

# ICOMS 2025

International Conference on Organisational  
and Management Studies



## BOOK OF ABSTRACTS

# International Conference on Organisational and Management Studies



## TECHNICAL DETAILS

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**António Manuel Cunha**

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# International Conference on Organisational and Management Studies



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# International Conference on Organisational and Management Studies



## Foreword

It is with great pleasure that we welcome all participants to the International Conference on Organisational and Management Studies (ICOMS 2025), hosted at ISCAP—Porto Accounting and Business School, part of the Polytechnic Institute of Porto, and organised under the scientific coordination of CEOS.PP—the Centre for Organisational and Social Studies.

ICOMS 2025 takes place on the 29th and 30th of May, bringing together researchers, academics, professionals, and policy makers from various countries and institutions to share innovative research and discuss critical challenges and opportunities in the fields of management, economics, finance, and organisational studies. This year's programme reflects the interdisciplinary and international nature of our academic community, with a wide range of topics spanning sustainable finance, innovation, digital transformation, social entrepreneurship, risk analysis, and the evolving role of artificial intelligence in business.

The conference opens with keynote contributions from renowned scholars and experts, most notably Professor Edward Altman from NYU Stern School of Business. His work on financial distress prediction models has influenced both academic research and practical applications in risk management. His presence enriches our discussions and underlines the conference's global reach and relevance.

Over five thematic sessions, ICOMS 2025 offers a platform for the presentation of high-quality research papers addressing pressing societal and organisational questions through diverse methodological lenses. Topics range from ESG reporting and green bond issuance to financial literacy, housing market dynamics, and technological adoption in SMEs. The diversity of contributions shows the vital role of research in responding to contemporary economic, technological, and social transformations.

The Organising Committee would like to thank all speakers, authors, reviewers, moderators, and participants for their enthusiasm and commitment to academic excellence. We are especially thankful to our institutional partners and CEOS.PP members for their tireless efforts in making this conference possible.

This Book of Abstracts compiles the summaries of the research works presented at ICOMS 2025. It is a record of the conference proceedings and a contribution to our academic community. We hope these contributions inspire future research and foster meaningful dialogue among scholars and practitioners.

May this conference be a moment of discovery, exchange, and connection for all who attend.

*The Organising Committee*

International Conference on Organisational and Management Studies (ICOMS 2025)

ISCAP – Porto Accounting and Business School

Polytechnic Institute of Porto

# International Conference on Organisational and Management Studies



## CONFERENCE PROGRAMME

# PROGRAMME

ISCAP  
Instituto Politécnico do Porto  
Portugal

**MAY 29th**

OPENING SESSION  
2:00 – 4:00 pm  
Main Auditorium

**Ana Azevedo**, President of the Centre for  
Organisational and Social Studies

**Manuela Patrício**, Vice-President of the Porto  
Accounting and Business School (ISCAP)

**Francisca Guedes de Oliveira**, Board Member of  
Portugal's Central Bank

**Plenary session: Edward Altman**, Keynote speaker  
Stern School of Business, New York University

4:00 pm – 4:30 pm  
Restaurant  
Coffee Break

<https://www.ceos.iscap.ipp.pt/post/icoms-2025>



# ICOMS 2025

International Conference on Organisational  
and Management Studies

## PROGRAMME

**SESSION 1 | Chair: Cristina Lopes**

**CEOS.PP Main Room**

**4:30 pm – 6:30 pm**

**Corporate value response to mandatory ESG reporting in Europe.**

Gilberto Loureiro, Sónia Silva

**Sustainable Finance in the EU: Macroeconomic Influence on Green Bond Issuance.**

Amanda Zetzsche, Elif Göksu Öztürk, Cristina Lopes

**Innovation Performance in 2024: A Feature Selection and Factor Analysis approach.**

Aldina Correia, Marta Azevedo

**Determinants of the Risk-of-Poverty Gap: A Panel Data Analysis Across European Countries.**

Cristina Lopes, Lurdes Babo, Cristina Torres, Isabel Vieira

**Analysis of the External Debt of Bosnia and Herzegovina and Portugal.**

Zlatko Simikić

**8:00 pm**

**Conference Dinner**

**LE PALAIS - Restaurant & Bar**

<https://www.ceos.iscap.ipp.pt/post/icoms-2025>

# ICOMS 2025

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and Management Studies

## PROGRAMME

### MAY 30th

SESSION 2 | Chair: Rui Bertuzi

CEOS.PP Main Room

11:30 am – 1:00 pm

#### **Optimizing Commercial Teams Performance and Territory Design Using Mathematical Models**

Ana Miguel Carvalho, Cristina Lopes, Manuel Cruz,  
Jorge Santos, Sandra Ramos, Filipa Vieira, Pedro Louro

#### **An Essay on the Evolving Role of B2B Salespeople in the Age of Artificial Intelligence: Challenges and Opportunities**

Pedro Mendonça da Silva

#### **Young student's knowledge and practices of financial and tax literacy: a study in the Porto region (Portugal)**

Nuno Gonçalves, Rui Bertuzi, Amélia Silva

#### **The Paradox Between Concept Knowledge and Digital Maturity Level for Industry 4.0: The Portuguese Case**

A. Guimarães, R. Pereira, T. Pereira, A. Carvalho, P. Reis,  
Antonio. J. Marques Cardoso

#### **Nestlé analysis of international risk management instruments**

Ana Ferreira, Adalmiro Pereira, Tânia Teixeira

<https://www.ceos.iscap.ipp.pt/post/icoms-2025>

# ICOMS 2025

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## PROGRAMME

**SESSION 3 | Chair: António M. Cunha**

**11:30 am – 1:00 pm**

**Room 228**

**Are we in a housing bubble? Empirical evidence  
from Portugal**

António M. Cunha, Luís M. Loureiro

**The Disruptive Power of Digitalization upon  
Financial Services**

Walter Gontarek

**CFA: Financial Analysis with Cognitive Diversity**

Randy Katzenstein, D. Frank Hsu, Avital Pilpel

**Implementation of Basel III Stress Testing  
Framework in Ukraine's Banking System During  
Military Conflict**

Anastasiia Nabokova

**Applying the Altman Z-Score Model to Portuguese  
Micro Entities**

Sandra Ferreira, Carlos Quelhas Martins, Cláudia  
Pereira

**1:00 - 2:30 pm**

**Restaurant  
Lunch**

<https://www.ceos.iscap.ipp.pt/post/icoms-2025>



# ICOMS 2025

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## PROGRAMME

**SESSION 4 | Chair: António M. Cunhai**

**2:30 – 4:00 pm**

**CEOS.PP Main Room**

**Inclusive volunteering: A study of the perceptions  
of people with functional diversity**

Susana Bernardino, Ana Luísa Martinho, Paula Pereira,  
Ana Luísa Azevedo

**Management and legal challenges for social  
entrepreneurship in Portugal**

Deolinda Meira, Susana Bernardino, Conceição Castro,  
Raquel Pereira, Cláudia Pinto

**Arbitration decisions on transfer pricing: a trend in  
favor of taxpayers?**

Beatriz Da Silva Alves, José de Campos Amorim

**Tracking Socioeconomic Development: A Dynamic  
PCA-Based Approach to Country Classification Over  
Time**

Elif Göksu Öztürk

**4:00 pm – 4:30 pm**

**Restaurant**

**Coffee Break**

<https://www.ceos.iscap.ipp.pt/post/icoms-2025>

# ICOMS 2025

International Conference on Organisational  
and Management Studies

## PROGRAMME

**SESSION 5 | Chair: Armando Silva**

**4:30 – 6:00 pm**

**CEOS.PP Main Room**

**Implementing a Content Management System in an  
SME: Enhancing Information Accessibility and  
Operational Efficiency**

Rosalina Babo, Tiago Soares, Joana Rocha

**Business Intelligence as a strategic tool for process  
optimization at a SME**

Rosalina Babo, Filipa Silva, Fabrício Olo

**Towards a Cooperation-Based View of Strategy**

Filipe Sousa

**The T-Shaped Profile of a Modern IT Leader: A  
Combination of Agile Methodologies and a Data-  
Driven Approach**

Anzhela Tyshchenko

**Driving Digital Transformation through CRM:  
Strategies from a Multinational Advertising  
Company**

Mário Ribeiro, Rosalina Babo

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# ICOMS 2025

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## CLOSING SESSION

6:00 – 8:00 pm

Main Auditorium

### **António Manuel Cunha**

Member of the Organising Committee

### **António Mendonça**

President of the Portuguese Economists Association

### **Victor Mendes**

Board Consultant of the Portuguese Securities Market  
Commission

### **João Carlos Martins**

Head of Risk of Natixis Portugal

### **Edward Altman**

Masterclass

Keynote speaker

Stern School of Business, New York University

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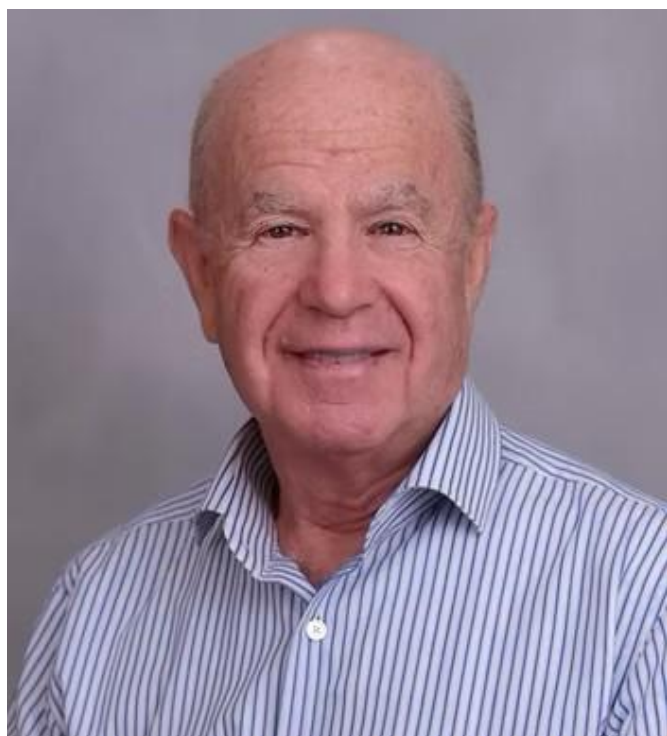


## KEYNOTE TALK

### Unlocking the Credit Cycle: Insights into Leveraged Finance and the Rise of Private Debt

**Professor Edward Altman**

Emeritus Professor of Finance at the Stern School of Business, New York University



#### Biographic note

Professor Edward Altman is Emeritus Professor of Finance at the Stern School of Business, New York University. Professor Altman was one of the founders (1977) and Executive Editor of the Journal of Banking and Finance and Consulting Editor of the John Wiley Frontiers in Finance Series. He has published and edited two dozen books and more than 160 articles in academic journals in the fields of finance, accounting and economics. His work has been published in many languages, including Chinese, French, German, Italian, Japanese, Korean, Polish, Portuguese and Spanish. In 2005, Prof Altman was named one of the '100 most influential people in finance' by Treasury & Risk Management magazine.

Professor Edward Altman is the Chairman of the ICOMS 2025 Scientific Committee.





## Corporate value response to mandatory ESG reporting in Europe

Gilberto Loureiro<sup>1</sup>, Sónia Silva<sup>2</sup>

<sup>1</sup> Full Professor, University of Minho, School of Economics and Management & NIPE (Centre for Research in Economics and Management), Email: gilberto@eeg.uminho.pt. (Corresponding author).

<sup>2</sup> Researcher, University of Minho & NIPE, Email: sonia@eeg.uminho.pt.

### Abstract:

The Green Paper, launched in 2001 in the European Union (EU), aimed to promote corporate investment in corporate social responsibility to address social, environmental, and community concerns. Large companies started to disclose information about their corporate social responsibility initiatives and policies on a voluntary basis. Ever since, the EU's priority has been to increase transparency in disclosing non-financial reporting. The Non-Financial Reporting Directive (NFRD) 2014/95/EU makes disclosure about climate and ESG-related matters mandatory. We tested the impact of the passage of the Non-Financial Reporting Directive on EU-based firms' value. The disclosure of mandatory non-financial reporting impacts value positively. Our findings reveal a positive impact on corporate value post-Directive when matched with a comparable U.S.-based sample. Such effect started to take shape even before the NFRD entered into force due to the voluntary disclosure of non-financial reports related to climate ESG matters in the years preceding the new regulatory regime. We document that firms that improved their ESG metrics and information environment post-NFRD enhanced their corporate value.

The lack of non-financial reporting harmonization among member states and within the same country poses challenges to corporations, regulators, and investors. In 2020, the European Commission assessed the NFRD's effectiveness and concluded that non-financial disclosure does not meet users' expectations completely. Additionally, the NFRD allows firms to use the "comply or explain" principle, meaning that if firms do not report all ESG-related matters according to the Directive, they have the facility to explain the reason for not doing so. This flexibility might raise uncertainty among outsiders about a firm's commitment to the ESG regulations due to potential corporate attempts to meet the non-financial reporting requirements by using "boilerplate" disclosures. To overcome this criticism, we analyze possible mechanisms that justify our results: i) a significant rise in climate and ESG outcomes post-NFRD; and ii) an improvement in the corporate information environment. Besides the ESG pillar scores retrieved from the Refinitiv ESG Database between 2010 and 2023 (which corresponds to our sample timespan), we built our ESG score based on the NFRD requirements: climate and environmental matters, social aspects related to respect for human rights and employee treatment, health and safety, anti-corruption and bribery, and finally, the governance level regarding diversity on corporate boards (age, gender, educational, and professional background). We proxied for green innovation based on the information provided by green bond issuers gathered from the Bloomberg Terminal, intending to test whether investing in innovation processes to

reach more sustainable solutions significantly affects value.

Therefore, we expect that non-financial reporting enhances disclosure about climate and ESG-related matters, which were always surrounded by information asymmetry; such procedure shall improve firms' information environment, leading to higher corporate valuations.

Our results inform corporate insiders, outsiders, and policy makers about the effects of EU regulation concerning non-financial reporting.

**Keywords:** Non-Financial Reporting Directive; ESG Reporting; European Union; Disclosure; Information Environment

**Acknowledgement:** *This paper is financed by National Funds of the FCT (Portuguese Foundation for Science and Technology) and, when eligible, by FEDER funds, under the Scientific Employment Stimulus - Individual Call - CEECIND/07301/2022 and within the project UIDB/03182/2020, Centre for Research in Economics and Management/University of Minho.*



## Sustainable Finance in the EU: Macroeconomic Influences on Green Bond Issuance

Amanda Zetzsche<sup>1</sup>, Elif Göksu Öztürk<sup>1</sup>, Cristina Lopes<sup>1</sup>

<sup>1</sup> CEOS.PP/ ISCAP, Polytechnic of Porto, Porto, Portugal

### Abstract:

Green investments, often driven by expectations of better financial performance, have become a significant focus (Hartzmark & Sussman, 2019). Tiftik et al. (2020) reported that over 90% of green bonds were investment-grade and rated with quality credit ratings such as AAA, AA, A, and BBB. Further, Maltais and Nykvist (2020) identified a new trend among fixed-income investors, focusing on ESG factors that concern companies. Hanson et al. (2017) noted already that green bonds potentially have a greater impact than ESG-related equity investments. Tang and Zhang (2020) state the benefits to shareholders, demonstrating that the announcement of green bond issuance leads to improvements in short-term firm value, institutional ownership, and stock liquidity. The issuance of corporate green bonds can signal a company's commitment to environmental sustainability, addressing information asymmetry (Flammer, 2021).

This study contributes to the literature by examining how macroeconomic conditions, financial market development, and climate policy influence green bond issuance across European countries by adopting a cross-country perspective, providing insights into the broader economic and institutional determinants of sustainable finance. By combining descriptive analysis of market trends with a panel data approach, this research offers qualitative and quantitative insights into the dynamics of green bond issuance in Europe.

First, descriptive analysis conducted, the results show that the European green bond market is maturing, with rising issuance volumes, reliance on sovereign and corporate issuers, and benchmark-sized deals. West and Northern Europe dominate the European market, with the euro dominating issuance currencies. Energy, buildings, and transport still dominate green bond funding, but new environmental industries are emerging. These trends demonstrate Europe's leadership in global green finance and imply a growing climate-focused institutional and investor base.

Second, econometric model is implemented to evaluate the impact of macroeconomic conditions and financial development on green bond issuance, we implemented fixed-effects panel regression model that captures both cross-country and time variations.

The dataset used for the econometric model covered annual observations for 27 European countries over a 10-year period (2014-2023). The primary sources include the European Environmental Agency (EEA), the World Bank's World Development Indicators (WDI), and the International Monetary Fund (IMF).

The results of econometric analysis proved that the financial market characteristics have a significant influence on green bond issuance across countries over time. More precisely, financial market access and financial market depth show negative effect on green bond issuance. While broader financial market access might intuitively support green finance by encouraging participation, the negative coefficient could indicate that, in certain contexts, greater access facilitates conventional investment flows that compete with or overshadow green financial instruments. In less mature green finance ecosystems, traditional sectors may still dominate investor portfolios, and without dedicated green incentives, financial openness may not automatically translate into sustainable investment behavior. Similarly, financial market depth, often seen as a sign of financial sophistication, is also associated with a reduction in green bond issuance. One interpretation is that deeper markets may gravitate towards high-yield instruments, leaving low-return and long-horizon green bonds relatively underfunded. On the other hand, financial market efficiency appears to play a strongly positive role on green bond issuance, suggesting that reduced transaction costs and more transparent pricing environments may encourage both issuers and investors to participate in green finance. This finding points to the enabling role of structural efficiency, especially when paired with policy clarity and ESG integration, in enhancing the attractiveness of green financial instruments. Moreover, inflation appeared to be the only significant macroeconomic variable in green bond issuance. The opposing effect reflects that the higher inflation often raises the cost of borrowing and generates uncertainty around long-term investments—conditions that can discourage issuance of instruments like green bonds.

Findings indicate that green bond issuing requires more than traditional financial development. This requires targeted policy initiatives, regulatory clarity, and a commitment to financial market sustainability

**Keywords:** Green bonds, Macroeconomic Indicators, Europe, Sustainable Finance, Panel Data

## References

- Hanson, D., Lyons, T., Bender, J., Bertocci, B., & Lamy, B. (2017). Analysts' Roundtable on Integrating ESG into Investment Decision-Making. *Journal of Applied Corporate Finance*, 29(2), 44–55.
- Hartzmark, S. M., & Sussman, A. B. (2019). Do investors value sustainability? A natural experiment examining ranking and fund flows. *The Journal of Finance*, 74(6), 2789–2837.
- Flammer, C. (2021). Corporate Green Bonds. *Journal of Financial Economics*, 142(2).
- Maltais, A., & Nykvist, B. (2020). Understanding the role of green bonds in advancing sustainability. *Journal of Sustainable Finance & Investment*, 1–20.
- Tang, D. Y., & Zhang, Y. (2020). Do Shareholders Benefit from Green Bonds? *Journal of Corporate Finance*, 61. <https://doi.org/10.1016/j.jcorpfin.2018.12.001>
- Tiftik, E., Mahmood, K., & Nozema, C. (2019). Sustainable finance in focus: Green bonds take root. Institute of International Finance. [https://www.iif.com/Portals/0/Files/SF\\_green\\_bond\\_issuance%20vf.pdf](https://www.iif.com/Portals/0/Files/SF_green_bond_issuance%20vf.pdf)



## Innovation Performance in 2024: A Feature Extraction Approach Using EIS Data

Aldina Correia<sup>1</sup>, Marta Azevedo<sup>1</sup>

<sup>1</sup> CIICESI - Center for Research and Innovation in Business Sciences and Information Systems, ESTG - Escola Superior de Tecnologia e Gestão, IPP- Instituto Politécnico do Porto, Portugal.

### Abstract:

The literature review in [1] highlights the evolution of research on innovation performance using the European Innovation Scoreboard (EIS), covering traditional statistical methods as well as more recent machine learning techniques. The review also identifies gaps in existing literature, particularly concerning the application of up-to-date data and advanced feature selection techniques. By addressing these gaps, this study contributes to a deeper understanding of the drivers of innovation across EU countries and offers an updated perspective for the year 2024. This study aims to expand on prior research that explored the correlation structure between the dimensions of the EIS across previous years. The primary objective of this research is to update and deepen the understanding of the relationships between different innovation dimensions in EU countries, using the most recent 2024 data. Specifically, the study seeks to identify underlying patterns and correlations that explain variations in innovative performance across countries. The main hypotheses being tested in this study are:

1. Hypothesis 1 (H1): There are significant correlations between the various dimensions of innovation.
2. Hypothesis 2 (H2): By using advanced feature selection techniques, it is possible to identify a subset of key indicators that most effectively differentiate between countries with varying levels of innovation performance.

To test these hypotheses, the study employs a combination of traditional statistical techniques and modern machine learning methods. Exploratory factor analysis is used to reduce the dimensionality of the data, combined with the parallel analysis based on PC (Principal Components) for defining the number of factors, allowing for the identification of latent variables that capture the core relationships among the observed indicators. These methods help confirm the underlying structure of innovation performance across countries and years, thus verifying H1.

The dataset used in this study includes several key indicators from the EIS. By applying these methodologies, the study aims to offer a comprehensive view of innovation performance in the EU, shedding light on how different dimensions of innovation interrelate and evolve over time. Identifying the EIS indicator as a latent variable of all the indicators was possible, thus verifying H2. The findings from this research will not only update existing knowledge but also contribute to a more nuanced understanding of the key drivers of innovation performance, with a particular focus on the changes observed in 2024. This study builds on previous research that analyzed the correlation structure between the dimensions of the EIS for earlier years. Earlier studies used techniques like principal component analysis



(PCA) and factor analysis to examine relationships between different innovation dimensions in EU countries. The goal was to identify patterns and connections within the observed variables over time, [1]. This current work, however, focuses on updating the data for the year 2024. The main contribution is to provide an updated analysis of the correlations between innovation dimensions, taking into account the latest metrics and the impact of new variables. Therefore, this study offers a more current view of the innovative performance of EU countries, based on the most recent available data, which can be considered for informed policy innovation decision-making.

To assess the suitability of the dataset for Exploratory Factor Analysis (EFA), we first applied the Kaiser–Meyer–Olkin (KMO) test and Bartlett’s test of sphericity. The overall KMO value was 0.884, indicating meritorious sampling adequacy, with individual MSA values all exceeding 0.80. Bartlett’s test yielded a statistically significant result ( $\chi^2 = 427.145$ ,  $df = 66$ ,  $p < 0.001$ ), confirming that the correlation matrix was not an identity matrix.

The scree plot clearly shows a steep decline after the first component, followed by a levelling off, suggesting a one-factor solution. This is further supported by the eigenvalue-greater-than-one rule and the parallel analysis, which indicated that only the first factor exceeds the significance threshold. Additionally, Mardia’s test was used to assess multivariate normality. The test for skewness ( $p = 0.206$ ) and kurtosis ( $p = 0.297$ ) did not indicate significant violations, suggesting that the assumption of multivariate normality was reasonably met. These results justify the application of EFA on the dataset. The chi-squared test of model fit yielded a statistically significant result ( $\chi^2 (54) = 95.631$ ,  $p < 0.001$ ), suggesting that the model does not perfectly reproduce the observed covariance matrix. However, it is well known that the chi-squared statistic is sensitive to sample size, often rejecting models even with acceptable practical fit. The results of the EFA revealed a clear unidimensional structure. All variables loaded substantially on a single factor, with loadings ranging from 0.501 to 0.934. Some items exhibited very high loadings (above 0.90), indicating strong contributions to the latent construct. Most uniqueness values were below 0.40, suggesting that the extracted factor explains a significant proportion of the variance in these variables. Overall, the factor solution supports the existence of a dominant latent dimension underlying the set of innovation indicators. The factor analysis revealed a dominant single factor, with an eigenvalue of 7.599, well above the commonly used threshold of 1.0. This factor alone accounted for 60.6% of the total variance in the dataset. The high eigenvalue and proportion of explained variance indicate a strong underlying dimension unifying the observed indicators. Because only one factor was extracted, the rotated and unrotated solutions are identical.

Reliability analysis was conducted using both Cronbach’s alpha and McDonald’s omega. The results revealed high internal consistency of the scale, with  $\alpha = 0.935$  and  $\omega = 0.955$  ( $SE = 0.011$ , 95% CI [0.934, 0.976]).

Therefore, this analysis reinforces the EIS as a well-defined construct and the robustness of the factor structure (H1 and H2, for 2024).

**Keywords:** Performance European Innovation, EIS, robustness of the factor structure, latent variable.

**Acknowledgement:** This work has been supported by national funds through FCT - Fundação para a Ciência e Tecnologia through project UIDB/04728/2020.

[1] Aldina Correia, Diogo Ribeiro, Filomena Teodoro. Exploring the European Innovation Scoreboard with Intelligent Feature Selection Using R. In: ICNAAM 2024 - The 23rd International Conference of Numerical Analysis and Applied Mathematics Proceedings, AIP conference Proceedings (to appear in 2025).



## Determinants of the Risk-of-Poverty Gap: A Panel Data Analysis Across European Countries

Cristina Lopes<sup>1</sup>, Lurdes Babo<sup>1</sup>, Cristina Torres<sup>1</sup>, Isabel Vieira<sup>1</sup>

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### Abstract:

The 2030 Agenda for Sustainable Development, adopted by all United Nations, outlines 17 Sustainable Development Goals (SDGs) to address global challenges and promote inclusive growth. Two of these goals are related to reduce poverty and social inequalities: SDG 01 – No Poverty and SDG 10 – Reduced Inequalities.

This study underscores the multifaceted nature of poverty and highlights the importance of integrated policy approaches that address housing affordability, health perceptions, educational attainment, and labour market participation to effectively mitigate poverty depth. According to Carlsen and Bruggemann (2022), monitoring the progress of the 17 Sustainable Development Goals (SDGs) requires an integrated and multidimensional approach that reflects the complex interdependencies between goals. Achieving a balance between poverty eradication, reducing inequalities, and climate action remains a critical challenge, as these goals often involve complex trade-offs and potential synergies (Khan, Yuan, & Hussain, 2024).

The socio-economic determinants influencing the poverty gap across European Union member states using Eurostat indicators over the period 2015–2023 were studied. Using panel data methods, we assess how various factors contribute to the depth of poverty, as measured by *Relative Median At-Risk-of-Poverty Gap* (SDG\_10\_30) - the distance between the median income of those at risk of poverty and the poverty threshold.

Regression models were estimated for the variable *Relative median at-risk-of-poverty gap* testing several possible regressors. From each set of similar measures related to each SDG, only one variable was chosen, to avoid multicollinearity and to take in account strong correlations and significant coefficients. From SDG01 (No poverty) it was chosen the *Housing cost overburden rate*, from SDG03 (Good Health and well-being) *Share of people with good or very good perceived health*, from SDG04 (Quality education) *Early leavers from education and training*, from SDG08 (Decent work and economic growth) the *Employment rate*, from SDG10 (Reduced inequalities) *Adjusted gross disposable income of households per capita*, and from SDG11 (Sustainable Cities and Communities) the *Severe housing deprivation rate*.

An OLS regression model was estimated and compared to fixed effects panel data models and random effects panel data models. Statistical tests such as F-test, Breusch-Pagan Lagrange Multiplier test, and Hausman test were applied, resulting in the panel data model with fixed effects for the individuals (countries) as the best model (Table 1). This model was validated regarding multicollinearity (all VIF<3) and the independence of the residuals (Pesaran

CD test  $p=0.8111$  and Breusch-Godfrey/Wooldridge test  $p=0.0664$ ). As to what concerns homoscedasticity, the Breusch Pagan test resulted in  $p=0.002044$ , therefore the robust variance-covariance matrix was used. The R-square (0.318) shows a moderate fit of the model.

Table 1 - Regression model with fixed effects for the individuals (countries), with *Relative median at-risk-of-poverty gap* (sdg\_10\_30) as dependent variable. The coefficients shown are computed with the robust variance-covariance matrix and Arellano method.

Variables		Estimate	Std. Error	t value	p-value	
Housing cost overburden rate	sdg_01_50	0.4642	0.1326	3.5014	0.0006	***
Share of people with good or very good perceived health	sdg_03_20	-0.2578	0.0891	-2.8922	0.0045	**
Early leavers from education and training	sdg_04_10a	-0.4941	0.1639	-3.0152	0.0031	**
Employment rate	sdg_08_30	-0.2830	0.1395	-2.0283	0.0445	*
Adjusted gross disposable income of households per capita	sdg_10_20	0.0002	0.0001	1.5617	0.1207	
Severe housing deprivation rate	sdg_11_11	-0.7095	0.3121	-2.2734	0.0246	*
Significance: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

The *housing cost overburden rate* exhibited a positive and significant effect ( $p=0.0006$ ) on the *Relative median at-risk-of-poverty gap*. This suggests that in countries where housing costs are more substantial, there is an increase in the *Relative median at-risk-of-poverty gap*, resulting in elevated levels of inequality. A negative significant effect was observed in the other variables, except for *Adjusted gross disposable income of households per capita*, which did not demonstrate a significant effect. In countries where the *Share of people with good or very good perceived health* is high ( $p=0.0045$ ), there is a reduced incidence of inequalities. It is evident that an increase in the *Employment rate* has a concomitant effect of reducing the *Relative median at-risk-of-poverty gap*. However, a surprising finding was the observation of significant negative coefficients in both the *Early leavers from education and training* ( $p=0.0031$ ) and the *Severe housing deprivation rate* ( $p=0.0246$ ), meaning that these factors contribute to a decrease in the *Relative median at-risk-of-poverty gap*.

Results indicate that housing cost pressures significantly exacerbate income inequality, while improved health perception and higher employment rates are associated with reduced inequality; however, the unexpected mitigating influence of early school leaving and severe housing deprivation on poverty gaps highlights the complex and context-dependent nature of socio-economic indicators.

Integrated SDG strategies in housing, health, and education policies are essential for sustained reductions in inequality. Potential measures including the expansion of affordable housing, investment in community health programs, and improved access to quality education may be more effective in mitigating disparities than income-focused approaches alone.

References:

Carlsen, L., & Bruggemann, R. (2022). The 17 United Nations' sustainable development goals: A status by 2020. *International Journal of Sustainable Development & World Ecology*, 29(3), 219-229.

Khan, S., Yuan, H., & Hussain, M. (2024). Balancing act: Trade-offs and synergies within Sustainable Development Goals 1st, 10th, and 13th—Poverty, inequality, and climate actions. *Sustainable Development*, 32(6), 6950-6967.

**Keywords:** Sustainable Development Goals, Panel data regression, European Countries, Poverty, Inequalities

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## Analysis of the External Debt of Bosnia and Herzegovina and Portugal

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### Abstract:

#### Purpose

This study aims to examine and show the trends in external debt in Portugal and Bosnia and Herzegovina during the recent period using graphical representation and comparative analysis. By analyzing the dynamics of external debt, its size, growth or declining patterns, as well as its share in GDP, this explores the economic drivers behind such trends. By comparing a transition economy with restricted access to international capital markets (Bosnia and Herzegovina) and a Eurozone member recovering from a debt crisis (Portugal), the study investigates key determinants of external debt sustainability and the strategies applied for its management.

#### Methodology

Methodology involves collecting and analyzing current statistics on Portugal and Bosnia and Herzegovina external debt for 2019-2024. Using the methodological approach developed by Reinhart and Rogoff (2020) as a foundation, we examine external debt from several perspectives: the total amount and its growth or decline over time; the ratio of external debt to GDP; visualizing debt trends through graphs to identify patterns; pinpointing major events that have influenced debt paths; and comparing institutional factors that affect how debt is managed. The analysis considers significant economic disruptions during the study period, with particular emphasis on the COVID-19 pandemic, as reported by the OECD (2023).

#### Results

In Bosnia and Herzegovina, the analysis indicates a consistent but gradual rise in external debt, which aligns with the research by Hurić-Bjelan and Hadžiahmetović (2021). The current state of the country as a transition economy combined with its complex institutional framework has shaped unique patterns in its external borrowing. Important observations include the following: limited access to international capital markets has both restricted and supported the stabilization of the country's debt profile; institutional fragmentation has hindered efficient debt management; and the COVID-19 pandemic has placed moderate strain on external debt levels. In the case of Portugal, the analysis reveals that membership in the European Union and the Eurozone has significantly influenced the country's external debt development. After the debt crisis, there was a notable change in borrowing behavior, with the country benefiting from more favorable borrowing conditions than non-EU members. This comparative analysis demonstrates how

factors such as political stability, fiscal reforms, and international economic integration lead to different external debt paths, despite facing similar global pressures.

## Conclusion

The similarity in external debt patterns between Portugal and Bosnia and Herzegovina helps to understand the impact that economic globalization, political stability, and budgetary reforms have on the development of external debt. Both countries have experienced growth in external debt, although the speed and driving factors of this growth differ significantly. This study emphasizes the importance of monitoring debt sustainability in relation to domestic economic performance as well as global financial pressures. It also points out that membership in monetary unions offers advantages such as increased borrowing capacity and stability, while transition economies may have a gradual path to deeper integration into the international financial system. By analyzing the dynamics of external debt in different institutional frameworks, the research provides important guidance for policymakers, financial analysts, and researchers, especially for countries aspiring to join the EU, on balancing greater economic integration with debt sustainability. Future research should also consider how digital transformation and the shift to green investments affect external debt profiles in both developed and transition economies

**Keywords:** external debt, COVID-19 impact, fiscal reforms, debt sustainability, comparative analysis

## References:

- Hurić-Bjelan, J., & Hadžiahmetović, A. (2020). External debt in Bosnia and Herzegovina—An empirical analysis. *The South East European Journal of Economics and Business*, 15(2), 70-82.
- OECD. (2023). *Economic Outlook: The Impact of COVID-19 on Public Finances*. Paris: OECD Publishing.
- Reinhart, C. M., & Rogoff, K. S. (2020). *This Time Is Different: Eight Centuries of Financial Folly* (Updated Edition)





## Optimizing Commercial Teams Performance and Territory Design Using Mathematical Models

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### Context:

This study was developed in the business context of NORS Construction Equipment ST, a wholly owned subsidiary of NORS, S.A., which sells, rents, and services equipment across sectors such as construction, infrastructure, mining, oil and gas, public services, municipalities, waste management, and forestry. Operating across Canada, a vast and geographically sparse country, logistical challenges are critical in optimizing operations. Effective sectorization of this territory is essential for maximizing operational efficiency. Given the enormous potential of the Canadian market, the performance of commercial teams plays a fundamental role in the company's success.

### Problem Framing:

This research tackles two interconnected challenges faced by the company: the evaluation of commercial team performance and the sectorization of the Canadian market. Traditionally, commercial team performance was evaluated solely based on sales volume, a limited approach that failed to capture the nuances of team efficiency. Sectorization, on the other hand, aims to optimize the assignment of commercial teams to territories, ensuring effective resource allocation across a geographically dispersed market.

### Objectives:

The objective of this study is to improve the evaluation of commercial team performance by incorporating a range of Key Performance Indicators (KPIs) and to optimize the sectorization of Canada's vast market using mathematical models.

### Methodology:

To evaluate commercial team performance, several KPIs were considered, such as the number of sales opportunities per team member, the win rate (percentage of opportunities won), and the monetary value of both lost and won deals. These KPIs provide a comprehensive understanding of the teams' effectiveness and enable management to identify and address underperformance. Customer segmentation was performed using the RFM (Recency, Frequency, and

Monetary Value) model (Patron, 2004), categorizing customers into Low-Value, Mid-Value, and High-Value groups based on their purchasing behaviour.

Sectorization was approached as an optimization problem (Álvarez-Miranda et al, 2022; Sandoval et al, 2022), where a linear programming model was developed to allocate sales territories. The objective function minimized total travel distance, ensuring compact sectors (Lopes et al, 2023). Constraints included balancing the number of sales opportunities and the distribution of customer types (Low-value, Mid-value, High-value). The implementation of this model used Python, and Pareto front analysis was conducted to explore multiple optimal solutions for the sectorization.

### **Results and Conclusion/Contributions:**

For evaluating commercial team performance, the study goes beyond sales volume by incorporating multiple KPIs, offering a comprehensive view of team effectiveness. The new model allows for a deeper understanding of why some sales contracts are lost, providing management with actionable insights to improve sales strategies and better allocate team resources. This approach equips the company with the tools to optimize performance across its commercial teams.

The optimization process resulted in a more efficient and balanced distribution of sales territories compared to the current system. Significant improvements were observed, such as reductions in imbalance (20.55%, 25.70%, and 8.86%) and travel distance (18.36%, 15.92%, and 33.24%) for the Case, Crane, and Construction Equipment divisions, respectively. These improvements demonstrate the model's effectiveness in optimizing resources and enhancing operational efficiency.

The proposed sectorization not only reduces travel distances but also balances the assignment of customers across sales teams, ensuring better coverage of high-value clients and improving market penetration. These outcomes are expected to lead to higher sales and better resource allocation, contributing significantly to the company's growth.

### **References:**

- Álvarez-Miranda, E., & Pereira, J. (2022). "A Districting Application with a Quality of Service Objective". *Mathematics*, 10(1), 13. <https://doi.org/10.3390/math10010013>
- Lopes, C.; Rodrigues, A. M.; Romanciuc, V.; Ferreira, J. S.; Öztürk, E. G. and Oliveira, C. (2023) "Divide and conquer: A location-allocation approach to sectorization," *Mathematics* 11 (11), 2553. <http://dx.doi.org/10.3390/math11112553>
- Patron, M. (2004) "Case Study: Applying RFM segmentation to the SilverMinds catalogue". *J Direct Data Digit Mark Pract* 5, 269–275. <https://doi.org/10.1057/palgrave.im.4340243>
- Sandoval, M. G.; Álvarez-Miranda, E.; Pereira, J.; Ríos-Mercado, R. Z. and Díaz, J. A. (2022) "A novel districting design approach for on-time last-mile delivery: An application on an express postal company," *Omega*, vol. 113, p. 102687. <https://doi.org/10.1016/j.omega.2022.102687>

**Keywords:** Performance analysis, Sectorization, Optimization, Sales territories, Machinery and construction equipment



## An Essay on the Evolving Role of B2B Salespeople in the Age of Artificial Intelligence: Challenges and Opportunities

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### Abstract:

Technology has played a crucial role in the evolution of sales, optimizing processes, enhancing the customer experience and generating significant competitive advantages. In recent years, Artificial Intelligence (AI) has emerged as a transformative factor in sales strategies, particularly in the B2B context, reshaping practices and redefining roles within organizations (Rainsberger, 2023; Singh et al., 2019). Although the full impact of AI on sales is still uncertain, it is undeniable that its adoption is profoundly changing the commercial landscape, bringing both challenges and opportunities for companies and professionals in the sector (McClure et al., 2024).

The integration of AI into B2B sales brings benefits across multiple dimensions, including process automation, optimization of customer relationship management (CRM), and improved predictive capabilities through large-scale data analysis (Rodriguez & Peterson, 2024). Digital monitoring technologies and automation tools enable efficiency and innovation gains, offering companies a significant competitive advantage (Silva et al., 2023; Neeb, 2023). However, there is still a gap between expectations about the benefits of AI and the concrete results observed, especially in complex organizational contexts, where technological adaptation faces cultural and structural barriers (Keegan et al., 2024).

The literature highlights different areas of impact of AI on B2B sales: (i) AI-Enhanced Market Dynamics & Strategies, which addresses the influence of AI on competition and consumer behaviour prediction; (ii) AI for Decision-Making, which explores the integration of AI in CRMs and big data to optimize strategic decisions; (iii) AI for Value-Transformation, highlighting the role of AI in innovation and value co-creation; and (iv) AI for Ethical Marketing, which analyses issues such as algorithmic bias and ethics in the use of data (Labib, 2024).

In addition to technological advances, the role of salespeople is undergoing significant transformation. With AI taking over operational and repetitive tasks, such as order processing and prospecting, salespeople can focus on more strategic and consultative roles (Chang, 2022). This shift drives the need for analytical skills to interpret large volumes of data and create personalized strategies that improve sales performance (Peesker et al., 2022). New roles, such

as Sales Analysts, Digital Prospecting Specialists and Sales Operations Managers, are emerging to support this new paradigm (Elhajjar et al., 2023). In B2C markets, automation tends to replace human interaction, while in B2B, the salesperson remains essential, using AI as a support tool (Rodríguez et al., 2020).

However, the digitalization of B2B sales presents challenges, such as sellers' resistance to change (Giovannetti et al., 2022) and the management of the human factor during technological implementation (Alavi & Habel, 2021). Successful adaptation depends on clear strategies and organizational support to overcome cultural and structural barriers (Mattila et al., 2021). On the other hand, significant opportunities arise, such as the use of AI for real-time feedback, automation of operational tasks, and the creation of new positions focused on digital analysis and strategy (Luo et al., 2021)

The increasing integration of AI in the sales sector is transforming organizational processes, roles and strategies. A conceptual model highlights the main dimensions of this transformation: (i) operational efficiency and automation, where AI takes over repetitive tasks, optimizing resources and increasing productivity (McClure et al., 2024); (ii) strategic decision-making, with AI-based tools that analyse large volumes of data, enabling predictive insights and strategy personalization (Peesker et al., 2022); (iii) transformation of the salesperson's role, which shifts from operational tasks to more strategic and consultative functions, driving new professional categories (Elhajjar et al., 2023); (iv) human-AI interaction in the customer experience, where technologies such as augmented and virtual reality strengthen trust and personalization (Giovannetti et al., 2022); and (v) organizational challenges and adaptation, which include cultural barriers, redefining performance metrics, and investing in ongoing training (Paschen et al., 2021).

The future of sales in the AI era points to a hybrid model, where the efficiency of automation is combined with human intuition and expertise (Chang, 2022). Emerging technologies, such as augmented and virtual reality, promise to transform the sales experience, offering immersive product demonstrations and virtual negotiations (Giovannetti et al., 2022). In this scenario, collaboration between humans and machines will be essential to create value, drive personalization and ensure competitive advantage for organizations (Jazairy et al., 2025). The conclusion highlights that the integration of AI in B2B sales is reshaping the sector, increasing operational efficiency, refining decision-making and transforming the role of the salesperson. The hybrid model is seen as the future of sales, where humans and AI collaborate to drive innovation and engagement. However, cultural and structural barriers must be overcome for organizations to maximize the benefits of this integration.

Future research should explore the long-term effects of AI on sales performance, work dynamics and organizational structures, as well as ethical issues and ongoing training for technological adaptation.

**Keywords:** Artificial Intelligence; B2B Sales; Sales Technology; Sales Process Automation; Hybrid Sales Model.

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## References

- Alavi, S., & Habel, J. (2021). The human side of digital transformation in sales: review & future paths. *Journal of Personal Selling & Sales Management*, 41(2), 83–86. <https://doi.org/10.1080/08853134.2021.1920969>
- Chang, W. (2022). The effectiveness of AI salesperson vs. human salesperson across the buyer-seller relationship

stages. *Journal of Business Research*, 148, 241-251. <https://doi.org/10.1016/j.ibusres.2022.04.065>

Elhajjar, S., Yacoub, L., & Ouaida, F. (2023). The present and future of the B2B sales profession. *Journal of Personal Selling & Sales Management*, 44(2), 128–141. <https://doi.org/10.1080/08853134.2023.2183214>

Giovannetti, M., Sharma, A., Cardinali, S., Cedrola, E., & Rangarajan, D. (2022). Understanding salespeople's resistance to, and acceptance and leadership of customer-driven change. *Industrial Marketing Management*, 107, 433-449. <https://doi.org/10.1016/j.indmarman.2022.10.021>

Jazairy, A., Shurrab, H., & Chedid, F. (2025). Impact pathways: Walking a tightrope—Unveiling the paradoxes of adopting artificial intelligence (AI) in sales and operations planning. *International Journal of Operations & Production Management*, 45(13), 1-27. <https://doi.org/10.1108/IJOPM-07-2024-0582>

Keegan, B.J., Dennehy, D., & Naudé, P. (2024). Implementing Artificial Intelligence in Traditional B2B Marketing Practices: An Activity Theory Perspective. *Information Systems Frontiers*, 26(6), 1025–1039. <https://doi.org/10.1007/s10796-022-10294-1>

Labib, E. (2024). Artificial intelligence in marketing: exploring current and future trends. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2024.2348728>

Luo, X., Qin, M. S., Fang, Z., & Qu, Z. (2021). Artificial Intelligence Coaches for Sales Agents: Caveats and Solutions. *Journal of Marketing*, 85(2), 14-32. <https://doi.org/10.1177/0022242920956676>

Mattila, M., Yrjölä, M., & Hautamäki, P. (2021). Digital transformation of business-to-business sales: what needs to be unlearned? *Journal of Personal Selling & Sales Management*, 41(2), 113–129. <https://doi.org/10.1080/08853134.2021.1916396>

McClure, C. E., Epler, R. T., Schmitt, L., & Rangarajan, D. (2024). AI in sales: Laying the foundations for future research. *Journal of Personal Selling & Sales Management*, 44(2), 108–127. <https://doi.org/10.1080/08853134.2024.2329905>

Neeb, H. P. (2023). Technology in sales. In *Account management strategies in B2B sales* (pp. 67-83). Springer. [https://doi.org/10.1007/978-3-658-40450-5\\_4](https://doi.org/10.1007/978-3-658-40450-5_4)

Paschen, J., Kietzmann, J., & Kietzmann, T. C. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business & Industrial Marketing*, 34(7), 1410-1419. <https://doi.org/10.1108/JBIM-10-2018-0295>

Peesker, K. M., Kerr, P. D., Bolander, W., Ryals, L. J., Lister, J. A., & Dover, H. F. (2022). Hiring for sales success: The emerging importance of salesperson analytical skills. *Journal of Business Research*, 144, 17–30. <https://doi.org/10.1016/j.ibusres.2022.01.070>

Rainsberger, L. (2023). Sales technology: An ocean of possibilities. In *Digital transformation in sales*. Springer, Wiesbaden. [https://doi.org/10.1007/978-3-658-38887-4\\_4](https://doi.org/10.1007/978-3-658-38887-4_4)

Rodriguez, M., & Peterson, R. (2024). Artificial intelligence in business-to-business (B2B) sales process: A conceptual framework. *Journal of Marketing Analytics*, 12(4), 778–789. <https://doi.org/10.1057/s41270-023-00287-7>

Rodríguez, R., Svensson, G., & Mehl, E. J. (2020). Digitalization process of complex B2B sales processes – Enablers and obstacles. *Technology in Society*, 62, 101324. <https://doi.org/10.1016/j.techsoc.2020.101324>

Silva, P. M., Lima, A. P., & Teixeira, S. F. (2023). The use of sales technology by salespeople as an information source and stimulant for intrapreneurship. *Revista Galega De Economía*, 32(2), 1-20. <https://doi.org/10.15304/rge.32.2.8606>

Singh, J., Flaherty, K., Sohi, R. S., Deeter-Schmelz, D., Habel, J., Le Meunier-FitzHugh, K., ... Onyemah, V. (2019). Sales profession and professionals in the age of digitization and artificial intelligence technologies: concepts, priorities, and questions. *Journal of Personal Selling & Sales Management*, 39(1), 2–22. <https://doi.org/10.1080/08853134.2018.1557525>





## Young Students' Knowledge and Practices of Financial and Tax Literacy: A Study in the Porto Region (Portugal)

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### Abstract:

Financial and fiscal literacy are crucial in equipping individuals with the knowledge and skills necessary to manage personal resources, understand fiscal obligations, and contribute to long-term economic resilience. The increasing complexity of the financial environment, digital banking tools, and globalized markets heightens the need for financial literacy, especially among younger generations transitioning into economic independence.

This study examines the financial and fiscal literacy of Portuguese youth aged 17 to 25, in Porto city region. The selection of the Porto city region is justified by the fact that it is the second most important city in Portugal, and that the researchers are also inhabitants of the same region. The primary aim is to assess not only the levels of knowledge in these domains but also behavioral tendencies and contextual factors affecting outcomes. The literature review emphasizes the multidimensional nature of financial literacy—covering knowledge, behavior, and attitudes (Remund, 2010)—and its strong correlation with life outcomes, including savings, credit management, and investment planning (Lusardi & Mitchell, 2011).

The OECD (2024) highlights that while access to financial tools has increased among youth, proper guidance and structured education have not followed suit. In PISA 2022, only 11% of students could solve complex financial problems, indicating severe readiness gaps. Similarly, Lopes (2016) underscores the underdeveloped state of fiscal literacy in Portugal, which often remains excluded from mainstream education despite its relevance for responsible citizenship.

This study adopts a quantitative methodology using an online survey answered by 55 participants. The questionnaire was adapted from validated international studies and segmented into financial and fiscal knowledge, self-perception of literacy, financial behavior, and demographic information. Results reveal that 32.7% of respondents scored at an insufficient level overall, while only 18.2% demonstrated high literacy.

A clear discrepancy was observed between financial and fiscal knowledge. While most participants understood basic financial concepts—such as simple interest (84%) and inflation—less than 35% could correctly answer questions related to income taxation, tax brackets, and deductible expenses. The majority also misunderstood the obligations of freelancers or students with part-time income.

The analysis showed strong correlations between higher literacy and certain predictors: being enrolled in higher education, financial autonomy, and access to economic subjects. Participants who earned an independent income and managed personal accounts performed significantly better. Moreover, the study found that self-perceived financial knowledge did not consistently align with actual performance, highlighting issues of overconfidence—a phenomenon confirmed by Cannistrà et al. (2024).

Participants indicated high interest (76%) in learning more about these topics. Among proposed educational strategies, scenario-based simulations, gamified platforms, and hybrid online courses were rated most effective. This reflects current evidence from Kaiser & Menkhoff (2019), who found that financial education programs yield measurable improvements in student outcomes, particularly when delivered experientially.

This study has some limitations. Firstly, it was carried out in a single area of Portugal and has a small sample size. Despite these limitations, the study contributes to raising awareness of the need to strengthen financial literacy skills among young people. This study serves as a starting point for a more comprehensive one, covering more territory and young people.

**Keywords:** Financial Literacy, Fiscal Literacy, Young Adults, Financial Knowledge, Tax Knowledge, Portugal, Financial Education, Tax Education

## References:

- Cannistrà, M., De Beckker, K., Agasisti, T., Amagir, A., Pöder, K., Vartiak, L., & De Witte, K. (2024). The impact of an online game-based financial education course: multi-country experimental evidence. *Journal of Comparative Economics*, 52(4), pp. 825-847.
- Lusardi, A. and Mitchell, O.S. (2011) 'Financial literacy around the world: an overview', *Journal of Pension Economics and Finance*, 10(4), pp. 497–508. doi:10.1017/S1474747211000448.
- Lopes, C.M. da M. and Brites, R. (2016). O conhecimento fiscal, as perceções fiscais e a educação fiscal em Portugal. *Revista de Finanças Públicas e Direito Fiscal*, 8(4), pp.13–33. Lisboa: Faculdade de Direito da Universidade de Lisboa (FDUL).
- OECD (2024). PISA 2022 Results: How Financially Smart Are Students?. Available at: [https://www.oecd.org/en/publications/pisa-2022-results-volume-iv\\_5a849c2a-en.html](https://www.oecd.org/en/publications/pisa-2022-results-volume-iv_5a849c2a-en.html) (Accessed: 21 March 2025).
- OECD (2025). Action needed to address gaps in financial literacy among students. Available at: <https://www.oecd.org/en/about/news/press-releases/2024/06/Action-needed-to-address-gaps-in-financial-literacy-among-students.html> (Accessed: 24 March 2025).
- OECD (2025). Shaping students' financial literacy. Available at: [https://www.oecd.org/en/publications/shaping-students-financial-literacy\\_c3f3dc74-en.html](https://www.oecd.org/en/publications/shaping-students-financial-literacy_c3f3dc74-en.html) (Accessed: 17 March 2025).
- Remund, D.L. (2010), Financial Literacy Explicated: The Case for a Clearer Definition in an Increasingly Complex Economy. *Journal of Consumer Affairs*, 44: 276-295. <https://doi.org/10.1111/j.1745-6606.2010.01169.x>
- Hogarth, J.M. and Hilgert, M.A. (2002). Financial knowledge, experience and learning preferences: preliminary results from a new survey on financial literacy. *Consumer Interest Annual*, 48.
- Mandell, L. and Klein, L.S. (2009). The impact of financial literacy education on subsequent financial behavior. *Journal of Financial Counseling and Planning*, 20(1), pp.15–24.
- Kaiser, T. and Menkhoff, L. (2020). Financial education in schools: a meta-analysis of experimental studies. *Economics of Education Review*, 78, p.101930.



## The Paradox Between Concept Knowledge and Digital Maturity Level for Industry 4.0: The Portuguese Case

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### Abstract:

This study investigates the paradox between theoretical knowledge of the Industry 4.0 (I4.0) concept and the actual level of digital maturity observed in Portuguese industrial companies. Specifically, it examines whether companies' awareness of I4.0, geographic location, and size influence their capacity to adopt and integrate digital technologies. Data were collected from a sample of 450 companies through a structured self-assessment questionnaire developed in collaboration with the Shift2Future consortium. The instrument evaluated the degree of familiarity with the I4.0 concept and the stage of digital maturity across different dimensions. The statistical analysis applied ordinal logistic regression models and chi-square tests to assess three hypotheses related to the potential influence of concept knowledge, regional distribution, and company size.

The results reveal no statistically significant relationship between the tested variables and the level of digital maturity, suggesting that individual factors do not primarily drive digital advancement. Instead, the findings indicate that broader structural and strategic dimensions, such as leadership commitment, participation in support programs, availability of qualified human resources, and alignment with national and European digitalization agendas, are more decisive in determining companies' digital readiness.

These results challenge common assumptions in the literature, which often posit a direct relationship between company characteristics and technological integration. The study highlights the limited predictive power of isolated variables and highlights the importance of a systemic and integrated approach to promoting digital transformation. The findings contribute to academic and policy discussions by identifying the need for more comprehensive frameworks considering the complex interplay of internal capabilities and external enablers.

Future research should expand this approach by including longitudinal and sector-specific analyses and qualitative data to explore internal organizational dynamics, leadership behaviour, and employee digital literacy. The data gained can support designing more effective and inclusive digital transition strategies for industrial firms in Portugal and similar European contexts.

**Keywords:** Concept Knowledge, Digital Maturity, Industry 4.0, Regional Disparities, Portugal.

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## Nestlé Analysis of International Risk Management Instruments

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### Abstract:

This report explores key subjects like risk management techniques for reducing exchange rate volatility, capital distribution models that equilibrate short-term liquidity with long-term investments, and the effects of regulatory adherence on international operations. Furthermore, it examines how global corporations enhance their financial tactics to maintain growth and generate value for investors in a continuously evolving global environment.

This study offers insights into how top global companies manage the complex dynamics of international financial management by examining Nestlé's financial strategies as a case study. The results seek to shed light on general principles and effective strategies relevant to multinational companies aiming to succeed in an intricate and competitive global economy.

These factors, combined with the complexity of operating in diverse markets, underline the importance of flexibility and resilience in Nestlé's global strategy.

**Keywords:** Nestlé; Hedge; Financial risk; Derivatives



## Are we in a housing bubble? Empirical evidence from Portugal

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### Abstract:

This paper investigates whether housing price bubbles emerged in Portugal's two major metropolitan areas — Lisbon and Porto — and whether price pressures in central municipalities have spilled over into neighboring municipalities. We employ a quantitative approach based on the present value model, testing three hypotheses regarding affordability, speculative behavior, and spatial contagion. Affordability was analyzed using the housing affordability index (price-to-income ratio). Housing bubbles were identified if rental yields fell below mortgage interest rates (measured with T-tests). The spillover effects were identified using the Granger causality test.

The results show a substantial decline in affordability in both metropolitan areas. Lisbon reached an affordability index of 24.5 years of net income to purchase a standard dwelling (up from 13.8 in 2017). Porto also sees a significant rise to 19.1 years. While no widespread housing bubble was detected, localized speculative signs appeared in Lisbon and Oeiras, where housing yields temporarily fell below mortgage rates. Both metropolitan areas have widespread spillover effects, especially in Porto's neighboring municipalities, showing that the affordability constraints depart from the central municipality but affect neighboring municipalities.

Policymakers can benefit from these conclusions to address the housing affordability problem with metropolitan-level policies instead of national-level or municipal-level policies, as they are being addressed today.

**Keywords:** Housing Prices, Bubbles, Real Estate





## The Disruptive Power of Digitalization upon Financial Services

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### Abstract:

This narrative literature examines the accelerating impact of digitalization on financial services five years after the author's initial publication on this topic. It investigates how cloud computing, artificial intelligence (AI), and digital assets are transforming the financial landscape and creating opportunities for both incumbent institutions and fintech disruptors.

The study employs qualitative analysis of industry reports, academic literature, and primary interviews with financial technology experts. Case studies of leading institutions implementing digital transformation strategies are examined to identify best practices and evaluate performance outcomes.

The research identifies three primary drivers of digital disruption in financial services: cloud computing infrastructure (particularly DevOps implementation), AI applications (across customer engagement, risk management, compliance, and insurance), and digital assets. Key findings demonstrate that institutions successfully leveraging these technologies achieve measurable improvements in operational efficiency, customer experience, risk assessment accuracy, and regulatory compliance.

Incumbent financial institutions are challenged on many fronts from shareholders, analysts, customers and other stakeholders, to become more efficient subject to their regulatory constraints. Broadly speaking, four levers are identified to maximize productivity, including managing revenue growth, applying digitalization and automation, employing advanced analytics (including AI/machine learning), and greater management of human capital and conduct. Financial institutions understand that efficiency gains can be delivered by harnessing data, automation and AI as part of an overall digitalization strategy.

Financial institutions face this challenge with varying levels of commitment, investment and engagement. Many banks have increasingly embraced big data, AI and advanced processing tools. But the very existence of fintechs and their growing role in payments, lending, and investments validate the disruptive power of digitalization in financial services and many banks, big and small, are embracing digitalization to build shareholder value, so some banks are up to the challenge.

Fintechs, more so than incumbent firms, appear to quickly adopt innovative and disruptive technologies. Fintechs are companies that rely on technology and cloud services (as opposed to physical branch locations) to provide financial services to customers. Many believe Fintech came to prominence during the Global Financial Crisis in response to lost trust in incumbent financial services and the introduction of new means to distribute financial services

via cloud-based services. Cloud-computing, AI and Digital Assets are three of the more important developments today in financial services.

A revolution is underway in global financial services markets today. The traditional supermarket model to acquire and cross-sell services followed by some incumbents is now increasingly being challenged by new digitally enabled entrants.

These new players lure away digitally savvy clients, tempted by improved customer experience, greater efficiency and lower cost structures. We have also seen that in many cases, players are bundling several technologies at once such as cloud computing, APIs and AI, to provide better customer experience, reduce client prospecting costs and gain greater risk insights.

Players in the financial services ecosystem are leveraging the power of digitalization to enhance shareholder value by realizing customer experience gains, improved efficiency and identifying and repricing risks dynamically.

**Keywords:** Digitalisation, Financial Services, Artificial Intelligence, Digital Assets

#### References:

- Arner, D., Barberis, J., and Buckley, R. (2017). The evolution of fintech: A new post-crisis paradigm. *Georgetown Journal of International Law*. 47. 421.
- BankDirector. (2022). Capital One's Secret to Success. Available at: <https://www.bankdirector.com/article/capital-ones-secret-to-success/> (Accessed 8 March 2024).
- BIS. (2021). Fintech regulation: How to achieve a level playing field. Available at: <https://www.bis.org/fsi/fsipapers17.pdf> (Accessed 9 February 2021).
- Boot, A., Hoffman, P. Laeven, L., Ratnovoski, L. (2020). Financial intermediation and technology. What's old, what's new? ECB Working Paper. Number 2438.
- Chishti, S. (2021). Susanne Chishti, interviewed by the author.
- DBS. (2025). DBS uses AI to Nudge Clients. Available at: <https://www.dbs.com/artificial-intelligence-machine-learning/index.html> (Accessed 22 March 2025).
- Deloitte. (2020). DevOps Point of View. An Enterprise Architecture Perspective. Available at: <file:///Users/waltergontarek/Pictures/deloitte-nl-etp-devops-point-of-view.pdf> (Accessed 19 December 2020).
- Fortune. (2025). Goldman Sachs CEO says that AI can draft 95% of an IPO prospectus in minutes. Available at: <https://fortune.com/2025/01/17/goldman-sachs-ceo-david-solomon-ai-tasks-ipo-prospectus-s1-filing-sec/> (Accessed 20 January 2025).
- Gartner. (2025). Build AI Agent Services to Revolutionize Client Operations. Available at: [https://www.nice.com/lps/rpcs-gartner-ai-agent&utm\\_campaign=NL\\_Q125\\_EN\\_PLT\\_GLOB\\_243695\\_CLP\\_RPCS-Gartner-Build-AI-Agent&utm\\_source=google&utm\\_medium=cpc&utm\\_content=0295424&utm\\_detail=dentsu-all-us\\_ca-ai\\_agent&qad\\_source=1&gclid=Cj0KCQjwqcO\\_BhDaARIsACz62vNYE76614xerolvFtQJO6DX0gaVp3wDfZBWCOJ1h2ZhSl6ngovEcaAnozEALw\\_wcB](https://www.nice.com/lps/rpcs-gartner-ai-agent&utm_campaign=NL_Q125_EN_PLT_GLOB_243695_CLP_RPCS-Gartner-Build-AI-Agent&utm_source=google&utm_medium=cpc&utm_content=0295424&utm_detail=dentsu-all-us_ca-ai_agent&qad_source=1&gclid=Cj0KCQjwqcO_BhDaARIsACz62vNYE76614xerolvFtQJO6DX0gaVp3wDfZBWCOJ1h2ZhSl6ngovEcaAnozEALw_wcB) (Accessed 20 February 2025).
- Gontarek, W. (2021). Digital Disruption: How the Financial Services Landscape is Being Transformed. T. King et al (eds.), *Disruptive Technologies in Banking and Finance*, Palgrave Studies in Financial Services Technology. [https://doi.org/10.1007/978-3-030-81835-7\\_8](https://doi.org/10.1007/978-3-030-81835-7_8).
- Hon, W. K., & Millard, C. (2018). Banking in the cloud: Part 1 – banks' use of cloud services. *Computer Law & Security Review*, 34(1), 4-24.
- Houlihan Lokey. (2025). Digital assets update. Available at: <https://hl.com/insights/digital-assets-and-blockchain-market-update/> (Accessed 9 March 2025).
- Kuisma, T. Laukkanen, T., and Hiltunen, M. (2007). Mapping reasons for resistance to internet banking. A means-end approach. *International Journal of Information Management*. 27(2). 75-85.
- KYC 360. (2024). Key Takeaways from TD's Historic Fines for AML Breaches. Available at: <https://kyc360.com/knowledge-hub/resources/key-takeaways-from-td-banks-record-fine-for-amlfailures> (Accessed 15 March 2025).

- McKinsey. (2018). Unlocking success in digital transformations. Available at: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/unlocking-success-in-digital-transformations> (Accessed 29 October 2018).
- McKinsey. (2019). A recipe for banking operations efficiency. Available at: <https://www.mckinsey.com/industries/financial-services/our-insights/banking-matters/a-recipe-for-banking-operations-efficiency> (Accessed 3 January 2020).
- McKinsey. (2024). What is Fintech? Available at: <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-fintech> (Accessed 18 March 2025).
- Sabato, G. (2021). Gabriele Sabato, interviewed by the author.
- Saunders, A. and Cornett, M. (2018). Financial Markets and Institutions. 7th Edition. McGraw-Hill Education: New York.
- TX. (2024). How does Agentic AI based risk assessment outshine the others? Available at: <https://www.testingxperts.com/blog/agentic-ai-insurance> (Accessed 10 December 2024).
- US Government. (2025). Presidential Action: Strengthening American Leadership in Digital Financial Technology. Available at: <https://www.whitehouse.gov/presidential-actions/2025/01/strengthening-american-leadership-in-digital-financial-technology/> (Accessed 13 March 2025).



## CFA: Financial Analysis with Cognitive Diversity

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### Abstract:

Combining the forecasts of multiple models or experts is a well-established strategy in predictive analytics, particularly in finance. Traditional ensemble approaches typically rely on simple averaging or on assigning more weight to historically better-performing models. However, these methods often underappreciate a critical factor: the value of disagreement or 'cognitive diversity' among models.

This paper presents Combinatorial Fusion Analysis ('CFA'), a methodology that builds on existing ensemble techniques by introducing a third weighting dimension—diversity weighting. CFA posits that the divergence among independently derived model outputs contains valuable information. Rather than punishing outliers, it strategically amplifies the influence of diverse predictions under the logic that such variance can cancel out systematic errors and expose hidden insights.

Originally formulated for use in decision fusion and ranking systems outside finance, CFA is adapted here to the context of portfolio optimization. The authors implement CFA within the OBEX Volatility Parity Strategy® ('OVPS'), using machine learning models including Random Forests, SVMs, Neural Networks, and XGBoost. Each model analyzes a set of 17 stock attributes (12 financial, 5 technical), and the aggregated output ranks stocks for investment.

CFA is described as a reinforcement-learning-based pipeline, using score normalization, rank aggregation, and stochastic dominance to refine predictions. The paper also includes a pedagogical example from figure skating scoring to illustrate how diverse opinions can be algorithmically balanced.

**Keywords:** CFA, diversity, prediction, stock attributes, AI



## Implementation of Basel III Stress Testing Framework in Ukraine's Banking System During Military Conflict.

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Keywords: Stress testing, Banking supervision, Financial stability, Military conflict, Basel standards

### Introduction

Stress testing has become a fundamental tool for ensuring banking sector stability worldwide, particularly following the 2008 financial crisis. The Basel Committee on Banking Supervision established comprehensive principles for stress testing in 2018, creating international standards that guide regulatory practices across jurisdictions. However, implementing these standards becomes significantly more complex during extraordinary circumstances such as military conflict. Ukraine's banking system presents a unique case study, as the National Bank of Ukraine (NBU) resumed comprehensive stress testing in 2025 after a four-year suspension due to the COVID-19 pandemic and Russia's full-scale military aggression that began in February 2022. This situation creates an unprecedented opportunity to examine how international banking standards can be adapted to function effectively during active military conflict while maintaining regulatory integrity and financial system stability.

### Purpose

This research aims to compare Ukraine's stress testing methodology with Basel III principles and identify the main modifications made to accommodate military conflict conditions. The study examines how the National Bank of Ukraine adapted international standards in 2025, focusing on key differences in scenario design, governance structures, and capital requirements. The research seeks to understand what specific changes were necessary to implement Basel standards during wartime and how these changes differ from the original Basel framework.

### Relevance

This study is relevant because Ukraine currently faces the unique challenge of implementing international banking standards during military conflict. The National Bank of Ukraine's decision to resume stress testing in 2025 after a four-year break provides an interesting case for examining how Basel III principles can be adapted to extraordinary circumstances. As Ukraine works toward European integration and seeks to align its financial system with

international standards, understanding these adaptations becomes important for both academic study and practical policy development. The research also contributes to broader understanding of how regulatory frameworks can be modified while maintaining their core objectives during crisis conditions.

## **Methodology**

This research employs a comparative analytical approach, examining Ukraine's 2025 stress testing methodology against the Basel Committee's 2018 stress testing principles through document analysis and regulatory comparison. Research on regulatory adaptations during severe crises focuses on financial crises (Judge K., 2020) rather than military conflicts, creating a significant knowledge gap regarding regulatory responses to war-related financial system disruptions. The study analyzes primary sources including NBU regulatory decisions, Basel Committee publications, and IMF technical assistance documents. The methodology includes three main components: first, a systematic comparison of Ukraine's stress testing framework with Basel III principles across nine key dimensions including governance structures, scenario design, risk coverage, and capital requirements; second, an examination of specific adaptations made to address military conflict conditions; and third, an assessment of compliance gaps and their implications for financial system resilience. The analysis draws on official NBU documentation of the 2025 resilience assessment program, which covers 21 banks representing over 90% of Ukraine's banking system assets.

## **Analysis of Results**

The comparative analysis reveals both significant alignment and notable divergences between Ukraine's approach and Basel III standards. Ukraine's 2025 stress testing framework demonstrates strong alignment with Basel principles in several areas, including the adoption of comprehensive governance structures, multi-stage assessment processes, and integration with supervisory planning. The NBU's three-stage approach—comprising Asset Quality Review, extrapolation, and scenario-based stress testing—reflects Basel's emphasis on thorough risk assessment and supervisory validation. However, substantial adaptations have been made to address conflict-specific conditions. Key findings reveal that Ukraine's scenario design is closely aligned with IMF agreements and specifically tailored to the country's unique risk landscape, including war-related economic shocks and extended capital recovery periods. Ukraine's adverse scenario design incorporates war-related economic shocks, including assumptions of GDP decline (-3.1% in the first year), significant currency depreciation (25.6% over the forecast period), and accelerated inflation rates. These modifications align with IMF program requirements rather than Basel's traditional multi-year, countercyclical scenarios reflecting global economic disruptions. Regarding capital and liquidity benchmarks, the NBU requires a minimum core capital adequacy ratio of 10% post-test, with phased implementation deadlines and shorter implementation timelines reflecting the urgent need for financial system stability during conflict. In contrast, the Basel framework integrates stress test outcomes into dynamic capital buffers and leverage ratios. Ukraine's ongoing governance reforms—such as introducing external audits and multi-year capital plans—are bringing its practices closer to the Basel Committee's emphasis on independent validation and sound supervisory oversight. The analysis also identifies areas where Ukraine's approach currently falls short of full Basel compliance, particularly in multi-year scenario sophistication, broader asset coverage, and public disclosure requirements.

## **Conclusions**



The study concludes that Ukraine has successfully adapted Basel III stress testing principles to function effectively during military conflict while maintaining essential regulatory standards. The NBU's approach demonstrates regulatory innovation in crisis conditions, showing how international standards can be modified without compromising their fundamental objectives. However, significant challenges remain in achieving full Basel compliance, particularly in areas requiring longer-term perspective and comprehensive risk coverage. The research identifies several key recommendations for strengthening Ukraine's framework: adopting more sophisticated multi-year scenarios once conflict conditions stabilize, expanding asset coverage to include additional risk categories, improving public disclosure to enhance market confidence, and developing clearer transition plans for eventual full Basel compliance. These findings suggest that while crisis adaptations are necessary and can be effective, they should be viewed as temporary measures with clear pathways toward full international standard compliance. The study contributes to understanding how regulatory frameworks can maintain both flexibility and integrity during extraordinary circumstances, providing valuable insights for other jurisdictions facing similar challenges.

## References

- 1) Basel Committee on Banking Supervision. (2018). Stress testing principles. Bank for International Settlements. <https://www.bis.org/bcbs/publ/d450.pdf>.
- 2) European Central Bank. (2024). Supervisory methodology 2024. Retrieved from [https://www.bankingsupervision.europa.eu/activities/srep/2024/html/ssm.srep202412\\_supervisorymethodology2024.en.html](https://www.bankingsupervision.europa.eu/activities/srep/2024/html/ssm.srep202412_supervisorymethodology2024.en.html).
- 3) Judge, K. (2020). Stress Testing During Times of War. SSRN Electronic Journal.(Cited on page 6.).
- 4) National Bank of Ukraine. (2025). Description of model for stress testing banks in 2025. Internal Technical Document. [https://bank.gov.ua/admin\\_uploads/article/ST\\_model\\_2025\\_public\\_eng.pdf?v=13#:~:text=Main%20specifics%20of%20stress%20testing%20in%202025&text=In%202025%2C%20the%20NBU%20returns,baseline%20and%20an%20adverse%20one.&text=The%20baseline%20scenario%20builds%20on,forecast%20by%20%C2%ABFocuz%20Economics%C2%BB](https://bank.gov.ua/admin_uploads/article/ST_model_2025_public_eng.pdf?v=13#:~:text=Main%20specifics%20of%20stress%20testing%20in%202025&text=In%202025%2C%20the%20NBU%20returns,baseline%20and%20an%20adverse%20one.&text=The%20baseline%20scenario%20builds%20on,forecast%20by%20%C2%ABFocuz%20Economics%C2%BB).
- 5) National Bank of Ukraine. NBU approves concept of 2025 resilience assessment of banks and banking system. NBU Press Release. <https://bank.gov.ua/en/news/all/shvaleno-kontseptsiyu-otsinki-stiykosti-bankiv-i-bankivskoyi-sistemi-v-2025-rotsi>.
- 6) National Bank of Ukraine. NBU approves methodology for 2025 bank stress testing. NBU Press Release. <https://bank.gov.ua/en/news/all/natsionalniy-bank-zatverdiv-metodologiyu-stres-testuvannya-bankiv-u-2025-rotsi#:~:text=The%20National%20Bank%20of%20Ukraine,of%20the%20banking%20system%20assets>.



## Applying the Altman Z-Score Model to Portuguese Micro Entities

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### Abstract:

The main objective of this paper is to analyze whether the Altman Z-Score Model (1983) is currently efficient in predicting corporate bankruptcy, or insolvency as it is considered in this study, of Portuguese micro entities. Additionally, adjustments have been made to the original model to address issues related to geographical, temporal, and corporate characteristics, enabling us to assess their potential impact on the model's predictive ability.

The results of this study show that the model correctly predicted the bankruptcy of a large number of companies in 2023 and 2024, with a predictive capacity of over 70 per cent one year prior to insolvency. Additionally, empirical evidence suggests that incorporating additional variables capturing the internal environment of companies enhances the model's predictive ability.

Overall, this study provides evidence that the model is effective when applied to Portuguese micro entities, which may be useful for several stakeholders, such as investors, creditors, managers and academics.

**Keywords:** Altman's Z-Score Model, Predicting Bankruptcy, Micro entities

### References:

- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589-609. <https://doi.org/10.2307/2978933>
- Altman, E. I. (2000). Predicting financial distress of companies: Revisiting the Z-Score and Zeta® models. Stern School of Business, New York University, 7-50.
- Altman, E. I., Haldeman, R. G., & Narayanan, P. (1977). ZETA analysis: A new model to identify bankruptcy risk of corporations. *Journal of Banking and Finance*, 1(1), 29-54. [https://doi.org/10.1016/0378-4266\(77\)90017-6](https://doi.org/10.1016/0378-4266(77)90017-6)
- Altman, E. I., & Sabato, G. (2007). Modelling credit risk for SMEs: Evidence from the U.S. market. *Abacus*, 43(3), 332-357. <https://doi.org/10.1111/j.1467-6281.2007.00234.x>
- Altman, E. I., & Saunders, A. (1998). Credit risk measurement: Developments over the last 20 years. *Journal of Banking & Finance*, 21(11-12), 1721-1742.
- Altman, E. I., & Hotchkiss, E. (2006). *Corporate financial distress and bankruptcy: Predict and avoid bankruptcy, analyze and invest in distressed debt*. Hoboken, NJ: John Wiley & Sons.
- Altman, E. I., Iwanicz-Drozdowska, M., Laitinen, E. K., & Suvas, A. (2017). Financial distress prediction in an international context: A review and empirical analysis of Altman's Z-Score model. *Journal of International Management & Accounting*, 28(2), 131-171.
- Altman, E. I., Sabato, G., & Wilson, N. (2010). The value of non-financial information in small and medium-sized enterprise risk management.

The Journal of Credit Risk, 6(2), 1-33.

Altman, E. I. (1983a). Corporate financial distress: A complete guide to predicting, avoiding, and dealing with bankruptcy (Frontiers in Finance Series). Nova Iorque, NY: John Wiley & Sons.

Batista, F. (2022). Aplicabilidade do modelo Z-Score às PME portuguesas (Dissertação de mestrado). Instituto Politécnico do Porto, Instituto Superior de Contabilidade e Administração do Porto.

Beaver, W. H. (1966). Financial ratios as predictors of failure. *Journal of Accounting Research*, 4(3), 71-111. <https://doi.org/10.2307/2490171>

Bessa, M. (2018). Análise Comparativa de Modelos de Previsão de Falência: PME's Portuguesas (Dissertação de mestrado). Universidade do Porto, Faculdade de Economia.

Costa, L. (2019). Modelo de Previsão de Falência das PME's Portuguesas (Dissertação de mestrado). Universidade do Porto, Faculdade de Economia.

Decreto-lei/20-g-2020; <https://diariodarepublica.pt/dr/detalhe/decreto-lei/20-g-2020-133723684>, accessed online on May 2024.

Gil, A. (2002). Como elaborar projeto de pesquisa (4ª ed.). Editora Atlas.

Guimarães, R., & Cabral, J. (2010). Estatística (2ª ed.). Verlag Dashöfer Portugal.

Hair, J., Black, W., Babin, B., & Anderson, R. (2018). Multivariate data analysis (8th ed.). Pearson.

INE. (2007). Classificação Portuguesa das Atividades Económicas – Rev 3. Lisboa: INE.

Instituto Nacional de Estatística, I. P. (2020). Empresas em Portugal - 2018. Lisboa: Autor. Portal do INE. Consultado em 15 de junho de 2024.

Marôco, J. (2018): Análise estatística com o SPSS Statistics 25. Report Number, 7ª Edição



## Inclusive volunteering: A study of the perceptions of people with functional diversity

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### Abstract:

Volunteering is defined as a set of actions of social and community interest carried out by a person who gives part of his or her time and skills to offer his or her services without expecting financial reward (Barbedo & Bandeira, 2015). The concept of volunteer, in turn, refers to an individual who spontaneously and without remuneration offers time, labor and talent to causes of common interest (Siqueira, 2016).

Despite the recognition of the many benefits of volunteering for the population in general, the available evidence still points to low levels of participation in volunteering by some groups of the population, including people with disabilities or functional diversity (Marková, 2020).

There are several factors that negatively affect the participation of people of disability in volunteering, of which are barriers to volunteering or the lack of role models (Marková, 2020).

Although some studies have addressed the topic of inclusive volunteering (e.g. Gorlova et al., 2020), existing studies are still very scarce. Especially, research that focus specifically on volunteers' with functional diversity (Marková, 2020).

This communication aims to explore the perceptions of people with functional diversity on inclusive volunteering. Specifically, based on a quantitative methodology, the study aims to understand the current practices and positioning of people with functional diversity towards volunteering, the benefits and barriers they perceive, and the actions considered more promising to promote inclusive volunteering.

Primary data was collected through a questionnaire from people with functional diversity in Portugal. A total of 67 valid responses were collected. The results show that the participation of people with functional diversity in volunteering activities is low, although there is a high interest to get involved in the future. Volunteering opportunities are mainly created through the volunteer's own initiative. People with functional diversity recognize the benefits and barriers associated with volunteering. The most highly appreciated benefits are those related to making better use of time, empowerment, and developing different skills.

The main barriers identified are related to lack of opportunities and other external factors rather than internal ones.

The findings also show that respondents consider the development of actions to promote inclusive volunteering to be highly valuable.

**Keywords:** Volunteering, inclusive volunteering, disability, functional diversity, benefits, barriers.

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## References

- Barbedo, P., Bandeira, A. (2015). Voluntariado: sua relevância e necessidade da relevação contabilística. *Comunicação apresentada no V Congresso dos TOC*. Lisboa.
- Marková, A. (2020). Volunteering of people with disability. *Kontakt*, 22(3), 200-206.
- Siqueira S.R. (2016). *Motivação para o trabalho dos voluntários que atuam em hospital público estadual de São Paulo, referência em HIV*. Tese de Doutorado em Enfermagem. São Paulo: Escola de Enfermagem, Universidade de São Paulo.
- Gorlova, A., Starovojtova, L., Akhtyan, A., Troska, Z., & Karandeeva, L. (2020). Social potential of inclusive volunteering in Russia: Determinants and developmental prospects. *Ad alta-journal of interdisciplinary research*, 10(1), 72–75.



## Management and legal challenges for social entrepreneurship in Portugal

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### Abstract:

Social entrepreneurship has established itself as a relevant instrument in the response to complex social challenges, integrating innovation, social impact and economic sustainability (Defourny & Nyssens, 2010; Mair & Martí, 2006; Santos, 2012). In Portugal, as in many other countries, this sector has been gaining ground through the creation of social purpose organizations that often operate in vulnerable contexts and with scarce resources. However, social entrepreneurs face significant challenges, particularly in terms of organizational management and the adequacy of the legal framework for their initiatives. The political, legal and organizational ambiguities for this type of organization lead to difficulties in carrying out its activities.

The lack of a specific and clear legal status for social enterprises contributes to legal ambiguity, making it difficult to access funding, tax benefits and the sustainability of their structures (Teasdale, 2012). Additionally, there are studies by Renko (2013) that argue that the initial challenges faced by nascent social entrepreneurs emphasize that understanding these unique obstacles is crucial to devising effective strategies.

This research aims to identify and analyze the main legal and management challenges faced by social entrepreneurs in Portugal. Therefore, through this study we seek to understand how the available legal forms for social entrepreneurship and management practices in social organizations influence their operations, as well as how public policies and existing legal instruments respond to their challenges, such as, the difficulty in ensuring the financial sustainability of initiatives; the transition from volunteer-based efforts to professionalized organizational structures; the lack of a specific legal status adapted to social enterprises; the eligibility for tax incentives and strategic alignment with their dual social and economic mission and, from a management point of view, the constraints of a lack of human and financial resources, which limits the scalability and effectiveness of their initiatives.

The study employed a qualitative method involving a focus group of social entrepreneurs in Portugal. The focus group took place in May 2024 and involved five participants engaged in SE initiatives that varied in terms of age, scope of activity, size, location and target groups.

The research reveals that SE in Portugal is a dynamic and constantly evolving field. It is characterized by a strong transformative motivation among its protagonists, as well as a significant set of structural challenges in setting up and developing the project.

From a management perspective, significant obstacles are encountered, particularly with regard to access to stable



funding, the transition from volunteering to professionalized structures, and the development of strategic management models that can cope with the pressure of dependence on conditional public and private funds. From a legal perspective, the results indicate that the available legal forms do not sufficiently address the specific needs of SE organizations.

**Keywords:** Social Entrepreneurship, Social entrepreneur, Social entrepreneurial initiatives, Management, Legal regime, Portugal.

### **Bibliographical references**

- Defourny, J., & Nyssens, M. (2010). Conceptions of social enterprise and social entrepreneurship in Europe and the United States: Convergences and divergences. *Journal of Social Entrepreneurship*, 1(1), 32–53.
- Mair, J., & Martí, I. (2006). Social entrepreneurship research: A source of explanation, prediction, and delight. *Journal of World Business*, 41(1), 36–44.
- Santos, F. M. (2012). A positive theory of social entrepreneurship. *Journal of Business Ethics*, 111(3), 335–351.
- Teasdale, S. (2012). What's in a name? Making sense of social enterprise discourses. *Public Policy and Administration*, 27(2), 99–119.

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## Arbitration decisions on transfer pricing: a trend in favor of taxpayers?

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### Abstract:

The aim of this study is to analyze the decisions of arbitration courts on transfer pricing practiced by related entities. This matter is of particular relevance due to the nature and tax impact of these transactions and all the problems related to tax litigation between the tax authorities and taxpayers.

This empirical study of transfer pricing tax disputes in Portugal shows that the vast majority of the 74 arbitration decisions handed down between 2012 and 2024 are in favor of taxpayers.

To achieve these results, it was necessary to analyze the evolution of the decisions of the arbitration courts of the Administrative Arbitration Center (CAAD) in order to understand whether or not they are favorable to the tax administration and taxpayers, in addition to the impact that this practice may have in terms of erosion of the tax base.

To this end, we present a quantitative approach based on a study of the case law of 74 arbitration decisions in which we conclude that the operations most contested by the tax authorities are financial operations and transactions in goods between related companies.

The decisions take into account the applicability of the principle of comparability between interconnected operations and independent transactions, the methodology used to determine transfer prices, the legal assumptions applicable to intra-group transactions and the transfer of income to jurisdictions with privileged tax regimes.

This study is limited to the case law between 2012 and 2024 of the arbitration courts and does not take into account the case law of the judicial courts and other jurisdictions, which could have contributed to conclusions different from those reached.

We also highlight the limitations arising from the applicability of the arm's length principle, the principle of comparability, as well as the complexity of the operations carried out by related entities, not to mention the difficulty in understanding certain multidisciplinary concepts, which requires an objective and subjective analysis of the operations.

The originality of this work lies in the impact that these operations have on states and especially on multinational companies seeking to obtain a greater market share by redistributing their revenues and thus maximizing their

profits by transferring their headquarters to countries or territories with privileged tax regimes.

We conclude that transfer pricing is not only an accounting technique for measuring costs, but also a strategic method for allocating resources and tax planning.

**Keywords:** Related Entities, Transfer Pricing, OECD, Arbitral Tribunals.



## Tracking Socioeconomic Development: A Dynamic PCA-Based Approach to Country Classification Over Time

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### Abstract:

Understanding the interplay among economic, social, governmental, and environmental indicators is essential for monitoring socio-economic and sustainable development and for designing effective policy interventions. However, the high dimensionality and interdependence of these indicators pose analytical challenges, as traditional approaches often struggle to extract coherent and interpretable patterns from such complex data. To address this, the present study employs a Dynamic Principal Component Analysis (DPCA) framework that captures both the structural complexity and temporal evolution of development processes.

At its core, DPCA builds upon Principal Component Analysis (PCA)—a widely used dimensionality reduction technique that transforms correlated variables into a set of uncorrelated components, ordered by the amount of variance they explain. This allows for the extraction of latent, interpretable factors that represent the underlying structure of multi-dimensional datasets, reducing noise while retaining essential information. The methodology unfolds in three stages. First, a static PCA is applied to each development pillar—economic, social, governance, and environmental—to extract latent components that capture the dominant patterns of variation. Second, the residuals from this initial PCA are analyzed using autoregressive (AR) models to estimate the temporal dynamics within each variable, isolating underlying trends and serial dependencies. These AR coefficients are then used to adjust the original data by removing predictable time-series structure. Third, a second PCA is applied to the adjusted data, yielding dynamic principal components that more accurately reflect structural changes over time. These components are subsequently used as inputs for K-means clustering, enabling the identification of groups of countries with similar developmental trajectories across both temporal and cross-sectional dimensions.

The empirical analysis draws on a balanced panel of 113 countries from 2000 to 2022, using annual data from internationally recognized sources such as the World Bank, UN databases, and the Worldwide Governance

Indicators. A curated set of indicators was selected based on data coverage, theoretical relevance, and diversity across development pillars. All variables were standardized to ensure comparability and mitigate scale effects. Where necessary, missing values were addressed using imputation techniques to preserve panel consistency.

The findings reveal latent patterns of development that are often obscured in static, aggregate indices. The year-by-year clustering uncovers dynamic transitions in country groupings, highlighting trends of convergence, stagnation, or divergence across time. Some nations demonstrate upward mobility into higher-performing clusters, while others exhibit structural inertia or volatility. A complementary all-time clustering reveals stable groupings of countries with similar long-term developmental paths, despite differing initial conditions. Moreover, transition matrices derived from yearly clusters illuminate patterns of mobility and rigidity, offering insights into the stability or volatility of developmental trajectories—especially in response to major global events. The framework thus provides a dynamic and integrative view of development that captures both gradual evolutions and abrupt structural shifts.

By bridging econometric rigor with practical relevance, this study offers a data-driven tool for analyzing multi-dimensional development. The approach generates actionable insights for international organizations and national policymakers, particularly in identifying countries on the edge of structural transformation or at risk of stagnation. Additionally, the framework aligns closely with the Sustainable Development Goals (SDGs) by enabling the quantification and tracking of progress across interdependent pillars. In doing so, it supports more targeted, evidence-based policy interventions and deepens our understanding of the complex pathways of national development.

**Keywords:** Socio-economic Development, Principal Component Analysis, K-means clustering, Trajectory Assessment



## Implementing a Content Management System in an SME: Enhancing Information Accessibility and Operational Efficiency

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**Keywords:** Content Management System (CMS); Information Management; Document Management; Digital Transformation; SMEs

**Introduction and Context:** In an increasingly globalised and competitive business environment, small and medium-sized enterprises (SMEs) face the ongoing challenge of improving internal efficiency while preserving knowledge and reducing operational delays. One strategic approach to meet this challenge is the optimisation of information management processes. Effective documentation practices, quick access to accurate information, and the retention of employee knowledge are vital for operational agility and long-term sustainability (Alavi & Leidner, 2001; Trkman, 2010).

**Objectives:** This study focuses on the design and implementation of a Content Management System (CMS) in a Portuguese SME dedicated to the manufacture and assembly of high-power electric vehicle charging stations. The company had previously recognised the need for a technological solution to improve access to internal information, preserve employee experience, and increase efficiency in document management. The main objectives were the conservation of employee experience, ensuring easy access to information through the structuring and definition of main processes, storing training resources for new employees, and enabling the effective management of all documentation. These elements are essential for maintaining a good information flow and ensuring continuity of organisational knowledge (Haug, 2012).

**Methodology:** CMS implementation in SMEs is often limited by financial, human, and technical resource constraints (Amponsah, 2021; Jordan & Zabukovšek, 2022; Vrecl & Zabukovšek, 2022). This study followed an action research approach in four iterative phases: planning, action, observation, and reflection (Baskerville, 1999). During planning, semi-structured interviews with five employees (HR, logistics, and production) revealed key issues: difficulty accessing documents, unstructured processes, loss of knowledge from staff turnover, and lack of a centralised repository. In the action phase, four CMS platforms—WordPress, Joomla, Drupal, and Wix—were evaluated. Wix was chosen for its ease of use, minimal technical requirements, and features such as PDF embedding (Madihah et al., 2024; Wix.com, n.d.). As noted by Benevolo and Negri (2007), selecting a CMS requires matching technical capacity with organisational needs. The chosen platform enabled intuitive navigation and required minimal



maintenance.

**Results:** The CMS implementation focused on usability and information accessibility. A central homepage allowed users to quickly find processes and documents. PDFs were embedded directly into the platform, ensuring consistency and reducing effort. Follow-up interviews revealed that employees found the platform intuitive and effective for accessing information and coordinating tasks. Most did not suggest changes, indicating that the system meets current needs. This positive feedback highlights its value in improving efficiency, communication, and task structure. Technical tests using Google PageSpeed confirmed strong performance, including fast loading and stable layout.

**Conclusions:** The CMS improved the way information was accessed and shared across the organisation. It also ensured knowledge retention through the centralisation of internal resources and training content. As a result, document management became more reliable and efficient, contributing to better operational performance and reinforcing the SME's competitive position. Future steps involve assessing the CMS's long-term impact on productivity, adding content on internal software tools, gathering user feedback for improvements, and integrating the CMS with other internal systems.

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## References

- Alavi, M., & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25(1), 107-136. <https://doi.org/10.2307/3250961>
- Amponsah, C. T. (2021). Knowledge management in SMEs: A review of the literature. *International Journal of Business and Management*, 16(3), 1–12.
- Baskerville, R. L. (1999). Investigating Information Systems with Action Research. *Communications of the Association for Information Systems*, 2, <https://doi.org/10.17705/1CAIS.00219>
- Benevolo, C., & Negri, S. (2007). Evaluation of Content Management Systems (CMS): a Supply Analysis. *The Electronic Journal Information Systems Evaluation*, 10(1), 9-22.
- Criador de Sites: Criar Site Grátis | Wix.com. (n.d.). Wix. Retrieved April 3, 2025, from <https://pt.wix.com/>
- Haug, A. (2012). The implementation of enterprise content management systems in SMEs. *Journal of Enterprise Information Management*, 25(4), 349–372. <https://doi.org/10.1108/17410391211245838>
- Jordan, S., & Zabukovšek, S. S. (2022). Critical Success Factors of Document Management Systems Considering the Maturity of the Organisation. In Z. Nedelko (Ed.), *6th FEB International Scientific Conference 2022* (Issue June, pp. 409–418). University of Maribor Press. <https://doi.org/10.18690/um.epf.5.2022.39>
- Madih, M., Ng, K. X., Tan, Y. W., Tan, Z. H., Chong, Z. T., & Chan, J. X. (2024). Wix for Web Development and the Application of the Waterfall Model and Project Based Learning for Project Completion: A Case Study. *Journal of Informatics and Web Engineering*, 3(2), 212–228. <https://doi.org/10.33093/jiwe.2024.3.2.16>
- Trkman, P. (2010). The critical success factors of business process management. *International Journal of Information Management*, 30(2), 125-134. <https://doi.org/10.1016/j.ijinfomgt.2009.07.003>
- Vrecl, D., & Zabukovšek, S. S. (2022). The role of document management systems in digital transformation of organisations. *Journal of Universal Excellence*, 11(Special Issue), 113–132.



## Business Intelligence as a strategic tool for process optimization at a SME

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**Keywords:** Business Intelligence, KPI, Power BI, Process Optimization, Digitalization

**Introduction and Objectives:** A small and medium enterprise was experiencing difficulties in controlling, monitoring and evaluating its production processes as well as the performance of its employees and the results achieved. The tools used to do such tasks were outdated, limiting a comprehensive view of the company's performance. In a world where competition grows globally and unceasingly companies need to remain competitive (Jiménez-Partearroyo & Medina-López, 2024).

The study aims at investigating and implement a system to digitalize processes in the company. The solution was to implement a Business Intelligence (BI) system. BI uses technologies to collect, analyze and transmit information, improving operational efficiency and competitiveness (Dresner, 2007; Ajah and Nweke, 2019).

**Methodology:** To guide the study, a research question was formulated: How do efficiency and accuracy in data collection and analysis contribute to KPI monitoring in operational management? To answer it, Baskerville's, (1999), action research methodology was followed due to its iterative problem-solving nature. This cyclical process involves five phases: diagnosis, action planning, taking action, evaluating and specifying the learning.

**Results:** The diagnosis was carried out by the company through a requirement analysis and communicated in meetings. They needed to improve their data collection methods and develop a database capable of generating dynamic reports with several key performance indicators (KPIs).

Then system implementation was planned, starting with assessing current data practices, revealing that data was paper-based and stored physically, with a general lack of automation. This made data analysis time-consuming and difficult. Various software solutions were compared to be implemented. Power BI was the one selected due to its comprehensive features and suitability for the company's needs; also, it integrates with other Microsoft platforms and offers an intuitive interface for users of all technical levels. Power BI addresses critical data challenges by connecting to diverse sources, transforming large volumes of data into dynamic reports, analyzing real-time information, and creating interactive visualizations. Its affordability also made it an appealing choice. Afterwards, the dashboards were defined based on KPIs, crucial for monitoring performance and aligning with strategic objectives (Hristov & Chirico,

2019).

The KPIs were defined to measure production times, error reduction, and productivity (Olo, 2024). The dashboard algorithms were developed, and Power Apps application was deployed to staff. Three distinct dashboards were created to measure the previously defined KPIs: the first assesses production quality, showing items produced and errors over time, with filters for date, quality tester, item, production line, and employee; the second analyses production times, comparing actual to theoretical times across lines and items to identify delays. It includes graphs showing time evolution and average/target production times, filterable by date, item, and production line; the third measures productivity, evaluating production and employee efficiency. It displays current versus target efficiency and allows filtering by time, item, production line, and employee (Figure 1).



Figure 1 - Example of a dashboard implemented (Olo, 2024)

Tablets were then installed at all workstations to capture real-time production data, from entering to completion. Ensuring accurate and comprehensive data collection is crucial to prevent incomplete and fragmented information. To evaluate the implementation, interviews were conducted with four staff members that were directly impacted by the system – one from management and three production team leaders. The feedback was positive since the system brought "greater clarity and organisation to data analysis", was easy to use and integrated pre-existing systems. It was concluded that, passed the adaptation phase, work has improved, decisions are made based on accurate data, strategies are easier to develop and interventions in different production lines are simplified.

**Conclusion and Future Work:** While the project was successful, for future work it is recommended to increase the interview sample size to improve the study's robustness and generality, the expansion of KPIs in the system as well as the establishment of an IT department in the company to sustain these efforts and keep evolving.

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References

Ajah, I. A., & Nweke, H. F. (2019). Big Data and Business Analytics: Trends, Platforms, Success Factors and Applications. *Big Data and Cognitive Computing*, 3(2), Artigo 2. <https://doi.org/10.3390/bdcc3020032>

Baskerville, R. L. (1999). Investigating Information Systems with Action Research. *Communications of the Association for Information Systems*, 2. <https://doi.org/10.17705/1CAIS.00219>

Dresner, H. (2007). *The Performance Management Revolution: Business Results Through Insight and Action*. John Wiley & Sons.

Hristov, I., & Chirico, A. (2019). The Role of Sustainability Key Performance Indicators (KPIs) in Implementing Sustainable Strategies. *Sustainability*, 11(20), Artigo 20. <https://doi.org/10.3390/su11205742>

Jiménez-Partearroyo, M., & Medina-López, A. (2024). Leveraging Business Intelligence Systems for Enhanced Corporate Competitiveness: Strategy and Evolution. *Systems*, 12(3), Artigo 3. <https://doi.org/10.3390/systems12030094>

Olo, F. (2024). *Business Intelligence como Ferramenta Estratégica para a Otimização de Processos: Estudo de Caso na Mizuru Tech*. Case Study, Instituto Superior de Contabilidade e Administração do Porto, Porto. Retrieved 4 2025



## Towards a Cooperation-Based View of Strategy

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### Abstract:

This conceptual paper challenges the dominant strategic paradigms, such as the Porterian and resource-based views, which emphasise firm independence and market competition (Barney and Clark, 2007; Porter, 1980). Instead, it advocates for a complementary cooperation-based perspective, underscoring the strategic importance of inter-firm collaboration, alliances, and networked business environments (e.g., Hakansson et al., 2009).

The paper advocates for a more integrated strategic approach that recognises both competitive and collaborative advantages in an evolving business landscape (Dyer, 2000; Porter, 1985). Drawing from interdisciplinary insights, particularly in industrial marketing, it emphasises the importance of interconnectedness, positive-sum games, and relational value creation (Baraldi, 2008).

The discussion contrasts the traditional competition-driven strategy with a cooperation-based perspective, emphasising that firms are embedded in complex networks and ecosystems where collaboration often produces superior outcomes (Adner et al., 2013; Axelsson and Easton, 1992). The paper suggests that businesses should not solely concentrate on outperforming rivals but should also pursue strategic partnerships to enhance resilience, innovation, and long-term success (Dyer et al. 2018).

In addition to merely trying to adapt to ever-changing, unpredictable, and often hostile environmental conditions (i.e., embracing the 'strategy as fit' approach), firms should be encouraged to adopt a "strategy as shaping" perspective, proactively taking steps to ensure they can change the contextual circumstances (Hakansson and Snehota, 1989; Reeves, 2018). For instance, they can engage in new partnerships with complementors, seek new customer relationships, or cooperate with a particular rival to develop new products. One should consider this "strategy as shaping" perspective an extension of Dyer and Singh's (1998) relational view, which argues that firms should engage in lasting, self-enforcing contractual arrangements with counterparts that allow for the exploration of complementary assets or the taking advantage of knowledge spillovers.

The paper contributes to developing a more comprehensive strategic theory that accommodates competitive dynamics and collaborative synergies. Ultimately, it calls for rethinking strategy beyond rivalry and embracing a nuanced perspective in which firms leverage cooperative interactions for mutual advantage in today's interdependent corporate settings.

**Keywords:** strategy, competition, cooperation, advantage, relational value, business ecosystems, business networks, partnerships, alliances

## References

- Adner, R., Oxley, J. and Silverman, B. (Eds.) (2013), *Collaboration and Competition in Business Ecosystems*, Emerald Group Publishing.
- Axelsson, B. and Easton, G. (1992), *Industrial Networks: A New View of Reality*, Routledge.
- Baraldi, E. (2008), "Strategy in Industrial Networks: experiences from IKEA", *California Management Review*, Vol. 50 No. 4, pp. 99–126.
- Barney, J. and Clark, D. (2007), *Resource-Based Theory: Creating and Sustaining Competitive Advantage*, Oxford University Press.
- Dyer, J. (2000), *Collaborative advantage: winning through extended enterprise supplier networks*, Oxford University Press.
- Dyer, J. and Singh, H. (1998), "The relational view: cooperative strategy and sources of inter-organizational competitive advantage", *Academy of Management Review*, Vol. 23 No. 4, pp. 660–679.
- Dyer, J., Singh, H. and Hesterly, W. (2018), "The relational view revisited: A dynamic perspective on value creation and value capture", *Strategic Management Journal*, 39(12), pp. 3140–3162.
- Hakansson, H., Ford, D. I., Gadde, L., Snehota, I. and Waluszewski, A. (2009), *Business in Networks*, John Wiley & Sons.
- Hakansson, H. and Snehota, I. (1989), "No business is an island: the network concept of business strategy", *Scandinavian Journal of Management*, 5 (3), pp. 187-200.
- Porter, M. (1980), *Competitive strategy: techniques for analyzing industries and competitors*, The Free Press.
- Porter, M. (1985). *Competitive advantage: creating and sustaining superior performance*, McMillan.
- Reeves, M. (2018), "The strategy palette: five approaches to strategy for a complex world", *Rotman Magazine*, pp. 51-55.





## The T-Shaped Profile of a Modern IT Leader: A Combination of Agile Methodologies and a Data-Driven Approach

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### ABSTRACT:

In today's digital transformation environment, the role of IT leaders is undergoing dramatic changes. The traditional understanding of an IT manager as a purely technical specialist no longer meets the challenges of the market, where the success of organisations largely depends on a harmonious combination of diverse competencies. Existing research treats Agile methodologies and data-driven approaches as separate dimensions of leader effectiveness, which creates a significant gap in understanding their synergy. The concept of a T-shaped profile, which implies deep expertise in one area (vertical component) and broad competencies in related areas (horizontal component), requires detailed operationalisation in the context of modern IT leadership. Particularly noteworthy is the integration of this concept with a project-based approach to leadership development, which allows for a holistic, structured system of IT leadership development.

### Objectives:

This study aims to develop and validate a comprehensive model for assessing and developing a T-shaped competency profile for modern IT leaders through the integration of vertical expertise in Agile methodologies and horizontal competencies in data-driven project management approaches. The study aims to create a conceptual and practical toolkit for analysing, assessing and strategically developing leadership competencies that meets the needs of the modern IT industry and enhances the effectiveness of management decision-making in conditions of high uncertainty.

### Methods:

The methodological approach of the study is based on the application of fuzzy logic theory as an innovative tool for modelling and assessing leadership profiles. The developed fuzzy model includes:

- 1) Identification of linguistic variables to describe the levels of Agile and data competences ("Low", "Medium", "High")
- 2) Building membership functions for each variable
- 3) Formation of a system of fuzzy rules (for example, "IF Agile expertise = High AND Data competencies = High,

THEN Efficiency = Very High")

Based on this model, a quadrant classification of IT leader profiles was created: 'Ideal T-shaped leader' (Quadrant I), 'Data-oriented leader' (Quadrant II), 'Agile-oriented leader' (Quadrant III) and 'Traditional leader' (Quadrant IV).

The empirical part of the study involves conducting a structured expert survey of IT leaders of different levels in five key aspects: expert profile, assessment of the vertical component (Agile expertise), assessment of the horizontal component (data-driven approaches), integration of both components, and effectiveness of the T-shaped profile. The obtained data are analysed using the developed fuzzy model to validate theoretical assumptions and formulate practical recommendations.

### ***Results:***

The preliminary results of the study demonstrate the existence of significant relationships between the balance of the T-shaped profile and the effectiveness of the IT leader in innovation projects. The conducted quadrant classification of leadership profiles allows not only to diagnose the current state of IT leader's competencies but also to design individualised trajectories of their development in accordance with the strategic goals of the organisation.

The analysis of expert opinions reveals a significant correlation between the development of data competencies and the effectiveness of Agile methodologies, especially in a highly uncertain project environment. This confirms the hypothesis of a synergistic effect from the integration of both components of the T-shaped profile. In addition, the optimal correlations between competencies for different types of IT projects have been identified, which allows the leadership profile to be adapted to the specifics of the tasks.

The integration of the fuzzy model with the cyclic project approach (diagnosis → design → implementation → monitoring) creates a holistic methodology for competence development that can be adapted to different organisational contexts.

### ***Conclusions:***

The study makes a significant theoretical and practical contribution to the understanding of modern IT leadership by integrating Agile methodologies and data-driven approaches into a single conceptual model. Differentiated practical recommendations have been developed for each type of leadership profile within the quadrant classification: maintaining balance for 'ideal T-shaped leaders', strategies for deepening Agile expertise for 'data-driven leaders', approaches to developing data competencies for 'Agile-oriented leaders', and a phased transformation plan for 'traditional leaders'.

The application of fuzzy logic to leadership development is a methodological innovation in this area, which allows taking into account the complexity and multidimensionality of the process of developing leadership competences. The quadrant classification and cyclic project approach provide practical utility that goes beyond purely theoretical constructs, offering organisations structured pathways to develop adaptive, future-ready IT leaders.

Areas for further research include: expanding the empirical base; in-depth analysis of the impact of industry specifics on the optimal ratio of Agile and data competencies; and the creation of specialised tools for automated diagnostics and monitoring of the development of T-shaped profiles in a dynamic IT environment.

**Keywords:** T-shaped profile, IT leadership, Agile methodologies, data-driven approach, fuzzy logic



## Driving Digital Transformation through CRM: Strategies from a Multinational Advertising Company

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**Keywords:** CRM adoption, digital transformation, user engagement, training strategies, change management

**Introduction and Context:** Digital transformation is vital for enhancing efficiency and customer relationships in competitive markets, especially in advertising's client-focused environment. Customer Relationship Management (CRM) systems consolidate data and automate workflows (Payne & Frow, 2005). Adoption faces technical and human challenges, like data integration and user resistance (Trainor et al., 2014). AI enhances CRM but raises ethical issues. This study examines CRM implementation in a multinational advertising company, focusing on training and user engagement.

**Objectives:** The study investigated CRM implementation, aiming to assess training's impact on adoption, evaluate usability and challenges (navigation, data integration, customization), and explore change management frameworks and AI's role in efficiency and sustainability.

**Methodology:** An action research approach examined CRM adoption in a multinational advertising company, driven by needs to enhance customer management (Avison et al., 1999; Ribeiro, 2024). Sales, marketing, and IT stakeholders collaborated in iterative planning and execution cycles for effective change management. A mixed-methods design integrated qualitative structured group discussions, analyzed via thematic analysis (Braun & Clarke, 2006), with quantitative usability assessments using an adapted System Usability Scale (SUS) with a five-point Likert scale and system usage metrics (e.g., accounts created, opportunities logged, tasks entered) over 10 months, analyzed descriptively (Brooke, 1996). Exploratory design and sample size justified avoiding advanced statistics. Training workshops enhanced proficiency and provided feedback for iterative adjustments, addressing resistance (Venkatesh et al., 2003). Data collection ensured ethical standards with informed consent and anonymized data.

**Results:** The CRM platform was accessible, though users suggested simpler interfaces. Data integration issues hindered reliable information access, reducing trust. Customization limitations caused mixed productivity outcomes, with automation gains but complexity disruptions. Training boosted confidence, though users requested tailored sessions. Usage increased post-training, with peaks in opportunities and tasks. Feedback prioritized usability, automation, and integration improvements.

**Conclusions:** CRM implementation enhanced efficiency and collaboration through structured training, but data integration and customization challenges persist. Lewin's model explains the need for stabilizing change to embed CRM routines, Kotter's framework highlights training as generating short-term wins, and UTAUT underscores training's role in reducing effort expectancy for user adoption. AI offers automation potential, requiring ethical governance, such as GDPR compliance. CRM's sustainability metrics support environmental and social goals. User-centric approaches remain essential for sustained digital transformation.

**Future Work:** Future research could explore AI-CRM's long-term impact and sustainability/blockchain integration for transparency.

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## References:

- Brooke, J. (1996). SUS: A quick and dirty usability scale. In *Usability evaluation in industry* (pp. 189–194). Taylor & Francis.
- Chatterjee, S., Chaudhuri, R., & Vrontis, D. (2021). AI and digitalization in relationship management. *Journal of Business Research*, 150, 632–645.
- Kotter, J. P. (1996). *Leading change*. Harvard Business School Press.
- Kumar, V., & Reinartz, W. (2018). *Customer relationship management: Concept, strategy, and tools* (3rd ed.). Springer.
- Lewin, K. (1947). Frontiers in group dynamics. *Human Relations*, 1(1), 5–41.
- Payne, A., & Frow, P. (2005). A strategic framework for customer relationship management. *Journal of Marketing*, 69(4), 167–176.
- Reinartz, W., Krafft, M., & Hoyer, W. D. (2004). The customer relationship management process. *Journal of Marketing Research*, 41(3), 293–305.
- Ribeiro, M. (2024). *A Customer Relationship Management Implementation: The JCDecaux Portugal Case*. ISCAP.
- Trainor, K. J., et al. (2014). Social media technology usage and customer relationship performance. *Journal of Business Research*, 67(6), 1201–1208.
- Venkatesh, V., et al. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.

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