a single grouping that have pledged to help each other and to deepen their trade with each other. These are the countries of the Slovak Republic, the Czech Republic, Hungary and Poland. The main objective of the article is to identify the overall level of trade of the Visegrad countries in the commodity wine and fresh grapes concerning the World, the Visegrad countries as a whole and the individual countries of the Visegrad country. The analysis shall take into account the monetary clarification of trade volumes in millions of euros. The commodity structure is based on the international HS system. The main analysis is carried out through the basic indicators of turnover, trade balance and RCA (Revealed Comparative Advantage). Hungary has a comparative advantage in the wine trade at the World level but also within the Visegrad countries. The Slovak Republic has both comparative advantages and comparative disadvantages within the World and the Visegrad countries, but most of all with the Czech Republic and Poland. The Czech Republic showed comparative advantages only with Poland. Poland has no comparative advantages with any of the Visegrad countries.

Keywords

wine sector, Visegrad countries, foreign trade, export, import, comparative advantages, RCA

JEL Classification

Q170

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Convergence, Inequality and Inflation Synchronization

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Abstract

This paper studies the impact of real convergence in the EU countries on inflation synchronization between these countries and the Eurozone. We report three major results. First, higher relative GDP per capita in the EU countries leads to stronger inflation co-movement. Second, the impact of real convergence on the inflation synchronization is non-linear. Third, lower income inequality results in greater inflation interdependence. Our findings suggest that real convergence in the Eurozone will lead to stronger inflation synchronization and more effective common monetary policy in the long run. Our results underline the importance of catching up before adopting the euro.

Keywords

real convergence, inflation synchronization, monetary union, income inequality, panel data regression

JEL Classification

C23, E31, E32, E42, O15, O47

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Regional Favouritism: Testing the Hungarian Manufacturing Firms

Vivien Czezelai^a, Jarko Fidrmuc^b and Gábor Kutasi^c

Abstract

The literature of political economy argue the existence of favouritism connected to public expenditures. The phenomenon can be the companion public tenders and procurement announced for firms. The micro-funded corporate database can be extended with political indicator related to the registered location of the firms, thus, the assumption on favouritism can be traced. The study is based on the multi-year financial reports of almost eight thousand Hungarian manufacturing firms and the results of political elections relate to local governments. The methodology is a regression analysis applying the probit model. The results are robust in the sense that, albeit minimally, the political orientation of the given settlement has a positive influence on access to subsidies. The data shows the effect of the election cycle, i.e. easier access to subsidies before the elections, and then the opposite. These basic relationships remain valid even if the models are expanded with variables describing additional company characteristics. There is also a rural preference over the capital city.

Keywords

favouritism, Hungary, probit model, manufacturing, subsidy

JEL Classification

C33, D22, G30, H25, H57

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Swarm PPO: Multi-Agent Optimal Control

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Abstract

This study presents a Multi-Agent Graph Attention System (MAGAS) for asset pricing in financial markets, expanding our previous work on Graph Attention Neural Networks (GATs) in a single-agent context to a complex multi-agent environment. MAGAS employs Proximal Policy Optimization (PPO) to train agents in making informed decisions on stock transactions, leveraging, and market exposure utilizing multiple heads in an actor network. This methodology surpasses traditional models by incorporating strategic elements like long and short positions, and by optimizing investment strategies through an understanding of the interconnections in financial markets. The integration of advanced neural networks and graph-structured data, with a multi-agent framework, is poised to enhance the model robustness and decision-making capabilities across various market scenarios. This paper's primary contribution is the application of multi-agent systems and graph attention networks in asset pricing utilizing PPO. We discuss the theoretical basis, architecture and empirical assessment of MAGAS for advanced asset pricing and informed decision-making.

Keywords

multi-agent, graph attention networks, asset pricing

JEL Classification

C380, C880, C890

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The Usability of Algorithms from Graph Theory in the Field of Multicriteria Analysis

Radim Farana^a

Abstract

The main ideas, on how to use algorithms from the Graph Theory to improve the process of Multicriteria Analysis have been presented in the paper Farana (2016). This paper presents practical results obtained by the use of these algorithms in practical decision-making procedures when multicriteria analysis has been used. Graph algorithms were used in two situations when determining the values of the weights of decision criteria. First was the checking, if the Fuller's triangle, filled in by an expert, is filled in correctly. The second application was the elimination of the overdetermination of the assessment in Saaty's method. A spanning tree describing dependencies between criteria has been used according to the algorithm in Farana (2016). Obtained results were compared with the full Saaty's matrix when the number of compared pairs of criteria is $k - 1$ for k criteria, compared to the number of $k(k - 1)/2$ in the classic Saaty's method. The paper presents the differences between the assessment given directly by experts and the assessment obtained using the spanning tree and shows that the described method is applicable in practice. The experience of experts using the proposed procedure, obtained through a guided interview, was mostly positive.

FARANA, R. Using graphs in multi-criteria analysis tasks (in Czech). In: XLI. Seminar ASR 2016 "Instruments and Control". Ostrava: VŠB-TU Ostrava, 22. 4. 2016, pp. 47–53. ISBN 978-80-248-3910-3. Available on the Internet: <http://akce.fs.vsb.cz/2016/asr2016/Sbornik-ASR2016.pdf>

Keywords

decision making, multicriteria analysis, graph theory, Fuller triangle, Saaty's method, acyclic graph, spanning tree

JEL Classification

D81

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Secure Access to IoT Devices Using Blockchain

Andrej Gono^a

Abstract

Smart IoT devices, such as lights, locks, washing machines, security cameras, etc., are becoming omnipresent in households and companies across all industries. However, most of these devices communicate over non-secure local protocols or via cloud services where security policies are not transparent. Vulnerabilities may lead to unauthorized access to such IoT devices. Blockchain is a technology that brings security by design and can be exploited also in the area of controlling access to IoT devices. This paper describes methodology how to combine existing technologies and build a smart door lock security layer that is decentralized and secure by design.

Keywords

blockchain, IoT, access control, smart home, ethereum, solidity, smart contracts

JEL Classification

C88

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Different Insight into the VAT Gap Using MIMIC Model

Iva Hasíková^a

Abstract

The paper focuses on the estimation of the MIMIC model for quantification of VAT gap. MIMIC model is a specific type of structural equation models, which treats the VAT gap as a latent unmeasurable variable whose emergence and size are influenced by causes and whose presence is reflected in indicators causes and indicators must be measurable. The contribution of this model is identification of causes of VAT gap, that are potential sources of VAT collection inefficiencies. The MIMIC model was built on data from selected European countries and according to the model VAT gap has these significant causes: openness of economy, corruption perception index, general government expenditure, final consumption and e-government development index. In this paper estimated MIMIC model was applied to the Czech Republic for estimation of VAT gap, such a method has not been used in the Czech Republic so far, so it provides a different perspective on VAT gap, its extent and causes. The MIMIC model was used to quantify the VAT gap for the period 2003–2020 and over this period the VAT gap fluctuated between 27% and 35% of total tax liability. However, the results show that since 2016, the VAT gap has been stable at 31%. These outputs can support the recommendations leading to improved efficiency of VAT collection in the Czech Republic.

Keywords

VAT gap, determinants of VAT gap, efficiency of VAT collection, MIMIC model, structural equation model

JEL Classification

C39, C51, H26

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Influence of Product Price on Consumer Perceptions of the Authenticity of Sustainability Labels

Julian Hoesen^a

Abstract

In terms of sustainability, there is a correlation between sustainability and health as well as price and value. Consumers consider sustainable products to be healthier and more valuable and therefore expect a higher price (Padilha et al., 2021; Rivera-Toapanta et al., 2022). The following analysis examines whether a higher price has a direct effect on perceived authenticity. In this study, an implicit association test involving 241 participants from German speaking market is conducted to assess the effects of price on perceived authenticity. The German-speaking market refers to the combined consumer and economic space encompassing Germany, Austria, and Switzerland, where German is the primary language of commerce. This region constitutes a significant economic force in Europe, characterized by a highly developed industrial base, advanced technological infrastructure, and a discerning consumer base. Companies operating in the German-speaking market benefit from a shared language and cultural similarities, enabling them to navigate a cohesive market environment. The uniqueness of this approach lies in measuring implicit attitudes by excluding self-image projection and gauging immediate reactions, thereby reflecting heuristic behaviors during purchase decisions. The study yields a noteworthy outcome, indicating an enhancement in trust regarding sustainability attributes solely through the price. The results allow for the delineation of the price on perceived authenticity, with perceived authenticity serving as a proxy for purchase intent. These findings can be strategically leveraged to reinforce the perceived authenticity of sustainable products, thereby positively influencing consumer decisions in favor of such products.

Keywords

sustainability, labelling, communication

JEL Classification

M14

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Smart Occupancy Detector for Model Railroad

Jan Horáček^a and Jiří Rybička^b

Abstract

For control of a model railway, simple track occupancy detectors are in use to detect the presence and absence of a vehicle on the track. However, these detectors do not use the full potential of a digital command control (DCC) system. A RailCom technology allows information to be obtained from the vehicle's DCC decoder, thus the detector can receive operationally important data from the rolling stock vehicle.

The subject of the paper is the description of requirements and design of our own RailCom detector MTB-RC, which presents an alternative to commercially available products. MTB-RC is an open-source and open-hardware project, which is also compatible with the rest of the trackside hardware used in the Track Vehicle Control Laboratory FBE MENDELU. MTB-RC can read the addresses of the DCC decoders present on the track and transmit them to the railway control software via MTBbus.

Keywords

railroad, model, interlocking, RailCom, occupancy detector, Digital Command Control, DCC, economic sustainability

JEL Classification

L920

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Soil Erosion Costs and Benefits of Conservation Grassland: the Case of the Czech Republic

Ivo Horák^a, Marek Litzman^b and Petr Marada^c

Abstract

Soil erosion is an ever-present negative externality that has yet to find its solid legislative and economic solution. For this solution, there must be thorough debate among the farmers, public authorities, and academic sector. Authors present here the main threats that are known in order the battle effectively soil erosion. The main issues highlighted are the short duration of subsidies, the undervaluation of ecosystem services, and the failure to adequately compensate farmers for the opportunity cost of implementing conservation measures. With a support period of only 5 years for conservation grassland, the long-term sustainability of soil protection measures is questioned. If farmers find it economically unfavorable to maintain conservation grassland after this period, they may revert to conventional practices, nullifying previous conservation efforts. There's a need to explore alternatives ensuring long-term soil erosion protection beyond short-term projects. Legislative measures could designate eroded land for conservation, but this requires compensation to motivate farmers adequately. The proposal includes establishing a Special Soil Fund (SSF) to financially support farmers in implementing and maintaining conservation measures. Once approved by the SSF, the protected area will be secured against withdrawal, ensuring consistent support despite policy changes, thus encouraging farmers to prioritize erosion-prone land conservation.

Keywords

erosion sustainability public policy opportunity cost ecosystem services

JEL Classification

Q57, Q58, Q51, Q19

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Financial Development and Renewable Energy Adoption in EU and ASEAN Countries

Florian Horiky^a and Jarko Fidrmuc^b

Abstract

The shift from carbon-based to green energy is pivotal in addressing climate change. However, this transition is expensive and the availability of financing sources is a necessary precondition for the green transformation of the economy. We therefore, examine the role of financial institutions and capital markets in facilitating this change, focusing on a heterogeneous sample of 32 EU and ASEAN countries covering the years 2000 to 2020. Our findings reveal a persistent preference by financial institutions and banks for carbon-intensive energy production, negatively impacting renewable energy consumption. Contrarily, developed capital markets demonstrate a positive influence on green energy initiatives, especially pronounced in EU countries. The results highlight a dichotomy in financial support for green energy transition. While traditional financial institutions lag in supporting renewable energy, developed capital markets show a positive effect for green energy production. Concluding, we advocate for an increasing financialization of renewable energy markets and enhanced regulatory support for banks and financial institutions in supporting renewable energy business models.

Keywords

energy transition, green transformation, renewables, financial institutions, capital markets, climate change, SDG

JEL Classification

G1, G2, O1, Q4

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Public Authorities and Risk Management – An Empirical Study on Risk Management by the Police

Torsten Huschbeck^a, Lothar Huschbeck^b and Jürgen Weltermann^c

Abstract

Risk Management (RM) is a continuous, systematic process for dealing with risks. Risk analysis and assessment play a decisive role in evaluating the identified risks and the consequences of action and dealing with them appropriately. Overall, RM in policing is a complex issue that requires careful planning and cooperation to ensure the safety of citizens. Interdisciplinary, this article analyses which economically oriented methods and approaches to RM may be found in the police, often disconnected from economic knowledge. In addition, the financial question of how far management expertise is currently embedded in the police and incorporated into their decision-making processes is addressed. In this context, the current scientific status is clarified by systematic and theory-guided analysis of the existing literature sources. The aim is to obtain a broad view of the current literature sources on RM in the police. Ultimately, the present article not only aims to point out the risks of a lack of or inadequate RM, but it will also argue for implementing a comprehensive, structured and opportunity-opening RM in the police. The authors conclude that RM still needs to be fully entrenched in the police force, but it is on the rise, according to their research. Finally, the scientific analysis also addresses the question of the extent to which RM has been developed and anchored in the police force to counteract risks successfully.

Keywords

public authorities, risk management, police

JEL Classification

L20, L89, M19

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Use of Annotated Image Data for Fruit Diversity Analysis

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Abstract

This scientific paper deals with the development and analysis of an annotated image dataset for the detection and classification of plants and fruits, aimed at supporting automation in agriculture. The work includes the collection of large image data, their annotation and classification, with the aim of creating a universally accessible dataset for the scientific community. The dataset is designed to be compatible with common hardware equipment and to support research and development in the field of automated plant identification and plant disease diagnostics. This approach has the potential to significantly improve the efficiency of cultivation processes and support the implementation of advanced technologies in the agricultural sector, along with the automation of this sector.

Keywords

image analysis, plant classification, dataset, learning, annotation, image data

JEL Classification

Q16, C55, C88

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Adaptive Datacenter Monitoring Based on the LoRaWAN Network Infrastructure

Andrej Juríčka^a and Jiří Balej^b

Abstract

High availability and quick response to abnormal situations are the key aspects for a reliable datacenter. Cooperation between physical environment monitoring and high-level cluster / container orchestration could increase the overall durability of the entire system. This paper describes the proposal of an entry-level monitoring system based on the LoRaWAN network infrastructure from a physical point of view to the application point of view. All components are open to use, without any additional license cost. Compared to typical monitoring applications, the cost-effective and main advantage lies in the interconnection solution for a large datacenter environment. The entire system consists of well-known technologies and applications interconnected via reliable protocols, with the addition of environment-specific rulesets. Based on these preferences, the management of systems such as virtualization or container orchestration systems can be more flawless and energy efficient.

Keywords

datacenter monitoring, LoRaWAN, MQTT, IoT, Prometheus Alertmanager

JEL Classification

C88, L63, L86, L96

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The Contribution of the Creative Industries to the Economic Growth

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Abstract

The creative industries belong among the most dynamic sectors of the world economy and represent the fundamental foundation stone of modern economies. These industries are characterized by a highly skilled workforce and the relative size of the creative industries is a significant factor in achieving economic growth and prosperity on regional as well as national level. The main goal of the contribution is to assess the effect of the creative industries' size on economic growth within the NUTS3 regions of the Visegrad Four countries, namely Czechia, Slovakia, Hungary, and Poland. The size of the creative industries in individual regions is estimated as the share of value added in these industries to the total value added across all sectors. The findings show an overall increase in the average size of the creative industries during the observed period from 2011 to 2019. Finally, the study estimates a positive impact of the creative industries' size on the economic growth of regions within the V4 countries suggesting a potential economic benefit associated with the growth and development of the creative sectors in these countries.

Keywords

creativity, creative industries, Visegrad Four countries, NUTS 3 regions, value added, economic growth

JEL Classification

R11, O18

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Modernizing Business Processes via Open-Source Integration

Katarína Kovalčíková^a, Zuzana Špendel^b and Ivana Rábová^c

Abstract

This study explores the role of process modeling within Business Process Management (BPM), focusing on optimizing and adapting business processes to an organization's needs. Central to BPM is the management of changes through process reengineering (BPR) projects that involve formalizing and optimizing business processes. These projects are influenced by factors such as corporate culture and management, and they require a systematic methodology for resolving and documenting processes effectively. The research employs a five-step BPM methodology (Design, Modeling, Implementation, Monitoring, Simulation) to examine potential problems and limitations of implementing the AFPA framework, a new technology for process optimization. The study emphasizes the importance of process reengineering for management improvement and identifies risks such as prolonged project timelines and inadequate solution details. Using the AFPA framework, a prototype workflow was developed and implemented in a government office. The framework supports operations like detecting personal information in registers, creating email notifications, and storing data in a relational database. Additionally, it allows processes to be driven by both internal and external events, providing a flexible and configurable system through REST APIs and microservices. The research also highlights the importance of aligning business processes with strategic goals, documenting organizational changes, and creating a unified documentation approach. Ultimately, the AFPA framework is shown to enable better process management, unification of documentation, and integration of new employees into organizational structures.

Keywords

workflow, AFPA, open-source technologies, Camunda, business process management, prototypes

JEL Classification

O32, Q55

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Democratic Governance in Action: Exploring the Influence of Participatory Budgeting on Voter Engagement across Various Elections.

Soňa Kukučková^a, Marek Litzman^b and Eduard Bakoš^c

Abstract

This research explores the complex relationship between participatory budgeting (PB) and voter turnout in local, regional, and parliamentary elections. The study examines whether the implementation of participatory budgeting initiatives affects citizens' involvement in subsequent elections. Based on a hand-picked dataset including data on participatory budgeting in the Czech Republic and voter turnout from the Czech Statistical Office, an ordinary least squares (OLS) regression analysis is used to estimate the impact of participatory budgeting on voter turnout in different types of elections. Our findings reveal a significant effect of participatory budgeting on turnout in local elections, suggesting that a round of participatory budgeting conducted in the year preceding local and regional elections leads to a considerable increase in turnout, by an estimated 3–4 percentage points. This effect persists even when accounting for various factors such as the unemployment rate, population density, share of the elderly population, and education level. Conversely, the impact of participatory budgeting on parliamentary elections appears marginal, with no measurable effect on voter turnout observed. While participatory budgeting proves to be a powerful tool for local democracy, the effectiveness may vary across different types of elections.

Keywords

participatory budgeting, civic engagement, voter turnout, elections

JEL Classification

H11, H76, H77

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Measuring the Dominance of Public Goods

Thomas Laudal^a

Abstract

When product innovations or new technologies lead to greater number of goods being offered to the market, or a need for less resources in order to produce a good, we see a decline in prices – all other things being equal. If the price falls below a certain level, it may no longer accurately reflect the demand since most market actors can afford the good without making significant sacrifices. Such a good will typically no longer be excludable or rivalrous given that goods with a negligible price tend to be plentiful and widely available. Thus, they have features associated with public goods. When the public/private category is determined by innovations and new technology in this way, the qualification of a ‘public good’ relies on how the good is provided, not only on the good itself, in line with Laudal (2020). It is shown that different goods have different trajectories through four public good categories. It is then analysed how these trajectories vary between industries and sectors and how they influence the green shift, incentives for innovation, and redistribution policies. The role of corporate strategies and public policies is also considered. The public good trajectories over the last century of products and services included in the UN’s COICOP classification system, are identified by applying eight public good criteria grounded in the literature. This new approach contributes to a better understanding of the drivers of public good trajectories and how public goods impact our economy.

Keywords

public goods, product innovations, excludable, rivalrous, green shift

JEL Classification

O300

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Influence of Project Frequency and Organization of Resources on Project Performance

Luca Leib^a

Abstract

Project management performance is highly dependent on the organization and the availability of its resources, as well as the frequency with which projects are initiated. Project work follows company and market-specific requirements and therefore cannot be generalized. This paper analyzes the influence of parameters related to the frequency of project triggers and resource characteristics. For this purpose, tasks are organized in a design structure matrix based on an exemplary product development team. Various factors that influence project performance, such as project lead time, capacity utilization or efficiency, are investigated with the use of a design of experiments, and the correlations and interactions are evaluated with regard to project performance.

Keywords

DSM, project management, product development, team organization, VUCA

JEL Classification

M10, L21, C88

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Do Trusting People Vote for Green Parties? Evidence from the European Regions

Michal Mádr^a and Luděk Kouba^b

Abstract

Through the four decades of globalized, post-industrial economy, the European societies have rapidly changed. As a consequence, political scientists have identified new cleavages with a greater emphasis on social, cultural and environmental matters. And in such a “postmaterialist” society, the importance of social capital and trust grows. The paper explores the impact of social capital and trust on the electoral support of Green parties across European states and regions. As the dependent variable, we employ the data on the regional electoral support of 41 European Green parties, that achieved at least 1% of votes in at least one parliamentary election in the period of 2002–2022. As the main explanatory variable, we employ the concept of social capital being expressed by both aggregate and individual indicators of trust, which are based on questions from the European Social Survey (ESS) database. Besides the standard concepts of social and institutional trust, with regard to the assumed attitudes of Green voters, we construct own variable of international trust, which innovatively covers the pro-European and cosmopolitan attitudes. The estimations confirm the hypothesis that higher levels of social capital have positive effects on the electoral results of Green parties, with higher, statistically significant impacts of social trust and international trust. Regarding the attitudinal issues, Green parties perform better in regions where citizens are satisfied with democratic system and tolerant to gays and lesbians both these effects are amplified by high levels of social trust.

Keywords

social capital, trust, Green parties, electoral geography, NUTS 2 regions

JEL Classification

D72, P48, Z13

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Guns or Butter: Cluster Analysis of EU Welfare Effects Caused by the Russian-Ukrainian War

Adam Marton^a and Gábor Kutasi^b

Abstract

The geopolitical situation caused by the Russian-Ukrainian war has reshaped the budgetary priorities across European Union countries over the past decade. Economic policy is related to making a choice between various uses of public money. Because government's resources are limited, budgetary trade-offs are bound to happen among different fiscal policy areas. One well-known illustration of the opportunity costs theory is the trade-off between guns and butter. The trade-off between military and social spending is not only a theoretical concept, but also a practical challenge for policymakers. We examine European Union member states based on a cluster analyses. The clustering variables are the defence expenditures, the public debt and the tax wedge as the measures of room for policy opportunities to counterweight the trade-off, the GINI coefficient to include the need for social spending, and the distance from Russia as an indicator of level of war threat. In this context, our research aims to examine the impact of military spending on social spending, particularly healthcare and education, in European economies that were once part of the Soviet Union and are now located close to war zone.

Keywords

cluster analysis, welfare effect, budgetary trade-off, fiscal policy

JEL Classification

C38, E62, H12, H50

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Influences of CSR/Sustainability Management on the Development of ISO Certifications of Management System Standards

Kay Mattern^a

Abstract

The growing importance of environmental, social and corporate sustainability issues has also led to increased pressure on companies to act in recent years. Important stakeholder groups expect companies and management to align their strategies and business processes with recognized sustainability standards and to provide transparent and objective information about their achievements (Gallear et al, 2012). The specific interests and expectations of politicians and the public, capital providers and investors, employees, customers and suppliers may vary, but ultimately all stake-holders, both internal and external, are confronted with or directly affected by corporate sustainability issues. The analysis and evaluation of corresponding expectations and requirements and their implementation has developed into a central management task in many companies, which can hardly be fulfilled without a systematic approach and corresponding management concepts. The growing importance of corporate sustainability management should also be reflected in the spread of internationally recognized management standards. On the basis of this thesis, this paper analyzes the development of certifications of management systems according to international management system standards (MSS) for environmental and energy management, occupational health and safety, IT and data security and anti-corruption systems in the period from 2018 to 2022, based on existing data from the ISO (International Organization of Standardization). A multi-layered analysis of the data using descriptive statistics is used to evaluate regional or industry-related differences and dependencies. The result, the significant spread of management standards on central sustainability topics, is clear and yet must be viewed in a differentiated manner with corresponding limitations.

Keywords

sustainability management automotive industry, integrated management systems, supply chain care, standardisation of sustainability requirements, sustainability standards

JEL Classification

L15, F64, Q56

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Construction of a New DEA-based Circular Economy Index

Markéta Matulová^a

Abstract

In recent years, there has been growing interest in exploring the concept of the circular economy as a potential solution for enhancing the sustainability of our economic system. The development of circular economy indicators provides valuable insights allowing the evaluation of the progress on the path to circularity and sustainability. On the other hand, composite indicators often stir controversies about the unavoidable subjectivity that is connected with their construction. Usually, the normalized sub-indicators are just added, sometimes with certain weights associated with the sub-indicators. We will depart from that approach using flexible weights obtained by Data Envelopment Analysis. Using flexible weighting can promote buy-in from relevant stakeholders, making the final results more widely accepted. Additionally, DEA-based indicator provides more information on the relative performance of evaluated units, and offers implications such as identifying target values of sub-indicators or selecting peer units for benchmarking purposes.

Keywords

circularity, composite index, data envelopment analysis

JEL Classification

Q51, Q56, Q60

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3D Geospatial Data Visualization in VR

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and Michael Varga^e

Abstract

The use of Virtual Reality (VR) to visualize data is increasingly common in various fields, from medical science to education. However, visualisation of geospatial data in VR is still not handled well. GIS data comes in various formats, and converting them to 3D can be challenging. The choice of a format capable of streaming large amounts of spatial data in the VR scene is crucial. However, the challenge lies in ensuring the reusability of the presented scenes with different data. Most applications are designed for a single use case and do not allow for simple interchangeability of presented data. This article proposes a reusable architecture of a general-purpose web service for processing and visualizing spatial data in VR using 3D Tiles as the chosen format. The critical aspect is the conversion of standard GIS format to 3D Tiles. We test and compare several conversion tools on publicly available point and polygon layers, choose which to use and how it could be extended for our use case.

Keywords

virtual reality, spatial data, 3D Tiles, data conversion

JEL Classification

L63, L86

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Artificial Intelligence in Georgia: Emerging challenges and opportunities

Nadia Mtchedlidze^a

Abstract

Artificial intelligence (AI) is a hotly debated topic and interest towards it is growing rapidly in the modern world. A series of studies evaluate AI effects on developed countries. Unfortunately, there is a limited body of literature available that investigate AI impact on the developing economies. For research purpose, Georgia has been selected. This article presents three-fold analysis. Firstly, a comprehensive literature review is conducted. In the second section, PESTLE analysis of AI usage in Georgia is presented. In the third section, hypotheses are tested and AI importance for different sectors and possible impact on economic growth is evaluated. Current research summarizes the opportunities and challenges for Georgia that might arise in the process of implementation AI technologies. Finally, relevant recommendations to enhance AI adoption in Georgia are proposed.

Keywords

artificial intelligence, developing economy, Georgia

JEL Classification

O33, O14, O10

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Behavioural Experiments in Public Sector

Mária Murray Svidroňová^a and Nikoleta Jakuš Muthová^b

Abstract

In this paper we present preliminary results of a research project aimed at mapping the preferences of young people in the areas of public sector such as housing, employment and commuting. To do so we employ methods of behavioural economics and experiments. First of all, we did a bibliometric analysis of studies dealing with behavioural experiments in the selected areas to reveal a gap for future research. We focused on a time period of 2010–2023. For mapping we used VosViewer and data from the Web of Science database. Results indicate that even there are some experiments done in the areas of housing, employment or commuting, there is no methodology based on behavioural economics to reveal the preferences of young people in these areas.

Keywords

behavioural economics, experimental research, preferences of young people, housing preferences, employment preferences, transportation preferences

JEL Classification

H41, C91, C93

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ESG Concept Implementation Based on the Polish Banking Sector Experience

Aleksandra Nocoń^a and Anna Pyka^b

Abstract

ESG (Environmental, Social, Governance) is one of the most noticeable concepts and trends of the 21st century. It is a strategic and long-term approach at various areas of the company's activities from the point of view of environmental protection, social responsibility and corporate governance. Its implementation is related to fulfillment of the needs to achieve sustainable development goals (SDG). The issue of including ESG factors in banking institutions' activities remains an important research area. Banks, like other business entities, are now obliged to adopt an open attitude to ESG aspects. That's why the main aim of the article is the exegesis of the ESG concept implementation in the Polish banking sector. The conducted theoretical and empirical studies became the basis for verifying the research hypothesis stating that the Polish banking sector is becoming more involved in the ESG concept implementation. The conducted research indicated that the studies including ESG concept implementation in the Polish banking sector are still marginal. Furthermore, banks has been involved in this process only for last few years so they still do not have a big experience in ESG concept realization. The identified research gap was the main motivation to undertake this topic and conduct the research in this paper.

Keywords

ESG, sustainable development, Polish banking sector, sustainable finance

JEL Classification

G21, G32

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Competitive Positioning of Agricultural Enterprises

Nataliia Parkhomenko^a

Abstract

The activation of globalization processes opens the access of agrarian business to world food markets. Taking into account the need to adapt to rapidly changing external markets, the justification of the system of strategic directions for the formation of competitiveness must meet the criteria of innovation, minimal riskiness, and maximum business efficiency, which allow increasing the competitive potential of agribusiness. The purpose of the research is to develop recommendations for formation and maintenance of competitiveness of agribusiness. System approach, economical and statistical method, correlation-regression and cluster analysis, expert and integral evaluation methods, matrix modelling methods used as research methods. The information base of research consisted of data from the Food and Agricultural Organization of the United Nations, the World Bank, official statistical materials, data from primary accounting documents and reports of agricultural enterprises, and the results of own research. As a result of research, the system of evaluation indicators of the agribusiness market situation determined procedure for forming the competitiveness of agrarian enterprises defined, which takes into account comprehensive diagnostics of competitiveness and analysis of external conditions of operation main problems that prevent the formation of competitive advantages for agribusiness entities identified competitive positioning tools for ensuring the competitiveness of agricultural enterprises proposed. This paper was supported by the project No. 09I03-03-V01-000145 funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia.

Keywords

positioning, agribusiness, competitiveness, competitive advantages, competitive potential

JEL Classification

L20, M11, Q13

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The Drop in Working Hours During the Pandemic in the Czech Republic and Austria

Tomáš Pavlíček^a

Abstract

I present a comparative analysis of the drop in working hours during the COVID-19 pandemic between Austria and Czechia. The analysis is mainly based on the Austrian “Austrian Corona Panel Project” and the Czech “Life during the pandemic” survey datasets. The descriptives and a regressions with the drop in working hours as a function of the restrictions and a set of individual characteristics are performed on the microdata for both countries separately. I show the connection between the restrictive policies and the drop in working hours and differentiated impact where the subgroup of the self-employed comes out as the most affected. The drop was less prominent in Austria. I explain The difference in employment structure as well as generally shorter pre-pandemic working hours in Austria and conclude recommendations for labour market crisis resilience.

Keywords

labor market, labor supply, crisis resilience, COVID-19

JEL Classification

J2, J4, J6

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Microcontrollers Suitable for Artificial Intelligence

Petr Pernes^a, Miroslav Jaroš^b, Jiří Podivín^c and Oldřich Trenz^d

Abstract

Artificial intelligence (AI) has become increasingly prevalent in various applications, from self-driving cars to facial recognition. However, the implementation of AI on resource-constrained devices such as microcontrollers has been a challenge due to the limited computational power and memory. In recent years, advances in AI technology and the development of specialized hardware have enabled the realization of AI on microcontrollers. This has opened up new opportunities for AI applications in domains such as embedded systems, Internet of Things (IoT), and wearable devices.

Keywords

embedded systems, internet of things (IoT), real-time processing, power consumption, hardware acceleration, machine learning, neural networks

JEL Classification

C45

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Purchasing Power Parity in the Euro Area: Time Series Evidence

Klára Plecítá^a

Abstract

This study evaluates the validity of Purchasing Power Parity (PPP) within the Euro Area (EA12) from 1999 to 2023 against three competitor groups: EA19, EU27, and IC42. Utilizing linear and non-linear unit root tests, and accounting for structural breaks, it presents a nuanced validation of PPP, with outcomes sensitive to competitor group, deflator choice, and PPP form. Results indicate stronger PPP support for EA12 than previously reported in the literature, although individual country outcomes vary. Significant structural breaks and non-linear adjustments highlight the complex dynamics of exchange rate behavior. The findings suggest PPP's inconsistent applicability across EA12, emphasizing the need for further investigation into exchange rate dynamics for informed economic policy. This research contributes to the understanding of PPP in the Euro Area, underscoring the heterogeneous nature of its applicability.

Keywords

PPP, euro area, unit roots

JEL Classification

F310

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On the Nature of the Economic Crisis – a View From Four Years Perspective from the COVID-19 Pandemic Announcement

Piotr Podsiadlo^a

Abstract

Theoretical background: The Covid-19 pandemic has undoubtedly triggered a global recession, the size of which, according to economists, was only surpassed by both world wars and the Great Depression. The occurrence of a global pandemic is projected to cause lasting socio-economic damage, contributing to a decline in economic activity and profitability. Purpose of the article: The purpose of the article is to retrospectively review the basic definitions of economic crisis, as well as its types. The article includes a detailed description of business cycles observed in free market economies, as well as presents the socio-economic crisis caused by the coronavirus pandemic. Research methods: The article was written based on economic literature, current articles and other academic sources, mainly in electronic form, specializing in macroeconomics, economic crises and also fiscal and monetary policy. Main findings: The large-scale fiscal packages and the loosened monetary policy have undoubtedly avoided a deep economic recession, but the costs of this aid will certainly be felt in the coming years, if not decades. Currently, the socio-economic situation seems to be slowly returning to the pre-pandemic state, nevertheless the observed new mutations of the Covid-19 virus effectively reduce euphoria on the markets and require careful monitoring of further developments at the local and global level.

Keywords

economic crisis, causes and types, business cycles, COVID-19 pandemic

JEL Classification

B30, E62, H12

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Analytical Platform

Jan Přichystal^a and Roman Valovič^b

Abstract

The Analytical Platform is an online platform that simplifies work of analytical department, front-office, back-office and compliance for investment firms. It is using an artificial intelligence, data analytics and machine learning in finance and investments. Analytical Platform helps investment funds, securities traders and professional investors gain higher alpha, and lower beta and get flawless records of investment decisions. It offers various specialized tools and services in a flexible and personalized way to fit investor's needs. This article presents the components of the platform, the technologies used for the development and approaches for sentiment analysis and summarization of financial articles as a source of key information for decision support.

Keywords

analytical platform, data mining, financial markets, natural language processing, machine learning, sentiment analysis, text summarization, web application

JEL Classification

L86

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Requirements for a Sustainable Consumption Product from the Perspective of the Young Generation Consumer

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Abstract

This paper objects to explore how the young generation consumer meets their needs through the example of an everyday product that is in line with the current understanding of sustainability – the reusable drinking bottle. In a questionnaire survey conducted, 639 responses were obtained regarding consumption behavior concerning the reusable bottle product. The data shows the wide and frequent use of this product. The most preferred material is Tritan plastic, followed by glass. The Pearson χ -squared test confirmed the relationship between the frequency of use of the reusable bottle and the volume of consumption of disposable bottles. Therefore, the use of reusable bottles leads to a reduction in the volume of disposable bottle consumption and thus to a reduction in the volume of waste produced. Using *k*-means cluster analysis, four segments of young consumers in the reusable bottle market were identified as environmental preferences. The segments were named “Environmental Enthusiasts”, “Deniers of Everything”, “Responsible for the Future” and “Protectors of the Environment and Quality”.

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Keywords

reusable bottle, sustainable product, sustainable consumption

JEL Classification

M310, M370

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Over-all Scoring System of Dairy Production Diseases

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Abstract

Cow metrics and over-all scoring systems are powerful and useful source of comparative criteria information for dairy farms. Dairy herd health is crucial factor, which has consequences for dairy longevity, milk yield and other important prosperity aspects. In this study was developed a new scoring approach for the comparison among dairy farms using a new metric that is able to measure and compare herd health in summary among farms or group of cows within dairy herd.

The scoring methodic of a novel scoring system is inspired by analogical approach in human medical health research area APGAR measurement for newborn children. The developed method takes a list of all dairy diseases from the disease treatment record. From the whole list is calculated summary score of all cows per specified unit of the time. The diseases were classified to three levels of severities from 1 with the lowest, 2 with medium severity and 3 with the highest severity of disease. First attempt of this study was implemented on Czech farm from the time window almost of 5 years.

It was shown in the study that summary score is powerful source of information which is possible use for decision support systems for usage of descriptive analysis of animal health on dairy farm. Consequently, the score is comparable by farm management on the level of dairy herd as well as among several farms to evaluate dairy herd health.

Keywords

dairy cows, decision support system, farm management, herd health, scoring-over-all system, production disease, descriptive analysis

JEL Classification

C44, Q12

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A Literature Review of Business Performance Measurement

Nikola Sobotková^a

Abstract

The paper is aimed at a critical review of the literature dealing with the measurement of business performance. Because, nowadays the importance of implementing modern and effective management methods to maintain competitive advantage in almost all business sectors is emphasized, given the increasing competitive pressure. The measurement of business performance is also an important aspect of management and decision-making in organisations. Various indicators are currently being investigated to show the importance of modern approaches and effective measurement systems. This paper aims to identify a list of these modern methods, their bottlenecks and point out the possibility of introducing new and better indicators for performance measurement. The aim of this work is thus to create a critical review of the literature, especially about the latest findings of research articles on the selected topic. The purpose of this article is then to point out the limits of the current state of literature in the field of modern methods to measure business performance and highlight possible research gaps arising from the review in this area.

Keywords

literature review, business performance, performance measurement methods

JEL Classification

G30, M21

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How Does a Country's Level of Economic Development Influence Digital Advancement? Evidence from European Countries

Anđelka Stojanović^a, Isidora Milošević^b and Sanela Arsić^c

Abstract

Recent years have brought numerous challenges to Europe and the world in the form of a complex geopolitical situation, threats to the safety and health of the population, deepening economic differences, and a lack of natural resources. Dealing with some of the challenges mentioned above is carried out through digitization and the development of the single market. The European Commission enacted numerous documents and implemented a series of activities aimed at strengthening the European digital market. Actions and policies aim to support digitization to increase economic activity and achieve other social benefits such as empowerment of people, solidarity and sustainability. Due to unequal initial levels of development and the readiness of states, companies and individuals for the changes brought by information technologies, a digital divide emerged. The main research question in this paper is whether the achieved level of economic development conditions the level of digitization. It also examines which elements in the digital transformation can be most influenced to reduce the digital divide. Structural equation modeling (SEM) is applied to answer the research question. The importance of the results is reflected in the fact that by confirming the connections between the digital level and economic parameters, the direction of influence on the reduction of digital divides and the fulfillment of globally set goals related to social equality can be defined.

Keywords

digital development, economic development, European countries, digital society and economy index

JEL Classification

F63, O33, O52, C38

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Mobile Augmented Reality Object Detection Application

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Abstract

This article proposes a Mobile Augmented Reality (MAR) application for object detection. The application can detect predefined objects in the camera stream and display information about them. Object detection poses many challenges, and a common approach is to perform it remotely on a server. However, this requires an active internet connection. Alternatively, detection can be performed locally using a model stored on the device. However, not all devices have the capability to perform real-time detection. We have created a Mobile Augmented Reality app that can detect objects in the camera stream. The app can perform detection locally or remotely, depending on the device's configuration. Secondly, the app's ability to perform detection locally or remotely makes it versatile. The paper has two main contributions. Firstly, the proposed application architecture can be applied to any similar MAR app. The application was tested on multiple Android devices to determine the minimum configuration required for local object detection.

Keywords

object detection, Mobile Augmented Reality, TensorFlow

JEL Classification

L63, L86

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AR Manuals Using Object Recognition on Mobile Devices

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Abstract

Manuals in augmented reality bring significant benefits over standard paper-format manuals. The provided instructions are connected to parts of a real object and users are precisely navigated throughout the process. While most mobile devices support only object detection based on 2D images, state-of-art Apple devices are equipped with LiDAR capable of 3D object detection. Such detection brings more precision in changing light conditions and also provides information about an object's position and rotation. This paper proposes an architecture of a universal manuals system that exploits 3D object recognition to precisely map instructions to real objects. Moreover, the proposed data model is universal and can be used in various scenarios. A demo was implemented and tested with help of test users to verify the reliability and usability of our solution.

Keywords

augmented reality, mobile devices, object recognition, system architecture, manuals

JEL Classification

C88

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Comparative Analysis of Selected Time Series Forecasting Approaches for Indian Markets

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and Pawan Kumar Mishra^d

Abstract

Financial market analysis and prediction have been topics of interest to traders and investors for decades. This study assesses the performance of selected time series prediction methods like deep learning algorithms (Long short-term memory model – LSTM), traditional statistical models (Seasonal Auto Regressive Integrated Moving Approach with exogenous regressors – SARIMAX), and advanced ensemble learning algorithms (XGBoost and FB-Prophet) using real-world data from the Indian financial market. The stock prices of Reliance Company serve as a case study, enabling a thorough evaluation of predictive accuracy and errors of the models. A pre-processing approach has been proposed and implemented, integrating significant economic factors (Gold Price, USD to INR conversion, Consumer Price Index, Indian 10-year yield bond, and Wholesale Price Index) and evaluated with technical metrics (Mean squared error, Mean Absolute Error, R2 Score). The study investigates how the inclusion of these factors impacts prediction accuracy across the selected time series prediction methods. The comparative evaluation of models before and after the pre-processing method sheds light on the evolving predictive accuracy of LSTM, SARIMAX, FB-Prophet, and XGBoost. The study showed that the SARIMAX (extension of ARIMA with seasonality and exogenous factors) and XGBOOST performed relatively well with the proposed approach while LSTM with 80% training and FB prophet (though advanced) did not perform as expected in Indian financial markets. This research contributes to advancing the understanding of time series forecasting in the financial market of India, offering practical insights for decision-makers and researchers.

Keywords

financial time series, stock market prediction, deep learning in finance, ensemble learning in economics, ARIMA, XGBoost Analysis

JEL Classification

C22, C53, G17

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Revolutionizing Fashion Sustainability: The Role of Social Media in Advancing Sustainable Value Chain Innovations

Yifan Tu^a

Abstract

The findings reveal a significant impact of social media on consumer awareness and behavior regarding sustainable fashion. They highlight how platforms like Instagram and Twitter are not just communication channels but pivotal tools in shaping consumer attitudes towards sustainability. The study uncovers the strategies employed by fashion brands to leverage these platforms for promoting sustainable practices, with a particular focus on the role of influencers and digital marketing tactics.

Key challenges identified include the complexity of conveying sustainable practices through social media and the risks of misinformation. Opportunities for innovation in digital sustainability communication are also explored. The research contributes to a deeper understanding of the synergistic relationship between social media and sustainable fashion, offering valuable insights for fashion brands, marketers, and policymakers. It underscores the potential of social media as a transformative tool in aligning the fashion industry with environmental and ethical standards.

This study opens avenues for future research in examining the long-term impact of social media-driven sustainability initiatives and the evolving role of digital platforms in consumer engagement and sustainable fashion advocacy.

Keywords

sustainable fashion, social media, consumer behavior, eco-marketing, green awareness

JEL Classification

Q01

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Digitization of the Methodology for Assessing the Sustainability of Plant Production Systems

Pavel Turčíněk^a and Vojtěch Krejsa^b

Abstract

This contribution describes how a web application was created based on the given methodology for assessing the sustainability of plant production systems. The key indicators of this methodology are introduced. The way of transformation into digital form is shown. The outputs of the created application are presented.

Keywords

sustainability of plant production systems, digitization, web application

JEL Classification

C88, Q59

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Pacific Rim Titans and Emerging South: Decoding Economic Decision-Making Power Shift in the 21st Century

Patrik Vaněk^a, Eleanor Doyle^b and Luděk Kouba^c

Abstract

This paper explores 21st-century trends in global economic decision-making, focusing on metropolitan areas and their evolving roles through the lens of MNE corporate geography. We follow an approach developed by Godfrey and Zhou (1999) to allow for an exploration of the change in the last three decades. Additionally, we further develop their method using a multidimensional approach to capture the geographic balance and international reach of the influence of metropolitan areas. Analysing HQ locations of the world's 100 largest corporations in the Fortune Global 500 list, we identify Pacific Rim cities, especially Beijing, Hong Kong, and Singapore, as key players. The dispersion of headquarters to North American second-tier cities suggests a multipolar shift. Philadelphia's unexpected inclusion challenges conventional notions, reflecting regulatory influences. European cities undergo nuanced transformations, exemplified by Dublin's ascent and Milan's decline. Clustering analysis unveils diverse archetypes, from established global centres like London and Tokyo to emerging players like Amsterdam and Dublin. Emerging economies from South Asia, the Middle East & North Africa, and Sub-Saharan Africa contribute to the globalization of economic decision-making power. Stable distribution across income levels underscores established powerhouses' persistent influence. Our findings provide insights into the dynamic interplay of metropolitan areas in steering global economic decisions, contributing to the discourse on urban hierarchy and the complexity shaping the global economic landscape.

Keywords

world cities, corporate geography, urban hierarchy, economic decision-making

JEL Classification

F02, F23

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The Challenge of Self-Sufficiency in Pork Meat Production: Past Evidence of Microfinance Data in Selected EU Member Countries for Future Economic Sustainability

Jan Vavřina^a and Lubor Lacina^b

Abstract

Pork production is one of the branches of agricultural production where there is a high degree of competition among producers based in EU member countries. Only those producers companies, which are able to invest in automation and increase their productivity can survive in the EU common market. The role of domestic subsidies in line with the CAP can play an important role in the economic sustainability of the sector as a whole at the national level. The synchronicity of recent global economic crises opens up a new dimension of food security and self-sufficiency need in the production of agricultural commodities. The overall situation of self-sufficiency in pork meat production can be assessed as stabilized, but there are differences between member states. The objective of the article is to identify significant financial and non-financial factors, which are influencing economic sustainability of pig breeding companies in selected EU member countries. Empirical findings emphasize that the profitability of the pig farming sector was identified as low and also negative for the respective enterprises in all monitored sample countries in the period 2011–2019. The pressure to further reduce the total volume of pork meat production in the EU is expected to continue into the future, both due to the requirements of the so-called Green Deal, but also due to the development of consumer behaviour regarding the preference for foodstuff with a lower environmental impact.

Keywords

self-sufficiency, pork meat production, economic sustainability of producers

JEL Classification

Q18, M21

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Survey of Large Language Models on the Text Generation Task

Michaela Veselá^a and Oldřich Trenz^b

Abstract

This paper focuses on the comparison of GPT, GPT-2, XLNet, and T5 models on text generation tasks. None of the autoencoder models are included in the comparison ranking due to their unsuitability for text generation tasks. The comparison of the models was performed using the BERT-score metric, which calculates precision, recall, and F1 values for each sentence. The median was used to obtain the final results from this metric. A pre-processed dataset of empathetic dialogues was used to test the models, which are presented in this paper and compared with other datasets containing dialogues in English. The tested models were only pre-trained and there was no fine-tuning on the dataset used for testing. The transformers library from Hugging Face and the Python language were used to test the models. The research showed on the pre-trained dataset empathetic dialogues has the highest precision model T5, recall and F1 has the highest precision model GPT-2. The paper also includes a possible design of a conversational agent and a whisperer of responses.

Keywords

natural language processing, autoregressive transformers, natural language generation

JEL Classification

C45, L86

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Rethinking Consumers' Behavior Models. A Financial Behaviour Perspective

Anna Warchlewska^a

Abstract

The paper examines generational breakdown and selected trends in consumer financial behaviour. An analysis of the 'rules' significant for types of consumer behaviour was conducted. Despite the development of the consumer behaviour sciences, a coherent research approach that integrates the issue of consumer behaviour with the specificity of the financial services market has not yet been developed. As the considerations suggest, the frailty and still insufficient functionality, as well as lack of application of the models may result from constantly changing macro and microeconomic factors, the influence of various sciences on societal behaviour, and conceptual-theoretical inconsistencies. A contribution to science is an attempt to diagnose the components of a functional model for financial behaviours.

Keywords

consumer behaviour models, generations, behavioural trends

JEL Classification

A14, D10, G41

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Is There a Resource Curse in the US? New Evidence from the Shale Revolution

Steven Yamarik^a and Jarko Fidrmuc^b

Abstract

The resource curse is the prediction that resource-rich countries will grow slower than resource-poor countries. The recent shale revolution in the U.S. and elsewhere provides a natural experiment to re-examine the resource curse. Estimates of these unconventional reserves are used to identify the effects of resource dependence on U.S. state growth. Using unconventional reserves as instruments, we find strong evidence of a resource curse in the U.S. for the 2010's.

Keywords

growth, natural resources, unconventional reserves

JEL Classification

O1, O4, O5, Q0

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CSR Disclosure's Influence on Listed Companies' Loan Access in China

Xinyi Yuan^a

Abstract

This paper investigates the evolution of corporate social responsibility (CSR) patterns among A-share listed firms in China and its impact on the access to bank loans. The study covers 15 years from December 2006 to December 2021 and includes 32,830 firm-year observations. Using fixed effects least squares (OLS) regression analysis, it is found that there is a positive relationship between the degree of CSR information disclosure and the accessibility of bank loans. Interestingly, the effects differ across sectors, with green sectors showing a negative relationship, while the opposite is true for non-green sectors. This paper further explores the subtle dynamics within state-owned enterprises (SOEs) and private firms, and reveals the differential moderating effect of the relationship between CSR and loan accessibility. In addition, the temporal analysis shows that the evolving pattern of CSR practices in China shows a stronger relationship before the 2009 mandatory CSR reporting regulations. This study not only contributes to the understanding of the impact of CSR on loan accessibility, but also provides practical insights for policy makers, financial institutions and firms navigating the complex intersection of finance, governance and sustainability.

Keywords

CSR, bank loan accessibility, OLS, China

JEL Classification

G21, G30, O16

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Enhancing Micro-credentials with Blockchain

Martin Záklasník^a, Veronika Konečná^b, Oldřich Faldík^c
and Oldřich Trenz^d

Abstract

The article addresses the problem of using micro-credentials in the educational process and explores the possibilities of their deployment through blockchain technology. The topic of micro-credentials as the first step in the process of digitalization of the educational process is presented along with the setting of its trustworthiness. A variety of advantages can be associated with micro-credentials, including the confirmation of individual transactions at the level of the educational process. One of the main problems in the centralized storage of micro-credentials is the risk of unauthorized access and the possibility of leakage of sensitive information. This paper proposes the implementation of blockchain technology as a way to decentralize data storage. This would eliminate the threat of unauthorized access and provide a higher level of data security and integrity. Challenges associated with a centralized certificate authority such as scalability issues and outages are also discussed. It can be evaluated that blockchain can provide a robust and reliable framework for digitizing certificates in the education sector. The conclusions of the paper highlight the benefits of decentralization through blockchain and the need to open up the certification network for corporate certificates. Overall, the paper discusses the importance and benefits of using blockchain technology to enhance the security and efficiency of digital certificates in the education sector.

Keywords

blockchain, digitalization, micro-credentials

JEL Classification

I8, O3

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