

the 1990s, the number of people in the UK who are employed in the public sector has increased from 10.5 million to 12.5 million, and the number of people in the public sector who are employed in health care has increased from 2.5 million to 3.5 million (Department of Health 2000).

There are a number of reasons for this increase in the number of people employed in the public sector. One of the main reasons is the increasing demand for health care services. The population of the UK is ageing, and there is a growing number of people with chronic conditions who require long-term care. This has led to an increase in the number of people employed in health care, particularly in the public sector.

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**WELCOME REMARKS**



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It is with great pleasure that I welcome you to the release of November 2023 issue of the CIT Review Journal.

This edition represents a culmination of rigorous research, and innovative ideas, into diverse facets of economic, technological, and societal landscapes. The collection of papers within this issue is a testament to the dedication of our contributors. These works span a wide spectrum of critical topics, each shedding light on pertinent issues shaping our world today.

I extend my heartfelt gratitude to the authors whose dedication and scholarly rigor have enriched this publication. Their contributions not only expand our understanding but also provide valuable insights that can pave the way for meaningful advancements in their respective fields.

I encourage all of you get into these thought-provoking ideas, and join us in celebrating the drive for innovation in our academic discussions.

Thank you, and may this edition inspire further exploration, dialogue, and progress in our shared quest for knowledge.

Kind regards,

A handwritten signature in black ink, consisting of stylized, overlapping letters that appear to be 'S', 'A', and 'B'.

**Sokol Abazi**  
Editor-in-Chief

# MACHINE LEARNING METHODS IN EVALUATING THE IMPACT OF ECONOMIC FACTORS ON THE CONSUMER PRICE INDEX IN ALBANIA

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## Abstract:

The Consumer Price Index (CPI) in Albania is a measure of inflation that tracks changes in the prices of a basket of goods and services typically purchased by urban households in the country. It is a vital economic indicator used to assess changes in the cost of living and the overall price level in Albania. There are several factors that affect the levels and progress of the CPI, among them we have chosen: Euro/Lek and USD/Lek exchange rates, import levels, the monetary base, and salary data, from January 2007 to September 2023. In this paper, we investigate the efficiency of machine learning methods in determining the factors that have the greatest impact on the CPI.

In our analysis, we assess the effectiveness of decision-tree models, Random Forest and XGBoost algorithms, in predicting the CPI behavior in Albania. Based on our empirical findings, we conclude that the monetary base and wages play a crucial role in influencing the CPI, with imports and exchange rates following closely in significance. Additionally, our results indicate that the Random Forest model demonstrates superior accuracy and demands less parameter tuning time compared to the alternatives. This research underscores the critical role of model selection in achieving precision and dependability in CPI forecasting. It underscores the immense potential of machine learning models in enhancing forecasting accuracy. The implications of this study are significant, as they can foster the creation of more precise and dependable forecasting models, equipping policymakers with a deeper understanding of economic stability.

**Keywords:** 4 Consumer Price Index, Exchange rate, Imports, Machine learning, Decision-tree.

## INTRODUCTION

The Consumer Price Index (CPI) is a widely used economic indicator that measures the average change in the prices paid by consumers for a basket of goods and services over time.

It provides valuable insights into inflation, allowing individuals, businesses, and policymakers to monitor the cost of living and assess the impact of price changes on households. The CPI typically includes a representative sample of items such as food, housing, transportation, and healthcare, and it plays a crucial role in determining adjustments in wages, social security benefits, and other financial instruments to maintain the purchasing power of consumers in an evolving economic landscape.

The field of using machine learning methods for macroeconomic forecasting is a relatively recent development (Carvalho et al., 2019, Linardatos et al., 2020). Medeiros et al., (2019) explore advances in machine learning (ML) methods and the availability of new datasets to forecast U.S. inflation. Garcia et al., (2017) explore the application of ML techniques

with Brazilian data. In Kohlscheen's study from 2021, he investigates the factors influencing CPI inflation using a straightforward yet computationally demanding machine learning approach. To be more precise, the research involves forecasting inflation in 20 advanced nations from 2000 to 2021, employing 1,000 regression trees established on six essential macroeconomic factors. This impartial, data-centric method yields relatively strong predictive performance for outcomes. Additionally, Costa et al., (2021) focused on oil price point and density forecasting using ML methods in their research. In the age of vast data availability, they seek to determine if modern automated tools can enhance forecast accuracy compared to conventional methods. They generate oil price point and density predictions using a total of 23 techniques.

Araujo and Gaglianone, (2023), are delving into the realm of machine learning techniques to enhance inflation prediction in Brazil. They introduce two novel contributions in their research. The first one is the introduction of a fresh method for combining

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quantiles, termed the “quantile regression forest model.” The second contribution involves the utilization of a hybrid machine learning strategy to develop innovative machine learning techniques. Their collection of top-performing forecasts encompasses a variety of methods, including forecast combinations, tree-based algorithms like random forest and XGboost, breakeven inflation, and expectations gathered from surveys.

Accurate inflation forecasting in a data-rich environment is challenging, with unanswered questions on extracting predictive information from correlated predictors. Traditional factor models have been used, but recent studies suggest machine learning models like random forests can help. Aras and Lisboa, (2022), promotes using machine learning models alongside or independently from factor models, incorporating new tree-based models, and combining feature selection techniques with Shapley values for concise inflation predictions. Experiments in volatile Turkey show that tree-based ensemble models offer both accuracy and explainable predictions.

Numerous prior investigations have centered on the variables influencing the Consumer Price Index (CPI) (Beckmann and Czudaj, (2013); Gao et al., (2014); Binner et al., (2010)). Nguyen et al., (2023), used various models, including multivariate linear regression (MLR), support vector regression (SVR), autoregressive distributed lag (ARDL), and multivariate adaptive regression splines (MARS), to forecast the US CPI from January 2017 to February 2022. The models considered factors like crude oil prices, world gold prices, and the federal fund effective rate. Evaluation metrics indicated that the MARS model outperformed the others in forecasting US CPI, which could aid the US government in shaping economic policies and promoting economic development. Several research studies have utilized regression models to examine the relationship between economic growth and environmental quality (Riofrío et al., (2020), Wang et al., (2023)).

In Gjika et al., (2020), the authors employ multivariate methods along with time series forecasting models to model the CPI indices in Albania. In a separate study by Gjika et al., (2016), they explore Albania's economic growth and its links with the consumer price index (CPI), unemployment rate, inflation, and life expectancy. Basha and Gjika, (2023), assess the performance of machine learning and traditional models for forecasting time-series data of the Consumer Price Index (CPI), both for the total CPI and its 12 component groups. They evaluate the effectiveness of ARIMA models, Prophet models, and combinations of ARIMA and Prophet models with XGBOOST algorithms.

In Albania, similar to numerous other countries, the Consumer Price Index (CPI) fluctuates annually owing to shifts in the costs of products and services,

variations in consumption habits, and various economic determinants. The National Institute of Statistics in Albania (INSTAT) frequently releases CPI data to monitor these fluctuations. The CPI serves multiple purposes, including measuring the inflation rate in Albania, acting as a deflator in National Accounts, Short-Term Statistics, and for adjusting the cost of living for households. It also plays a role in the monetary policy of the Central Bank of Albania. The CPI can fluctuate due to various economic and political factors, so it's essential to use the most recent and accurate data when analyzing inflation trends and making financial decisions.

For this purpose, the objective of this paper is to examine various factors and assess their influence on the Consumer Price Index (CPI). Specifically, the factors under investigation include the Euro/Lek and USD/Lek exchange rates, import levels, the monetary base, and salary data, all within the timeframe from January 2007 to September 2023. The analysis was performed using machine learning: decision-tree, random forest and XGboost methods.

The rest of the paper proceeds as follows. Section 2 provides an explanation of the model methodologies, introducing the three mentioned models briefly. In Section 3, we present our data and findings. Section 4 offers conclusions, discussing potential implications of the current research and outlining future directions.

## **Materials and methods**

**Decision tree models:** are a popular machine learning and data analysis technique used for classification and regression tasks. They are one of the earliest and simplest forms of predictive modelling, and they have been widely used in various fields, including data mining, artificial intelligence, and statistics. The concept of decision trees can be traced back to the early 1960s, with the development of the ID3 (Iterative Dichotomiser 3) algorithm by Ross Quinlan in 1986. The ID3 algorithm was one of the first practical decision tree algorithms and laid the foundation for subsequent variations like C4.5, C5.0, and CART (Classification and Regression Trees).

Decision trees are essentially a flowchart-like structure that helps make decisions based on the input data. They recursively split the dataset into subsets based on the most significant attribute or feature, resulting in a tree-like structure of decision nodes and leaf nodes. At each node, a decision is made based on a feature, leading to different branches (child nodes) and, eventually, a prediction or classification at the leaf nodes. Decision trees have several advantages, including their simplicity, interpretability, and the ability to handle both numerical and categorical data. However, they are prone to overfitting, which can be mitigated with techniques like pruning Han et al., (2012).

Random Forest: is an ensemble learning technique developed by Leo Breiman and Adele Cutler in the early 2000s. It's an extension of decision tree models and is widely used in machine learning for classification and regression tasks. Random Forest works by constructing multiple decision trees during the training phase and combining their predictions to make more accurate and robust predictions. The method: randomly select a subset of the training data (with replacement). This creates multiple subsets of data, known as bootstrap samples. For each bootstrap sample, a decision tree is constructed.

However, Random Forest introduces randomness into the process. At each node of the tree, instead of considering all features, it only considers a random subset of features. This helps to decorrelate the trees. When making predictions, each tree in the forest makes its prediction. For classification tasks, the class that receives the majority of the votes among the trees is the final prediction. For regression tasks, the predictions are averaged. Random Forest is a powerful and versatile ensemble method that often outperforms individual decision trees. It's less prone to overfitting compared to a single decision tree and it can handle both categorical and numerical data (Breiman, L., (2001).

**XGBoost**, which stands for "Extreme Gradient Boosting," is a machine learning algorithm known for its speed and performance in supervised learning tasks, particularly in regression and classification. It was developed by Tianqi Chen and released in 2014. XGBoost is a gradient boosting algorithm that builds an ensemble of decision trees to make predictions. It works by iteratively adding decision trees to correct the errors made by the previous trees. The algorithm starts with a single decision tree, which can be a shallow tree with a single node, representing the average target value of the entire dataset. It calculates the gradient of the loss function with respect to the model's current predictions. This gradient represents the direction and magnitude of the error. Then constructs a new decision tree to minimize the loss function. This tree is added to the ensemble and weighted according to its contribution to reducing the error. XGBoost includes regularization terms in its objective function to control model complexity and prevent overfitting. Gradient Boosting, Additive Tree Construction and Regularization are repeated for a specified number of iterations or until a stopping criterion is met. XGBoost offers several advantages, including high predictive accuracy, handling missing values, feature selection, and excellent performance on structured datasets. It's widely used in machine learning competitions and real-world applications.

## Results

For the study conducted in this paper, we decided to focus on the Consumer Price Index (CPI) in Albania and various factors such as: Euro/Lek and USD/Lek exchange rates, import levels, the monetary base, and salary data, for the period January 2007 to September 2023. The initial official Consumer Price Index (CPI) was computed in December 1991, with December 1990 as the base period. Monthly CPI calculations began in 1992. The CPI's consumer basket was revised in 1993 based on the results of the Household Budget Survey (HBS) carried out by INSTAT. The base period was updated to December 1993, featuring a basket with 221 items categorized into 8 main groups. In 2000, a new HBS was conducted, leading to further revisions in the CPI basket. December 2001 became the new base period, encompassing 262 items classified into 12 main groups by COICOP classification, including food and non-alcoholic beverages, clothing and footwear, housing, transport, education, health, recreation, and more. This allowed for the analysis of how different sectors contributed to inflation. Currently, the base period is December 2020 (December 2020=100), with potential future changes in base period revisions. The data were obtained from Institute of Statistics (INSTAT) and the Bank of Albania.

Following an initial data analysis, it was determined that the dataset did not contain any missing values. Moreover, various analytical steps were taken, including time series anomaly detection, the examination of series components, checking stationarity properties, and providing descriptive statistics for the data. Subsequently, the data was divided into two sets: the first 80% was allocated for model training, and the remaining 20% was designated for model prediction. This choice of an 80-20 split was made considering data limitations, and since the data pertained to monthly time series, this split was guided by best practices. Once the data was organized, decision-tree, random forest, and XGBoost models were constructed to evaluate the factors impact on the Consumer Price Index (CPI).

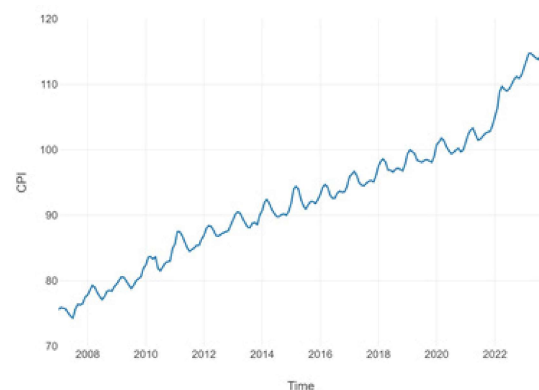


Figure 1. Consumer Price Index in Albania from January 2007 to September 2023. Source: Authors



In the year 2022, particularly in September and October, Albania experienced significant monthly fluctuations in the Consumer Price Index (CPI). The annual CPI change for September 2022 stood at 8.1%, marking a substantial increase compared to the 2.5% change a year prior. In September 2023, the CPI registered a value of 115.3, using December 2020 as the reference period. The annual CPI rate for September 2023 is 4.1%, showing a decline from the 8.1% rate in the previous year. The annual growth rate in September was primarily influenced by the prices of the “Food and non-alcoholic beverage” group, contributing a significant +2.80 percentage points, followed by the “Housing, water, electricity, and other fuel” group.

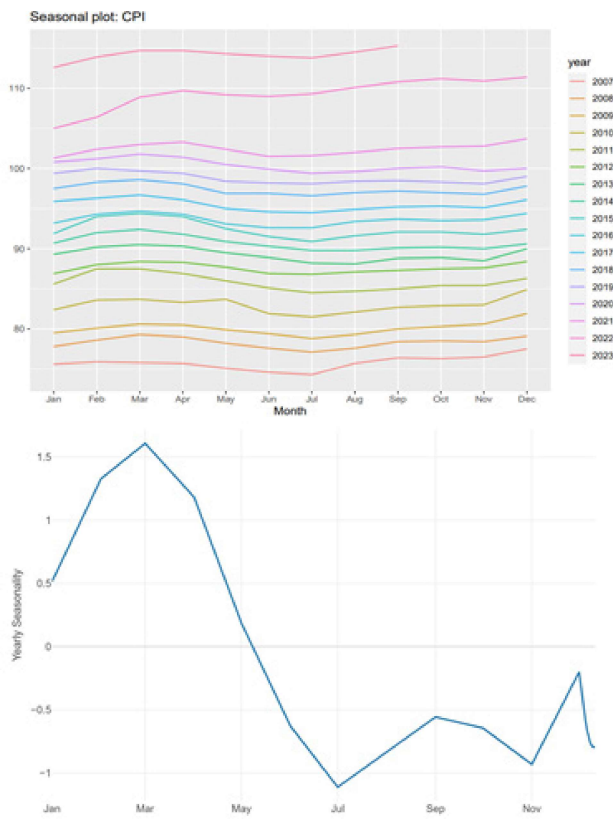


Figure 2. Seasonal plot. Source: Authors

The seasonal plot and time series graph of the Consumer Price Index (CPI) in Albania reveal a clear linear trend, for each year that passes, there is a higher value than the previous year for the index, and a seasonality pattern with a 12-month cycle. Figure 2 provides insights into assessing the annual cycle's shape consistency over time and identifying unique characteristics. The shapes of these annual cycles remain fairly similar, although the amplitude of the yearly fluctuations has decreased in recent years. Notably, March consistently exhibits a higher CPI compared to other months, while July consistently shows a lower CPI

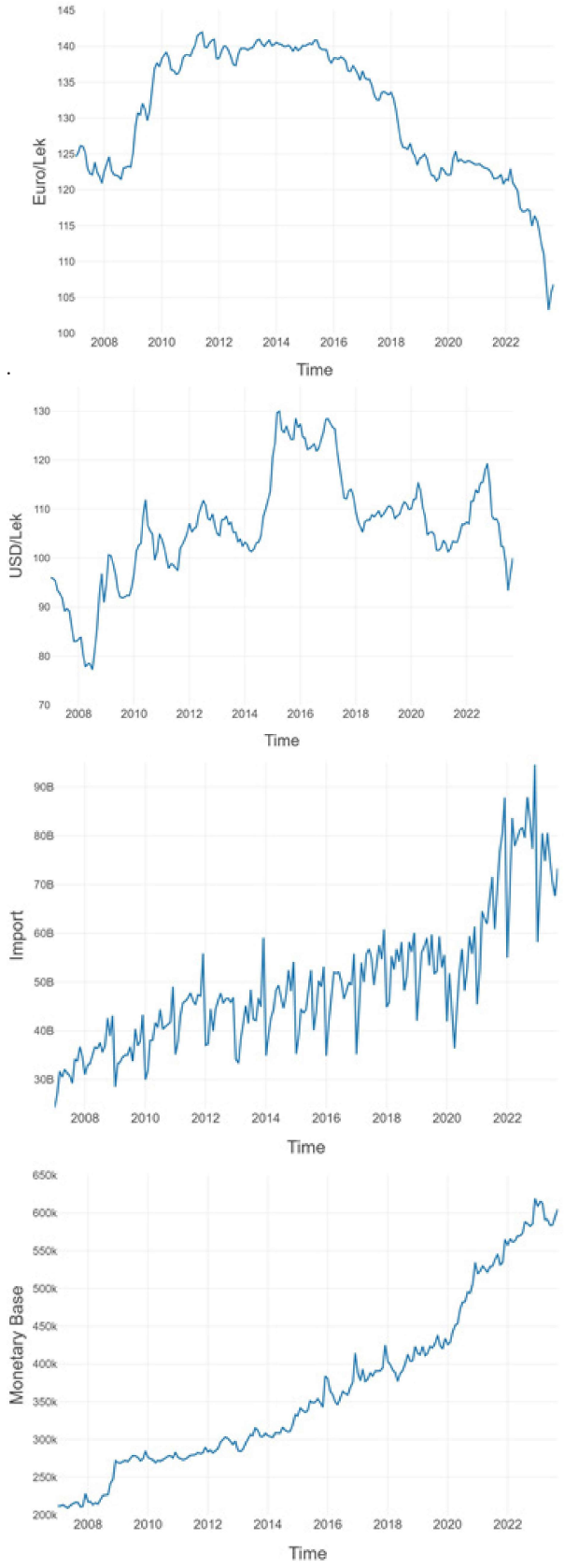


Figure 3. Currency Exchange Rate USD/Lek and Euro/Lek; Imports and Monetary Base in Albania from January 2007 to September 2023. Source: Authors

Exchange rates play a very important and critical role for most of the world's free market economies. The economic effects of the exchange rate changes are among the most controversial issues in the literature. The exchange rate's effect on the CPI is primarily through its impact on the prices of imported goods, inflation, interest rates, tourism, exports, and consumer sentiment. Exchange rate movements can contribute to both inflationary and deflationary pressures on the CPI, depending on the direction and magnitude of the currency's fluctuations. The Euro/Lek exchange rate hit its lowest point in July 2023, reaching 103.24, while its peak was recorded in June 2011 at 141.97. The average exchange rate over the years stands at 130.48. Conversely, the USD/Lek exchange rate reached its lowest point in July 2008, dipping to 77.24, while it reached its highest value in April 2015 at 129.97. The average exchange rate for the USD/Lek pairing over the years is 106.39.

Imports have a multifaceted impact on the CPI, affecting price levels, inflationary pressures, supply chain dynamics, competition, and consumer behaviour. From Figure 4 (a), we can see that the value of imports in Albania throughout the years under study is increasing. Imports had their lowest value in January 2007, and their highest value is in December 2022, with 94 billion. Changes in the prices and availability of imported goods can influence the overall inflation rate, making them an important component of CPI calculations. Imported inflationary pressures can contribute to overall inflation. When the prices of imported goods increase, it can lead to cost-push inflation. This, in turn, affects the overall CPI, as inflation measures the average change in prices for a basket of goods and services, including both domestically produced and imported items.

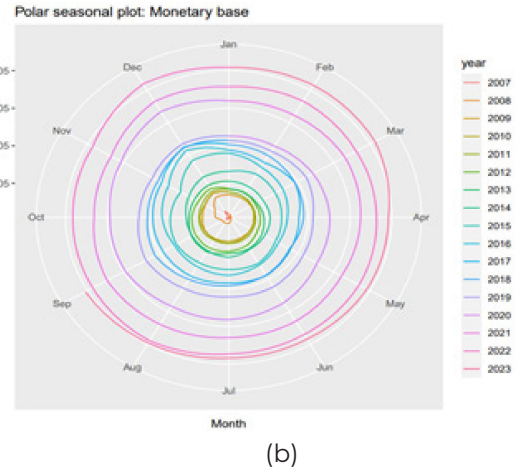
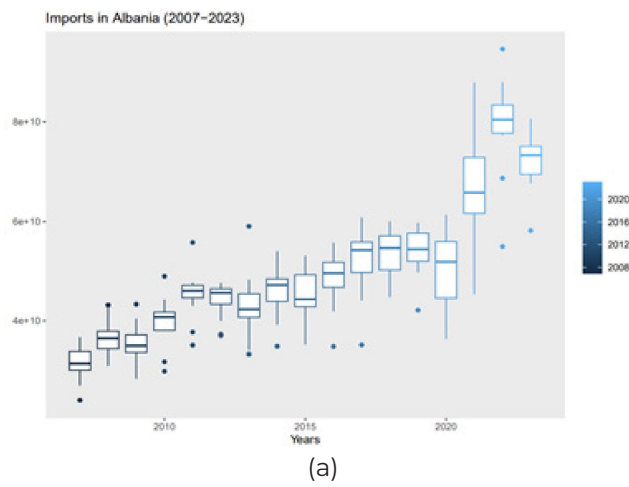


Figure 4. (a) Box-plot of Imports and (b) Polar seasonal plot of Monetary Base in Albania through 2007-2023. Source: Authors

The monetary base represents the amount of currency in circulation and the reserves held by commercial banks. When the central bank increases the monetary base by injecting more money into the economy (often through open market operations or quantitative easing), it can lead to an increase in the broader money supply. From polar seasonal plot Figure 4 (b), we can see that the monetary base in Albania throughout the years under study has a linear trend. An expansion of the money supply can contribute to demand-pull inflation, which, in turn, affects the CPI. Increases in the monetary base can contribute to inflation by expanding the money supply, lowering interest rates, stimulating economic activity, influencing exchange rates, and shaping inflation expectations. Conversely, a decrease in the monetary base may have deflationary effects on the CPI. The average salary in Albania during this time is 49068.7 Lek, with a minimum of 33750 and the highest value of 70905 reached during the year 2023.

In the second phase of the work, the impact that the factors taken in the study have on CPI was evaluated, applying the decision-tree, random forest and XGboost methods.

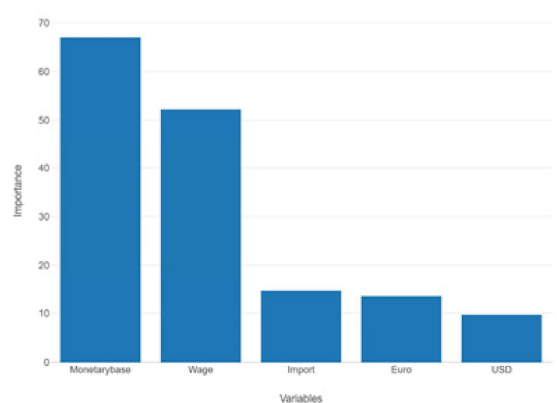


Figure 5. Variable importance plots. Source: Authors Variable

importance is a concept often used in statistics and machine learning to determine the significance or contribution of different variables (features or predictors) in a model, data analysis, or decision-making process Figure 5. It helps identify which variables have the most impact on the outcome of interest. We can clearly see that monetary base and wages have significant importance in the behaviour of the CPI in Albania, followed by imports and exchange rate. Variable importance is valuable for feature selection, model interpretation, and understanding the factors that contribute most to the model's predictive accuracy.

In the realm of predictive modelling, accuracy serves as a critical gauge for evaluating a model's effectiveness in making decisions. This accuracy can be assessed through in-sample data, which pertains to the data employed for model training, or out-of-sample data, which may encompass unseen data or a collection of observations utilized for testing. The performance of machine learning models can be evaluated using various metrics depending on the type of problem (classification, regression, clustering, etc.) and the specific goals of the analysis.

**Table 1.** Performance of the models. Source: Authors

MODEL	RMSE	R-squared
Decision-Tree	2.025191	0.959383
Random Forest	1.240062	0.984771
XGBOOST	3.12004	0.903596

Now that different models have been tried, we may compare the outcomes that have been found. Putting the outcomes in Table 1 together allows for a comparison to be made. As done for all the models, besides the RMSE parameter used in the fine tuning, we also report values for the R-squared for testing set. Root Mean Squared Error (RMSE), providing a more interpretable measure of error. R-squared (R2) measures the proportion of the variance in the CPI that is explained by the model. A higher R-squared indicates a better fit. Based on the results of Table 1, we can conclude that the best model for our data is the Random Forest model. Random Forest model shows the best performance both for training and testing data.

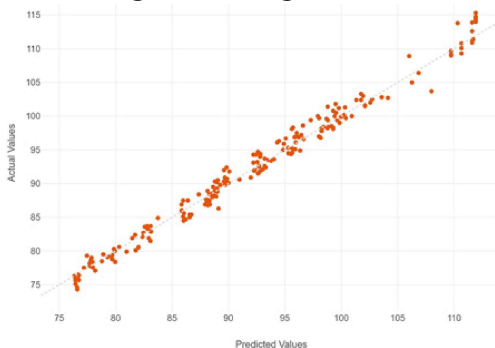


Figure 6. Actual versus predicted values, taken from Random-Forest model. Source: Authors

The graph of actual values versus predicted values is a visual tool that allows you to assess how well a model's predictions align with the actual data, Figure 6. Understanding the dispersion, pattern, and outliers in the graph helps in evaluating and improving the model's performance. Patterns in the data points form a linear pattern in our case indicates a strong, relationship between actual and predicted values. There is no significant evidence of outliers. So we can conclude that we have a highly accurate model.

### Conclusions

This paper extensively analyzed the Consumer Price Index (CPI) in Albania, which serves as the official indicator of inflation, carrying immense importance for policymakers and economists. In the year 2022, particularly in September and October, Albania experienced significant monthly fluctuations in the Consumer Price Index (CPI). The study also investigated the influence of multiple factors, including exchange rates, imports, the monetary base, and salary data, over the period spanning from January 2007 to September 2023. To achieve our goals, we employed three distinct methodologies: decision-tree models, random forest models, and the XGBoost algorithm. Through variable importance analysis, we identified the key contributors to CPI fluctuations, with the monetary base and wages emerging as the most impactful, followed by imports and exchange rates.

Our model evaluation demonstrated that the Random Forest model outperformed the alternatives, exhibiting the lowest Root Mean Squared Error (RMSE), 1.240062 and the highest R-squared, 0.984771, values for both training and testing data. The graphical representation of actual versus predicted values from the Random Forest model confirmed its exceptional accuracy, displaying a clear linear pattern with no significant outliers.

In summary, this study provided valuable insights into the factors influencing the CPI in Albania and demonstrated the effectiveness of machine learning models, particularly the Random Forest model, in predicting CPI changes. These findings can be instrumental for policymakers and individuals in making informed economic decisions and understanding the dynamics of inflation in Albania.

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# ON RELATIONS BETWEEN CYBER SECURITY INDEX AND ISO 27001 STANDARD INDEX IN WESTERN BALKAN COUNTRIES

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## Abstract:

My aim in this article was to illustrate the relationships between the Western Balkan nations' ISO 27001 index and the cyber security index, given the growing global interest in cyber security.

The primary findings of this study were derived from the research methodology, which involved gathering data and information about the degree of cyber security applications in the Western Balkans, as represented by the cyber security index, as well as data about the degree of ISO 27001 standard application in Western Balkan countries, processing data for ISO 27001 certificates, creating an index of ISO 27001 certificates, and managing a regressive analysis on the relationships between the cyber security index and the ISO 27001 certificates index, while examining the path toward EU integration, they are also working to address concerns related to cyber security. This is because gaining a competitive edge in fields like information technology, artificial intelligence, digitalization, e-commerce, and e-government necessitates robust cyber defenses.

The primary suggestion is that Western Balkan nations may better respond to cyberattacks and cyberthreats by implementing ISO standards including the ISO 27000 family of standards, particularly ISO 27001.

**Keywords:** Cyber security index, ISO 27001 index, Western Balkans, information technology management, competitive advantage.

## 1. Introduction

Cybersecurity is the process of defending networks, sensitive data, and electronic devices from hostile assaults. (2023; Kaspersky). It is often referred to as electronic information security or information technology security.

Network security, application security, information security, operational security, disaster recovery and business continuity, and end-user education are some of the areas into which cybersecurity may be subdivided.

Network security is the process of protecting a computer network from outside threats, such as malicious viruses or targeted attackers. The goal of application security is to prevent threats from entering devices and software.

Data integrity and privacy are safeguarded during storage and transmission using information security measures.

The procedures and choices made for managing and safeguarding digital assets are part of operational security.

Disaster recovery and business continuity pertain to an organization's response to an event that results in the loss of operations or data, such as a cyber-security incident. End-user education targets the most erratic aspect of cyber-security: human behavior.

There is an increasing number of data breaches every year, and the global cyber threat is still evolving at a rapid rate. Global investment in cybersecurity solutions is inevitably rising as the danger posed by cyberspace is expected to continue growing in scope.

According to Gartner, investment in cybersecurity will top \$260 billion worldwide by 2026 and reach \$188.3 billion in 2023.

An international live index that gauges a nation's readiness to stop cyberattacks and handle cyber events is called the National Cyber Security Index.

In addition, the NCSI serves as a tool for developing national cyber security competence and a database including publicly accessible evidentiary materials (NCSI, 2023). NCSI assists with the following tasks:

- Determining the primary cyber threats
- Determining the security measures and capacities
- Choosing significant and quantifiable components
- Developing cyber security indicators
- Classifying cyber security indicators

Controls are unquestionably necessary to ensure the security of devices, communication networks, and information assets given the increasing number of security events and assaults on information and IT systems that enterprises are facing.

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The idea of cybersecurity was born out of this requirement. Attacks of this kind try to gain access to, alter, or remove private data that belongs to companies. Adopting strong cybersecurity measures is a difficult task as hackers are always coming up with new ways to launch attacks thanks to the abundance of tools and technology available. Nonetheless, there is a method for putting data and information security measures into place that partly simplifies and normalizes the process of putting these IT security measures into place. In the current market, businesses want to give their clients trust and show that they are dedicated to protecting the security of the data they handle. To do this, a firm might gain a competitive edge by obtaining certification of an ISO standard or security regulation, which attests to the proper management of security needs in information processing operations. These are the information security and cybersecurity-related ISO standards and rules. The International Standards Organization creates and disseminates ISO standards (ISO). The ISO 27000 series of standards is one of them. This group of information security standards lays out the conditions and recommendations for putting in place an Information Security Management System (ISMS) to handle information security inside a company. The primary standard in this group is ISO 27001, which serves as the series benchmark. The criteria for creating, implementing, maintaining, and continuously improving an ISMS are outlined in this standard. The private sector is the primary implementer of ISO standards, but public administration bodies are also involved in cyber security matters. Therefore, for a nation to be safe from cyberattacks, there needs to be a strong correlation between government cybersecurity initiatives and the implementation of ISO 27001 standards.

**2. Literature review**

**2.1 The Western Balkans as a part of the Balkan region**

The Balkans, which roughly correlate to the Balkan Peninsula, are a region in southeast Europe that has been defined in a variety of ways throughout history (Gray & Sloan, 2014). The Balkan Mountains, which encircle all of Bulgaria, gave rise to the region's name. The Black Sea borders the northeast of the Balkan Peninsula, the Adriatic Sea borders the northwest, the Ionian Sea borders the southwest, the Aegean Sea borders the south, and the Straits forms the east.

There are many definitions for the peninsula's northern boundary (Vezenkov, 2017). Musala, located in Bulgaria's Rila mountain range at 2,925 meters (9,596 feet), is the highest peak in the Balkans.

German geographer August Zeune, who thought the Balkan Mountains were the main mountain range in Southeast Europe, stretching from the Adriatic Sea to the Black Sea, invented the idea of the Balkan Peninsula in 1808 (Todorova, 1997). In the 19th century, the regions of Europe that were then provinces of the Ottoman Empire were referred to as Rumelia or the Balkan Peninsula.

Its definition was more geopolitical than geographical, and it was furthered by the early 20th-century establishment of the Kingdom of Yugoslavia. Since the technical definition of a peninsula differs from the concept of the Balkan Peninsula's natural limits, contemporary geographers reject the notion of a Balkan Peninsula, while historical researchers typically discuss the Balkans as a region. Due to several conflicting definitions, the boundaries of the Balkans are up for debate. Regarding the region's constituent parts, there is no unanimous consensus. According to most definitions, the phrase includes all of the following: North Macedonia, Albania, Kosovo, Montenegro, Bulgaria, Greece, Bosnia and Herzegovina, and a sizable portion of Croatia and Serbia. The phrase is occasionally used to refer to Romania and the southern regions of Slovenia.

Italy is usually omitted, even though according to certain definitions it has a minor portion of its land on the Peninsula.

The economies of Albania, Bosnia & Herzegovina, Kosovo, Montenegro, the North Macedonian Republic, and Serbia are together referred to as the Western Balkans, which comprise the Balkan area, all looking towards EU integration, specifically discussing with the EU standards, cyber security, and ISO standards issues included.

*Table 1. Western Balkan Countries General Data*

	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North Macedonia	Serbia
Population	2,862,427	3,502,550	1,795,666	622,182	2,077,132	6,963,764
Area km <sup>2</sup>	28,749	51,197	10,908	13,812	25,713	77,474
Density 100/km <sup>2</sup>	100	69	159	45	81	91
Water area (%)	0.047	0.0002	0.01	0.0261	0.0109	0.0013
GDP nominal bln	\$15.418	\$20.106	\$8.402	\$5.424	\$12.672	\$55.437
GDP PPP, bln	\$38.305	\$47.590	\$20.912	\$11.940	\$32.638	\$122.740
GDP/head nominal	\$5.373	\$5.742	\$4.649	\$8.704	\$6.096	\$7.992
GDP/head	\$13.327	\$13.583	\$11.664	\$19.172	\$15.715	\$17.552
Gini Index	29.0	33.0	29.0	36.7	31.9	35.6
HDI	0.791	0.769	0.739	0.816	0.759	0.799
IHDI	0.705	0.658	N/A	0.746	0.660	0.710

*Data of this table are drawn from the World Bank Western Balkans report 2023 (World Bank, 2023)*

**2.2 Cyber Security as a practice of defense.**

The process of protecting networks, computers, servers, mobile devices, electronic systems, and data against hostile intrusions is known as cyber security. It is often referred to as electronic information security or information technology security. The word may be categorized into a few basic categories and is used in a range of situations, including business and mobile computing.

- Safety of networks.
- Program security.

- Data protection.
- Operative safety.
- Continuity of operations and disaster recovery.
- End-user training.

### **2.3 The scale of the cyber threat**

There is an increasing number of data breaches every year, and the global cyber threat is still evolving at a rapid rate. According to a RiskBased Security analysis, in only the first nine months of 2019, data breaches exposed an astounding 7.9 billion records. The amount of records revealed over the same period in 2018 is less than half (112%) of this statistic.

Most breaches occurred in the medical, retail, and public sectors, and the majority of the instances were caused by malevolent criminals. Because they gather financial and medical data, some of these industries are particularly attractive to cybercriminals; nonetheless, any company that uses a network might become the subject of consumer data breaches, corporate espionage, or customer assaults.

Global investment in cybersecurity solutions is inevitably rising as the danger posed by cyberspace is expected to continue growing in scope. According to Gartner, investment in cybersecurity will top \$260 billion worldwide by 2026 and reach \$188.3 billion in 2023. In response to the growing cyber danger, governments everywhere have released guidelines meant to assist businesses in putting into place efficient cyber-security procedures.

The National Institute of Standards and Technology (NIST) in the United States has developed a framework for cyber-security. To prevent malicious code from spreading and facilitate early discovery, the architecture suggests ongoing, real-time monitoring of all electronic resources.

### **2.4 Types of cyber threats**

Cybersecurity combats three types of threats:

- Cybercrime includes both individual and group targets who want to disrupt or obtain financial advantage from systems.
- Politically motivated information collection is a common component of cyberattacks.
- The goal of cyberterrorism is to compromise electronic systems to incite fear or panic.

The National Cyber Security Index is a real-time worldwide indicator that assesses how ready a nation is to handle cyber crises and stop cyber attacks. In addition, the NCSI serves as a tool for developing national cyber security competence and a database including publicly accessible evidentiary materials (NCSI, 2023).

The national cyber security framework has guided the development of the NCSI indicators. The primary cyber threats are displayed at the top of the figure:

- Denial of e-services: The inability to access services
- Unauthorized change of data, or a breach of data integrity
- Breach of data confidentiality: secrets are revealed

The regular operation of national information and communication networks, as well as electronic services (especially crucial e-services), are directly impacted by these risks. A nation has to have the necessary resources for incident management, general cyber security development, and baseline cyber security to handle these cyber threats. The NCSI focuses on quantifiable elements of federally implemented cyber security:

- Current laws, including enacted statutes, rules, and decrees.
- Established units, which include departments, organizations, and the like.
- The forms of cooperation: working groups, committees, etc.
- Results: guidelines, drills, tools, websites, applications, etc.

Public evidence serves as the basis for country ratings.

- Legal statutes
- Official records
- Official webpages

### **2.5 ISO 27001 and cyber security**

These days, privacy protection, cybersecurity, and IT security are essential for businesses and organizations. In the current market, businesses want to give their clients trust and show that they are dedicated to protecting the security of the data they handle. To do this, a firm might gain a competitive edge by obtaining certification of an ISO standard or security regulation, which attests to the proper management of security needs in information processing operations. Controls are unquestionably necessary to ensure the security of devices, communication networks, and information assets given the increasing number of security events and assaults on information and IT systems that enterprises are facing. The idea of cybersecurity was born out of this requirement. The goal of these assaults is to get access to access, modify, or destroy sensitive information belonging to organizations.

Adopting strong cybersecurity measures is a difficult task as hackers are always coming up with new ways to launch attacks thanks to the abundance of tools and technology available. Nonetheless, there is a method for putting data and information security measures into place that partly simplifies and normalizes the process of putting these IT security measures into place. These are the information security and cybersecurity-related ISO standards and rules. The International Standards Organization creates and disseminates ISO standards (ISO). These days, these standards are

a vital component of firms' compliance programs, giving them reputation and recognition across borders. Organizations can gain a competitive edge over their rivals by implementing ISO standards because these certified standards are regularly reviewed and audited to ensure compliance, which significantly enhances the organization's reputation with stakeholders like shareholders and clients. ISO standards are categorized into families and given sequential numbers that correspond to the areas they cover. This allows standards related to comparable problems to be grouped. The procedures, rules, guidelines, skill-building, and other aspects of the field they address—security, continuity, quality, etc.—are the focus of these standards and regulations.

The ISO 27000 series of standards is one of them. This group of information security standards lays out the conditions and recommendations for putting in place an Information Security Management System (ISMS) to handle information security inside a company. The primary standard in this group is ISO 27001, which serves as the series benchmark. The criteria for creating, implementing, maintaining, and continuously improving an ISMS are outlined in this standard.

They are safeguarded by the ISO/IEC 27000 set of standards. (2023 ISO). The most well-known international standard for information security management systems (ISMS) and the criteria that need to be met is ISO/IEC 27001. It outlines the conditions that an ISMS ought to fulfill. The ISO/IEC 27001 standard offers guidelines for creating, implementing, maintaining, and continuously improving an information security management system for businesses of all sizes and across all industries. When a corporation or organization complies with ISO/IEC 27001, it indicates that it has implemented a risk management system for the protection of its data and that the system adheres to all of the best practices and guidelines outlined in this international standard.

Managing cyber risks might appear challenging or even unachievable given the surge in cybercrime and the ongoing emergence of new threats. Organizations may become more risk-aware and proactively detect and fix vulnerabilities with the support of ISO/IEC 27001. The information security holistic approach—vetting of people, policy, and technology—is advocated by ISO/IEC 27001. An operational excellence, cyber-resilience, and risk management tool is an information security management system that is put into place by this standard.

An international standard for information security management is ISO/IEC 27001. The purpose of an information security management system (ISMS) is to assist businesses in strengthening the security of the information assets they own. It outlines the requirements for creating, implementing,

maintaining, and continuously improving an ISMS. After an audit is completed and the organization satisfies the standard's requirements, it may elect to be certified by an approved certification authority. A comprehensive analysis completed in 2020 (Akinyemi, Schatz, & Rabih. 2020) examined the efficacy of the ISO/IEC 27001 certification procedure and the standard as a whole.

### 3. Research framework, the purpose of the case study

The context for this research has been Western Balkan nations' ISO 27001 accreditation and cyber security challenges.

1. RQ1: Is there a connection between the ISO 27001 certifications index and the cyber security index?
2. based on this, two theories have been developed:
3. Ho: The ISO 27001 Standard Certifications Index and the Cyber Security Index are unrelated.
4. H1: The ISO 27001 Standard Certifications Index and the Cyber Security Index are related.

*... taking into account that there has been little research on the relationships between the ISO 27001 Standard Certifications Index and the Cyber Security Index, as well as the fact that theoretical approaches to these relationships have been developed but that there are no quantitative, statistical, or algebraic arguments about these relationships.*

### 4. Methodology

In particular, prior empirical research has not explained how the Cyber Security Index, ISO 27001 Standard Certifications Index, and quality management influence and connect, despite the importance of these factors being acknowledged in the business and entrepreneurship ecosystem. The few serious theoretical studies that have demonstrated a strong correlation between the Cyber Security Index and ISO 27001 Standard Certifications Index do not use numerical, statistical, or algebraic studies. As a result, a hypothesis that is backed by research and analysis is required. One in-depth case study technique should be used in an exploratory manner to gain a thorough grasp of phenomena and enable a deeper examination of theoretical structures.

The ISO 27001 standard certifications index and the Cyber Security Index (Y) were analyzed using regression. The ISO 27001 Standard Certifications Index was created by the author of this article by dividing the total number of firms in each Western Balkan nation by the number of ISO 27001 Standard Certificates issued. The CSI was derived from the NSCI Report 2022.



**1.1 Data collection**

- Data for the cyber security index has been gathered from the NCSI Report 2022 (NCSI, 2022), an annual ranking of countries by their capacity for, and success in cyber security.
- Data for ISO 27001 standard certificates has been gathered from the ISO 2022 survey (International Standards Organization, ISO Survey 2022).
- Data for several businesses in Western Balkan countries drawn from national institutes of statistics of Western Balkan countries, and HitHorizon.

**1.2 Data analysis**

A regressive analysis (inferential statistics) between the Cyber Security Index and ISO 27001 standard certificates Index for 5 Western Balkan Countries (Albania, Bosnia & Herzegovina, Montenegro, North Republic of Macedonia, and Serbia) was performed.

**Table 2.** National Cyber Security Index (NCSI Report 2022)

Rank	Country	National Cyber Security Index
21	Serbia	80.52
54	Albania	62.34
59	North Macedonia	58.44
97	Montenegro	35.06
112	Bosnia and Herzegovina	28.57

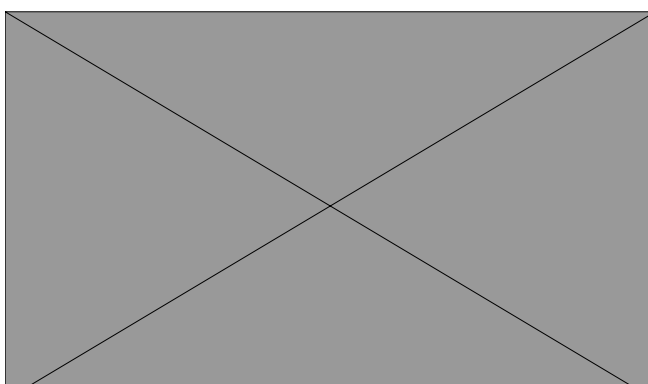
**Table 3.** Number of ISO 27001 Standards Certificates, Number of Businesses per WB country, and ISO 27001 Standard Certificates Index.

No	Country	Number certificates 2022	Variation in number	Variation %	No Businesses	ISO 27001 Standard Certificates Index
1	Albania	49	11	29	125222	0.0003913050
2	Bosnia & Herzegovina	52	5	11	98000	0.0005306122
3	N. R. Macedonia	48	3	7	70424	0.0006815858
4	Montenegro	2	0	0	39682	0.0000504007
5	Serbia	435	8	2	205139	0.0021205134

**Table 4.** Regression between Cyber Security Index (Y) and ISO 27001 Standard Certificates Index (X) table

No	Country	ISO 27001 Standard Certificates Index (X)	Cyber Security Index (Y)
1	Serbia	0.002120513	80.52
2	N. R. Macedonia	0.000681586	58.44
3	Bosnia & Herzegovina	0.000530612	35.57
4	Albania	0.000391305	62.34
5	Montenegro	5.04007E-05	35.06

**Graphic 1.** Correlation between ISDO 27001 Standard Certificates Index (X) and Cyber Security Index (Y)



SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.816679
R Square	0.666964
Adjusted R Square	0.555952
Standard Error	12.86206
Observations	5

ANOVA	df	SS	MS	F	Significance F
Regression	1	993.9257	993.9257	6.008045	0.091587
Residual	3	496.2974	165.4325		
Total	4	1490.223			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	39.47992	8.370709	4.716437	0.018049	12.84059	66.11925	12.84059	66.11925
ISO 27001 Index	19746.2	8055.953	2.451131	0.091587	-5891.44	45383.83	-5891.44	45383.83

**With these results, we have verified that There is a connection between the Cyber Security Index and the ISO 27001 Standard Certificates Index (Hypothesis 1). R<sup>2</sup> = 0.666964 > 0.50 (50%).**

**4.1 Implications for theory and practice**

Regarding the theory, a new avenue for investigation into the relationship between the ISO 27001 Standard Certificates Index and the Cyber Security Index has been made possible by the research's conclusive findings. This research views these two indices as instruments for enhancing a business's competitive advantage as well as that of a nation.

**4.2 Limitations and further research**

Numerous data on the ISO 27001 Standard Certificates for 2022 and the Cyber Security Index have been used in this research, employing a straightforward regression approach to examine the relationship between the two indexes. The statistical analysis results lead to the conclusion of a strong correlation between the two indices, providing a clear and accessible understanding of the relationship, emphasizing the strength of the correlation as a key takeaway from the analysis, however, it is essential to acknowledge a potential limitation regarding the sample size and the temporal horizon of the data. To enhance the future study's validity and applicability, consideration could be given to expanding the sample size by incorporating data from multiple years instead of solely relying on the information from 2022. This would provide a more comprehensive understanding of the trends and relationships over time. To confirm whether these relationships hold for other eras, more investigation is required.

**5. Conclusions and recommendations**

- A favorable attitude toward cyber security concerns and ISO standards, particularly those about cyber security, particularly ISO 27001, is necessary to achieve a competitive advantage.

- Taking a broader view, this study expands on the general knowledge of cyber security and ISO 27001 standard certification, as well as the relationships between them. It suggests that future research should concentrate on developing and validating the suggested framework and look into the issue in more contexts and settings.
- A regressive study confirmed the strong theoretical relationship between the Cyber Security Index and the ISO 27001 Standard Certification Index for Western Balkan Countries.
- The primary recommendation is that, in response to the path of EU integration, businesses should apply ISO standards more broadly and the ISO 27000 family of standards in particular to become more safe, secure, and guaranteed against cyber-attacks. This will help them remain dependable to their clients and support, improve, and protect business activities, processes, and procedures, giving the Western Balkan economies a competitive advantage.

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# ACCOUNTING OF INVENTORIES IN SERVICE SPHERE ENTERPRISES BASED ON MODERN TECHNOLOGIES AND ITS POSITIVE EFFECTS

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## **Abstract:**

In the dynamic landscape of service-sphere enterprises, accurate and transparent financial and management reporting plays a crucial role in assessing the company's performance and making informed business decisions. One essential aspect of these reports is the reflection of accounting information related to reserves. Reserves act as a safety net, allowing businesses to mitigate risks, fulfill obligations, and invest in future growth. This article aims to explore the significance of improving the reflection of accounting information of reserves in financial and management reports in service-sphere enterprises and highlights strategies to achieve this objective effectively. Accurate and transparent financial and management reporting is essential for service-sphere enterprises to evaluate their performance, monitor costs, and make informed business decisions. Among the crucial elements of these reports is the reflection of accounting information related to inventory. Inventory represents a significant asset for service-based organizations, and effectively capturing its accounting information is crucial for assessing profitability, managing costs, and optimizing operations. Accurate reflection of inventory in financial reports is crucial for service-sphere enterprises as it provides valuable insights into the organization's financial health and operational efficiency. By disclosing inventory-related information, such as valuation methods, carrying costs, and turnover ratios, financial reports facilitate decision-making for investors, creditors, and other stakeholders. Transparent reporting of inventory also enhances the credibility of financial statements, promoting trust and confidence in the organization's financial position. Improving inventory accounting in service enterprises is crucial for maintaining efficient operations and maximizing profitability. In this article, we will talk about ways to further improve inventory accounting in service enterprises using modern methods and modern technologies.

**Keywords:** accounting, inventory, finance, costs, assets, management

## **1. Introduction.**

In today's fast-paced business environment, effective inventory accounting plays a vital role in the success of service sphere enterprises. With the advent of modern technologies, service businesses now have access to advanced methods and tools that can revolutionize their inventory management processes. This article aims to explore the accounting of inventories in service sphere enterprises, focusing on the application of modern technologies and the positive effects they can bring. The management of inventories in service-oriented businesses presents unique challenges compared to traditional manufacturing or retail sectors. While physical goods may not be the core offering, service enterprises often rely on various tangible resources to deliver their services effectively. These resources can include equipment, spare parts, supplies, and consumables. Inventories constitute the second largest item next to fixed assets in the balance-sheet of most of the companies[1]. Hence, maintaining an accurate and efficient inventory accounting system is critical for optimizing operations, reducing costs, and improving customer satisfaction. Correct

reporting of reserves allows companies to be reflected in financial statements in an efficient and transparent manner. This article considers the key concepts and practical applications by analyzing the processes of analytical development of inventories for accounting purposes. This article explores the importance of improving the reflection of accounting information of inventory in financial and management reports in service-sphere enterprises. Effective inventory management is essential for service-sphere enterprises as it enables them to meet customer demands, minimize costs, and ensure smooth service delivery. Accurate reflection of inventory in financial and management reports is vital for stakeholders to assess the organization's financial health, profitability, and operational efficiency. By incorporating valuable accounting information related to inventory, enterprises can facilitate better decision-making and improve overall performance. Accounting for inventories is a critical aspect of financial reporting that allows companies to set aside funds for specific purposes, such as future expenses, contingent liabilities, or anticipated losses. Properly accounting for reserves

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ensures accurate financial statements and provides transparency to stakeholders. This article explores advanced methods and examples of accounting for reserves in financial statements, highlighting key concepts and practical applications.

## **2. Importance of Reflecting Inventory in Financial Reports.**

Financial reports provide crucial information to external stakeholders, such as investors, creditors, and regulators. Accurate reflection of inventory in financial statements ensures transparency and allows stakeholders to evaluate the organization's financial position. Accurate reflection of inventory in financial statements is of utmost importance as it ensures transparency and enables external stakeholders to evaluate the financial position of an organization. Financial reports provide crucial information to investors, creditors, and regulators, among others, who rely on these statements to make informed decisions. Investors, both existing and potential, analyze financial reports to assess the profitability and stability of a company. Accurate inventory accounting ensures that the financial statements reflect the true value of inventory held by the organization. This information is crucial for investors to evaluate the company's ability to generate revenue, manage costs, and assess its overall performance. Creditors, such as banks and lending institutions, rely on financial reports to evaluate the creditworthiness of a company. Inventory is one of the most important components of Profit and Loss (trading) account as well as current asset of Balance Sheet [2]. Accurate inventory valuation allows creditors to assess the liquidity of the organization and its ability to repay loans. It provides insights into the assets available to secure the debt and acts as a measure of the organization's financial health. Various regulatory bodies require organizations to report their financial statements accurately and adhere to specific accounting standards. Over the last few decades, the convergence process of accounting rules between IFRS standards and US GAAP has attracted great attention from regulators, investors, and other stakeholders [3]. Proper inventory accounting ensures compliance with these standards, such as the Generally Accepted Accounting Principles (GAAP) or International Financial Reporting Standards (IFRS). Transparent reporting of inventory enables regulators to monitor the organization's financial activities and ensures compliance with legal requirements. Accurate inventory valuation in financial statements enables management to make informed decisions regarding pricing, production, procurement, and resource allocation. It provides insights into the profitability of different product lines, helps identify slow-moving or obsolete inventory, and assists in determining optimal reorder levels. Effective inventory management based on reliable financial

information contributes to efficient operations and improved profitability. Accurate financial reporting, including inventory accounting, builds trust and credibility among external stakeholders. When stakeholders can rely on the transparency and accuracy of financial statements, it fosters confidence in the organization's management, financial stability, and long-term viability. This trust is crucial for maintaining positive relationships with investors, creditors, and regulators. The main purpose of inventory accounting is to determine periodic profit and loss by summing up the cost of products sold in a reporting period with revenue from sales and determining the amount of inventory that should be reflected in the balance sheet [4]. In conclusion, accurate reflection of inventory in financial statements is vital for service sphere enterprises. It ensures transparency, facilitates informed decision-making, and enhances stakeholder confidence. By employing sound inventory accounting practices and leveraging modern technologies, service businesses can provide reliable financial information that allows external stakeholders to assess the organization's financial position accurately. This, in turn, contributes to a healthy investment environment, secure financing opportunities, and regulatory compliance, supporting the overall success and growth of the enterprise.

## **3. Different approaches on improving inventory accounting.**

Inventory accounting is one of the most important issues for a company's financial structure and efficiency. The use of modern practices and technologies in this field shows that there are many ways proposed to make resource management better and more effective. One of the most modern practices used for resource management is financial automation and the use of technologies. Indeed, today, if any work is not automated, if modern technology is not used, the speed of doing that work, the material and time costs of doing that work will always be high. Inventory accounting helps in effective management of stock products, needs or other assets in an enterprise. With modern technology and automation surfacing around us, there are many new ways to manage inventory. In order to assess the security of the enterprise, it is necessary to analyze their composition and structure, take into account their optimality, and compare the actual ratio of fixed and circulating assets with their optimal value[5].

The first method is a high level of automation of the enterprise's stock in the warehouse. It ensures automatic recording and tracking of the company's stock, quantity and count. It provides the easiest way to manage the analytical accounting of transactions with the company's resources. The second method

ensures timely and accurate implementation of all transactions with the company's resources. This method records the stock in the warehouse when it is used the quantity of the stock and when it is used Recording large or complex inventories at the time of transaction reduces time wastage. Inventory needs to consider savings in terms of purchasing transportation costs per unit are cheaper because the company makes purchases in larger quantities compared to the costs incurred due to the large inventory (building rental costs, investment, risk, and so on) [6]. The third method provides a visual representation of the company's stock in the warehouse with graphs, frames and other indicators. It visualizes the quantity and value of the enterprise's resources, ensuring effective management of the resources in the warehouse. The fourth method provides a high-level analysis of the company's resources. This method analyzes the company's resources, for what purposes they are used, at what times they are used or what needs they meet. Therefore, it helps the enterprise to determine the most suitable times to use its resources. Many enterprises are now leveraging modern technologies such as blockchain, machine learning, and analytical programs for automatic provisioning and effective inventory accounting. Let's explore the benefits and applications of these technologies in more detail.

Blockchain enables secure and efficient recording of inventory information. By using decentralized and immutable ledgers, businesses can maintain a transparent and tamper-proof record of inventory transactions. This technology ensures constant adjustment and monitoring of information on resource productivity and availability, leading to accurate and reliable inventory management. Utilizing analytical programs allows organizations to gain insights into inventory usage, supply obsolescence, and other relevant metrics. By analyzing this data, businesses can make informed decisions for optimal inventory control and timely supply updates. Analytical programs help identify trends, patterns, and opportunities to streamline inventory management processes and improve overall efficiency. Machine learning technology replaces traditional methods in improving inventory management. Through machine learning algorithms, businesses can automate processes like stock reception, storage, and other inventory operations. This technology ensures safe and efficient handling of inventory, leading to increased productivity and optimal resource control. In addition to these technologies, several world-class applications are available for effective automatic inventory management. Here are some notable examples:

- SAP Inventory Management: SAP offers various products for automatic inventory calculation and

management, tailored to different industries and customer requirements.

- Oracle Inventory Management: Oracle provides software solutions for automatic inventory counting and management, allowing configuration based on specific customer needs.
- Microsoft Dynamics 365 Supply Chain Management: This application offers detailed and accurate inventory management capabilities to increase productivity, profitability, and efficiency.
- Fishbowl Inventory: Fishbowl Inventory provides comprehensive features for automatic inventory counting and management, including meeting customer requirements and optimizing inventory control.

These applications support functions such as purchasing, selling, returning inventory, inventory counting, managing supplier relationships, and reporting inventory movements across various warehouses. They can be configured according to specific customer requirements and business dimensions, allowing for accurate and effective inventory management. It's worth noting that countries worldwide are developing different systems to automate inventory accounting, reflecting the importance and widespread adoption of these technologies in the field. By embracing blockchain, machine learning, and analytical programs, businesses can optimize inventory management, improve resource allocation, and enhance overall operational efficiency. These technologies provide accurate and timely inventory data, leading to better decision-making and increased productivity.

#### **4. Reflecting material resources in financial statements in service sphere enterprises and further improvement of these mechanisms.**

Companies must follow appropriate reporting standards to ensure that inventories are properly reflected in their financial statements. These standards regulate the cost, reporting, valuation and presentation of tangible resources. Material reserves should be counted and valued and reflected in financial statements. Physical inventory procedures should be applied to determine the availability and value of physical resources. This ensures accurate valuation of reserves and accuracy in financial statements. Assets may lose value over time and may be subject to criticism. Therefore, predetermined impairment factors and criticisms should be reflected in the reports. It reflects the realized value of the reserves and shows the true values of the companies' assets. Automated reporting systems should be used to more effectively reflect material reserves in financial statements. These systems automate and efficiently perform inventory counting, valuation, reporting and financial reporting processes.

Technology has an important role to play in further improving the presentation of tangible resources in financial statements. Technological solutions such as QR codes, barcodes and automatic recognition systems facilitate inventory management and data collection related to reports. Companies should focus on reflecting in their financial statements by preparing accessible statements of tangible resources. These reports provide valuable information on resource mobility, efficiency and effectiveness. Automated reporting systems play a crucial role in effectively reflecting material reserves in financial statements. These systems automate and streamline various inventory accounting processes, including counting, valuation, reporting, and financial statement preparation. Automated reporting systems utilize barcode scanning or RFID technology to track and record inventory counts accurately. By automating this process, businesses can eliminate manual errors, save time, and ensure the accuracy of inventory data. Automated systems can integrate with inventory management software to calculate the value of inventory in real time. This integration allows for automatic updates of inventory valuations based on current prices and costs, ensuring accurate financial reporting. Automated reporting systems enable the generation of standardized reports and financial statements with just a few clicks. These systems can pull data from the inventory management software and automatically populate the required information, eliminating the need for manual data entry and reducing the chances of errors. Automated reporting systems can help ensure compliance with accounting standards and regulatory requirements. They can generate reports and financial statements in the required format, including disclosures related to inventory valuation methods, obsolescence provisions, and other relevant information. Advanced automated reporting systems often come with built-in analytics capabilities. These tools can analyze inventory data, identify trends, and provide insights into inventory performance, such as turnover rates, slow-moving items, or excessive stock levels. These insights assist in making data-driven decisions for better inventory management and optimization. Automated reporting systems can integrate seamlessly with financial systems, such as accounting software or enterprise resource planning (ERP) systems. One of the key issues for inventory management is accurate counting and identification [7]. This integration allows for efficient data flow between inventory accounting and financial reporting, ensuring consistency and accuracy in financial statements. Automated reporting systems provide a transparent view of inventory data and its impact on financial statements. Stakeholders, including investors, creditors, and regulators, can have confidence in the accuracy and reliability of the

reported inventory values, promoting transparency and trust in the organization's financial reporting. By leveraging automated reporting systems for inventory accounting, businesses can streamline processes, improve accuracy, and enhance overall efficiency in reflecting material reserves in financial statements. These systems enable timely and accurate financial reporting, support decision-making, and ensure compliance with accounting standards and regulatory requirements. Ultimately, they contribute to a more transparent and reliable representation of inventory in financial statements. The evaluation of the feasibility of the enterprise's financial rehabilitation should be carried out on the basis of information about the planned measures aimed at the enterprise's exit from the crisis [8].

The built-in analytics capabilities of advanced automated reporting systems offer valuable insights into inventory performance, helping businesses make data-driven decisions for better inventory management and optimization. Here are some key aspects and benefits of using analytics tools within automated reporting systems:

- Trend Analysis: Analytics tools can analyze historical inventory data to identify trends and patterns. By examining factors such as sales volumes, seasonality, or product demand fluctuations, businesses can gain a deeper understanding of inventory movement and adjust their strategies accordingly. This enables proactive inventory planning and optimization.
- Turnover Rates: Automated reporting systems with analytics capabilities can calculate turnover rates, such as inventory turnover ratio or days sales of inventory. These metrics provide insights into how efficiently inventory is being utilized and help determine if stock is moving too slowly or too quickly. By monitoring turnover rates, businesses can identify opportunities to reduce carrying costs, avoid stockouts, and optimize inventory levels.
- Slow-Moving or Obsolete Items: Analytics tools can identify slow-moving or obsolete inventory items that may tie up resources and hinder profitability. By analyzing sales data, product lifecycles, and customer demand, businesses can make informed decisions on pricing strategies, promotions, or liquidation efforts to minimize the impact of slow-moving or obsolete stock on their operations.
- Excessive Stock Levels: Analytics capabilities enable businesses to assess inventory levels and identify instances of excess stock. By analyzing historical data and demand patterns, businesses can determine optimal stock levels to avoid overstock situations, reduce holding costs, and free up working capital. This allows for improved cash flow management and prevents unnecessary inventory accumulation.
- Demand Forecasting: Some advanced analytics tools within automated reporting systems can

leverage machine learning algorithms to forecast future demand for inventory items. By considering various factors such as historical sales, market trends, and external influences, businesses can improve their accuracy in predicting demand and adjust inventory levels accordingly. This helps minimize stockouts and reduces the risk of overstocking.

- **Cost Analysis:** Analytics capabilities within automated reporting systems can also provide insights into cost analysis related to inventory. By analyzing purchase prices, carrying costs, and other expenses associated with inventory management, businesses can identify cost-saving opportunities, negotiate better supplier terms, and optimize procurement processes.

- **Scenario Planning and What-If Analysis:** Some automated reporting systems offer scenario planning and what-if analysis functionalities. This allows businesses to simulate different inventory management scenarios and assess their potential impact on key performance indicators, such as profitability, cash flow, or customer service levels. By conducting these analyses, businesses can make informed decisions about inventory strategies and optimize their operations.

By leveraging the analytics capabilities of automated reporting systems, businesses can gain valuable insights into inventory performance, identify trends and patterns, and make data-driven decisions for better inventory management and optimization. These insights help improve efficiency, reduce costs, enhance customer service, and drive overall business performance in the realm of inventory management. The vast majority of managers in management they do not pay much attention to the analysis, the discovery of problems in the field of management, and the search for management innovations[9]. Effective inventory management in the process of innovation activity, given the significant amount of money invested in the creation and maintenance of the required level of inventories is a very important issue[10].

As the world's largest e-commerce company, Amazon extensively employs automated systems in inventory accounting. Their warehouse and logistics processes are electronically monitored, and inventory information is automatically updated. This enables efficient inventory management and provides customers with fast and accurate fulfillment solutions. Amazon's success with inventory automation is exemplified by their efficient warehouse operations. They employ robots and automated systems to handle inventory movement, picking, and packing processes. These technologies enable fast and precise order processing, reducing human errors and improving overall efficiency. Additionally, Amazon's advanced analytics capabilities analyze customer behavior, market trends, and historical data to optimize inventory allocation and pricing strategies, further

driving their success. Walmart, a global retail giant, is another company that leverages automated inventory accounting systems. Their warehouse technologies enable automatic product coding through barcodes and RFID, allowing for rapid and error-free inventory access. Walmart's success with inventory automation has led to significant cost savings. By reducing holding costs associated with excess inventory, they have improved their profit margins and achieved better inventory turnover ratios. Additionally, the accurate tracking of inventory has allowed them to make data-driven decisions regarding product assortment, pricing, and promotions, enhancing their competitiveness in the retail industry. As a leader in the beverage industry, Coca-Cola utilizes automated systems in inventory accounting. Their inventory management system integrates with sales outlets to track automatic stock movements from warehouses and monitor stock levels at each retail location. The automation of inventory tracking has allowed Coca-Cola to streamline their production and distribution processes. By having accurate and up-to-date inventory data, they can make data-driven decisions regarding production schedules, transportation routes, and order fulfillment. This optimization has led to improved operational efficiency, reduced costs, and enhanced customer satisfaction. Renowned in the fashion and apparel sector, Zara effectively implements automated inventory accounting systems. Their warehouses are connected through RFID tags and automated scanners, providing real-time information on inventory status for both warehouse operations and in-store sales. These companies utilize automated inventory accounting systems to enhance inventory management and provide accurate information to shareholders and regulators, ultimately optimizing their operations.

Automated systems ensure accurate and reliable inventory data, which is crucial for preparing financial reports. By eliminating manual data entry and minimizing human errors, modern technologies improve the accuracy of inventory valuations and calculations. This leads to more reliable financial statements, reducing the risk of misstatements and providing stakeholders with confidence in the reported financial information. Modern technologies enable real-time or near real-time updates of inventory data. This allows for faster and more frequent reporting of inventory-related information in financial statements. Stakeholders, such as investors and creditors, can access up-to-date data on inventory levels, valuation, and turnover rates. Timely reporting provides a more accurate representation of the organization's financial position and helps stakeholders make informed decisions. Automation reduces the likelihood of human errors in inventory accounting, leading to improved accuracy in inventory data. This helps

businesses maintain reliable and error-free financial records. For example, a study conducted on a sample of companies found that after implementing an automated inventory system, the average error rate in inventory counts decreased by 30%. Automated inventory systems streamline various processes, saving time for employees. Tasks such as data entry, inventory reconciliation, and report generation can be performed more efficiently. As a result, employees can focus on value-added activities, leading to increased productivity. A study showed that implementing an automated inventory system reduced the time spent on inventory-related tasks by 40%. Automation enables real-time tracking of inventory levels, providing businesses with up-to-date information about stock availability. This helps in managing inventory levels efficiently, avoiding stockouts or excess inventory. A graph displaying real-time inventory levels over a specific period can demonstrate how automation provides immediate visibility into stock levels and helps businesses make informed decisions. With automation, businesses can optimize inventory levels based on demand patterns and avoid overstocking. This leads to a reduction in holding costs associated with storage, insurance, and obsolescence. A comparison graph illustrating the reduction in holding costs before and after automation can demonstrate the cost-saving benefits of inventory optimization. Miscalculating demand can lead to overstocking or understocking, which can negatively impact business profitability and reputation [3]. Automation enables businesses to exercise better control over inventory by implementing automated replenishment systems. This ensures timely stock replenishment, reducing the chances of stockouts and improving customer satisfaction. A line graph depicting the frequency of stockouts before and after automation can illustrate the effectiveness of automated replenishment systems. By accurately tracking inventory levels and demand patterns, automation helps businesses optimize their purchasing and production processes. This leads to improved cash flow management as excessive inventory and associated costs are minimized. A cash flow chart showcasing the positive impact of inventory automation on cash flow can highlight the financial benefits. Automation provides businesses with comprehensive inventory data and analytics. Advanced reporting and analytical tools enable businesses to identify trends, assess product performance, and make data-driven decisions regarding pricing, promotions, and inventory replenishment. Visualizations such as bar charts or pie charts can present the data insights derived from automation, showcasing the value of data-driven decision-making. Automation facilitates better customer service by ensuring product availability and faster order fulfillment. Accurate

inventory data allows businesses to provide real-time information to customers, reducing order fulfillment times and enhancing customer satisfaction. A line graph depicting customer satisfaction scores before and after implementing inventory automation can highlight the positive impact on customer service. In foreign countries, they have made a number of attempts to further improve the accounting of reserves, to prevent losses in reserves. Accordingly, the problem of accurate and correct accounting of goods as a strategic component of the assets of enterprises in the country's trade sector is becoming quite urgent [11]. For example, let's look at the efforts made by some developed countries. In Japan, companies have been early adopters of advanced inventory management technologies. RFID (Radio-Frequency Identification) technology has been extensively utilized in the retail sector. Retailers in Japan use RFID tags on individual products or product pallets to track inventory in real-time. As products move through the supply chain, RFID readers capture information about the products, such as their location and quantity. This data is then integrated with inventory management systems, providing accurate and up-to-date inventory information. By leveraging RFID technology, Japanese companies have significantly improved inventory accuracy, reduced stockouts, and optimized their supply chain operations. Germany is known for its precision engineering and efficient manufacturing processes. German companies have embraced automation in their warehouses to enhance inventory control. Automated warehouse systems leverage robotics and smart conveyor systems to handle inventory movement, sorting, and packing. Robots equipped with sensors navigate through the warehouse, picking up items based on predefined criteria. These systems ensure faster and more accurate order fulfillment, reducing errors and increasing operational efficiency. Additionally, German companies have implemented cloud-based inventory management solutions, enabling real-time access to inventory data, seamless collaboration among stakeholders, and enhanced visibility across the supply chain. The United States, being home to major e-commerce players, has witnessed significant advancements in inventory automation. Companies like Amazon and Walmart have revolutionized the way inventory is managed in their warehouses. They employ a combination of robotics, artificial intelligence (AI), and machine learning (ML) to automate various aspects of inventory handling. Robots known as Automated Guided Vehicles (AGVs) navigate the warehouse, picking up items and delivering them to designated areas. AI and ML algorithms analyze historical data, customer behavior, and market trends to optimize inventory allocation and pricing strategies. This enables companies to minimize stockouts, reduce



excess inventory, and improve overall profitability. South Korea has been at the forefront of implementing cutting-edge technologies in inventory management. The country has embraced the Internet of Things (IoT) for inventory automation. IoT sensors and devices are deployed throughout the supply chain to collect data on inventory levels, product movement, and environmental conditions. This real-time data is transmitted to inventory management systems, allowing companies to monitor inventory status, optimize replenishment processes, and ensure product quality and freshness. Moreover, South Korean companies have explored the use of blockchain technology to enhance inventory transparency and traceability. By leveraging blockchain, companies can create an immutable record of inventory movements, ensuring trust and visibility across the supply chain. The Netherlands has a strong focus on logistics and supply chain management. Dutch companies have adopted advanced warehouse management systems to automate inventory processes. These systems combine automation, robotics, and data analytics to optimize warehouse operations. Automated guided vehicles (AGVs) are used to transport inventory within the warehouse, reducing the need for manual handling and minimizing errors. Autonomous drones are also employed for inventory counting and order fulfillment, providing fast and accurate inventory management. Furthermore, data analytics and predictive algorithms enable proactive inventory management by analyzing demand patterns, seasonality, and market trends. This allows companies to make informed decisions about inventory replenishment, reducing excess inventory and improving supply chain efficiency.

#### **5. Advantages of accessible reports obtained using modern technology for the enterprise.**

Companies should focus on reflecting in their financial statements by preparing accessible statements of tangible resources. These reports provide valuable information on resource mobility, efficiency and effectiveness. Accurately reflecting tangible resources in financial statements is essential for companies to demonstrate transparency and build trust among stakeholders. Financial statements serve as crucial sources of information for investors, creditors, and other external parties who rely on them to assess the financial health and performance of a company. When tangible resources are clearly and accurately presented in financial statements, stakeholders gain a better understanding of the organization's asset base. They can see the tangible assets owned by the company, such as property, plant, and equipment (PP&E), which provide a foundation for its operations. This information helps stakeholders evaluate the company's capacity to generate revenue and its

ability to support ongoing business activities. Furthermore, presenting tangible resources in financial statements allows stakeholders to assess the utilization of these assets. For instance, stakeholders can analyze the efficiency with which the company is utilizing its physical assets. This includes evaluating factors such as the occupancy rates of facilities, the utilization rates of machinery and equipment, and the turnover rates of inventory. By understanding how effectively tangible resources are being utilized, stakeholders can gauge the company's operational efficiency and make informed judgments about its overall performance. Transparency in reflecting tangible resources also helps establish confidence among stakeholders. When companies provide clear and accurate information about their asset base, it demonstrates their commitment to transparency and ethical financial reporting practices. This, in turn, fosters positive relationships with stakeholders, including investors, creditors, regulatory authorities, and the broader business community. Accurate reflection of tangible resources in financial statements is particularly important for stakeholders making investment or lending decisions. Investors need reliable information about a company's assets to assess its financial stability and growth potential. Creditors rely on financial statements to evaluate a company's ability to repay debt obligations. When tangible resources are accurately presented, stakeholders can make informed decisions based on a thorough understanding of the company's asset base, utilization, and operational efficiency. Accurately reflecting tangible resources in financial statements is crucial for companies to demonstrate transparency and build trust among stakeholders. By providing clear and comprehensive information about their asset base and utilization, companies establish confidence and foster positive relationships with investors, creditors, and other external parties. This transparency enhances the credibility of financial reporting and contributes to a more informed and trustworthy business environment. In order to assess the security of the enterprise, it is necessary to analyze their composition and structure, take into account their optimality, and compare the actual ratio of fixed and circulating assets with their optimal value [12].

#### **6. Conclusion.**

Ensuring efficient utilization of reserves is crucial for companies in order to prevent any potential losses. To achieve this, it is important for organizations to prioritize the following measures:

- Companies should establish mechanisms to promptly detect any negative developments in their service-oriented operations. This involves regularly assessing the internal reserves available at different times and directing them towards the critical and essential areas of the organization's activities.

- It is essential to provide interested parties, such as owners and stakeholders, with a comprehensive understanding of the financial balance of the company and its ability to manage resources effectively. This includes both quantitative and qualitative indicators related to the resources owned by the company and how they are utilized.
- To mitigate the negative results of a company's financial activities and ensure its financial stability, internal reserves need to be identified. This helps to safeguard against any unfavorable outcomes reflected in the company's financial reports and maintain financial stability.
- Companies should take specific actions to mitigate the negative outcomes reflected in their financial statements and ensure financial stability. This may involve the identification and management of internal reserves to address any potential risks or challenges.
- In cases where the supply and service patterns of a company remain consistent over an extended period, the existing reserves may need adjustments, either in terms of increase or decrease. Therefore, provisions and reserves should be regulated in accordance with demand requirements.
- To optimize the management of reserves, companies can leverage specialized software programs tailored to their respective industries. These programs enable continuous monitoring and control of reserves, ensuring optimal utilization and management.
- It is essential to ensure compliance with legal regulations related to reserve management within the company. In the event of any issues or challenges concerning reserve management, the aim should be to resolve them in the most appropriate manner.
- Companies should utilize e-commerce and remote working methods to maintain optimal relationships with suppliers and customers. This enables efficient communication, reduces operational costs, and ensures effective management of reserves. By implementing these measures, companies can utilize various strategies, identify their own mistakes, and resolve conflicts. Each of these suggestions carries broader significance and warrants further analysis. In modern times, many service-oriented enterprises in Azerbaijan and elsewhere have been hiring specialized professionals to manage their reserves, aiming to prevent losses. These initiatives contribute to the efficient management of reserves and the preservation of the financial stability of the organizations.

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# THE FIRST PUBLIC OFFERING OF A CORPORATE BOND ISSUANCE AND THE EXPECTED IMPACT ON THE SECURITIES MARKET AND ECONOMY IN ALBANIA

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## Abstract:

This study aims to investigate the anticipated importance of the inaugural corporate bond issuance through public offering on the Albanian Stock Exchange (ALSE) and its potential ramifications for the bond market, investors, the broader financial sector, and the Albanian economy. Given that the ALSE has been predominantly characterized by government bonds, the initial public offering of the first corporate bond represents a noteworthy landmark that could facilitate the advancement of the Albanian financial market. We will scrutinize how this progression may result in heightened market liquidity, by appealing to both domestic and international investors, thereby increasing the aggregate trading volume and liquidity, within the exchange. Additionally, we will deliberate on the function of corporate bonds in diversifying the array of financial instruments accessible on the ALSE, which may assist in risk mitigation and the cultivation of a more stable financial environment.

Moreover, we will analyze how the issuance of corporate bonds could promote superior corporate governance practices, culminating in increased transparency, more rigorous financial reporting, and bolstered investor confidence. Finally, we will contemplate the potential of corporate bond issuances to stimulate economic growth by supplying companies with an alternative avenue of funding for expansion and investment initiatives. This can result in job generation, enhanced productivity, and comprehensive economic development in Albania. By examining the anticipated consequences of the first corporate bond issuance on the ALSE, this study will illuminate the potential advantages and challenges associated with this development, laying the groundwork for future inquiries as the market undergoes further evolution.

**Keywords:** Albanian Stock Exchange (ALSE); initial public offering, corporate bond issuance; market liquidity; financial sector diversification; economic growth.

## 1. Introduction

In the early 1990s Albania transitioned from a centrally planned economy to a market-based one. In the immediate post-communist era, a series of economic reforms were introduced to liberalize its economy. These reforms included the creation of a two-tier banking system, the privatization of state-owned enterprises, and the introduction of a securities market, albeit on a rudimentary scale and phase. In 1996 the Tirana Stock Exchange was established, as part of the country's efforts to develop its capital market, but it faced many challenges due to the underdeveloped state of Albania's financial sector and the absent sophistication of big businesses, let alone the low level of transparency and financial disclosure ("History and Development" n.d.). The exchange started operations as a separate department of Bank of Albania and it was organized as an order driven (call) market, trading mainly T-bills (both primary and secondary market) and 5 government bonds (Meka, 2013).

In 2002, Albania introduced a new Securities Law to further advance the development of its capital markets. This law established the Albanian

Securities Commission (ASC), which was tasked with regulating and supervising the securities market. This same year TSE spun-off from Bank of Albania and with a newly acquired license from the ASC started operations as a stand-alone institution structured as an organized market on financial instruments.

Despite these developments, Albania's capital market remained relatively underdeveloped compared to its regional peers. For many years, the market was characterized by low liquidity and limited product diversity, trading only government securities of different maturities. Even though the exchange in 2007 got their license renewed for an indefinite period, by the then newly established Albanian Financial Supervisory Authority (AFSA), Tirana Stock Exchange closed operations in 2014, and in 2015 their license was also revoked.

The second attempt to build up Albania's capital markets began with the formation of the Albanian Securities Exchange (ALSE) in 2017. ALSE received its license from AFSA during that same year and became the first private securities exchange in the country's history. Operations didn't begin until

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February 2018, and at that time the exchange's only trades were in government securities.

After several years of apparent stagnation, in 2023, manages to introduce for the first time a private corporate bond, which was listed on the ALSE in July and made accessible to private companies and individuals in Albania. This event marks a significant advancement in the development of the country's capital markets. This listing demonstrated Albania's capital markets' potential for growth and diversification and opens the road for a new phase of development, where the dynamics of ALSE may change. This can be the beginning of a period of expansion for the Albanian securities market, suggesting more investment options and it might draw in more investors, thus boosting the market's overall efficiency and liquidity. Building on these assumptions and expectancies, our primary goal in this study is to comprehend the advantages, potential effects, risks, and difficulties associated with this event.

In the first section we will look at the potential impact of corporate bonds, trading on the exchange to market liquidity. It is anticipated that the issuance of these innovative financial instruments will attract both domestic and foreign investors, who are looking to build a diversified investment portfolio. This increase in participation has the potential to increase trading activity within ALSE, improving the market's overall liquidity and efficiency.

In the second section of our study, we'll examine how corporate bonds help ALSE become more diverse and have a wider range of products. Government bonds have dominated the Albanian securities market up to this point, giving investors quite few alternatives. With the introduction of corporate bonds, investors now have the chance to spread their risk across a wider variety of financial instruments. The diversification of financial instruments not only aids in the better risk-return management of individual investors but also enhances the stability of the financial system, as a whole.

The potential impact on corporate governance is covered in the third section of the paper. Companies that seek capital from the bond market open themselves up to scrutiny from regulators and investors. This scrutiny is anticipated to result in improved corporate governance procedures, which in turn could increase transparency, accurate financial reporting, and investor confidence in the Albanian market.

In the last section of our paper, we'll examine how corporate bond issuances might affect the macroeconomic environment. Anticipating and assuming that, companies presented with an alternative source of financing might be encouraged for business expansion and investments, potentially accelerating Albania's economic development leading to an increase in employment, productivity, and wealth creation.

## **2. Background**

The road to establish a capital market in Albania has been long and marked by both progress and setbacks. It began with the creation of the Tirana Stock Exchange (TSE) in 1996, which was a significant step towards building a securities trading platform. However, the exchange faced numerous challenges during this time. The country was undergoing a significant transition where not only the economy but also society as a whole had to adapt and transform to the new socio-economic model.

This period was marked by early-stage and basic business structures and an underdeveloped financial sector and there was also a lack of government policies or focus to support the growth of a functional capital market. At this time the market was characterized by low liquidity and limited product diversity, trading chiefly government securities and privatization vouchers. TSE was never connected, either directly or indirectly, with the privatization process as a whole; such a process has been a "forbidden apple" for TSE and, historically, it has been excluded from any possible inclusion with this process (Meka, 2013). Such practices are known to have been successful when implemented in other countries of the Eastern Block. The weak performance eventually led to the closure of the Tirana Stock Exchange in 2014 and the revocation of its license the following year.

Even though this was not a surprise, it marked a significant setback for the Albanian capital market. After a few years of inactivity, in 2017, the establishment of the Albanian Securities Exchange (ALSE) opened a new chapter in the development of Albania's capital market. This time the initiative came from private entities. However, despite the promising start, the ALSE and the Albanian financial market have continued to be characterized by limited diversity and a dominance of government bonds, resulting in a market that offers few options for investors.

The issuance of the first corporate bond in 2023 by NOA sh.a., a microfinance institution, via an Initial Public Offering (IPO), signaled a change in this scenario and probably marked a turning point in the evolution of Albania's capital market. Practically, this is not the first issuance of a private corporate bond, as Credins Bank is the first corporate in Albania to issue corporate bonds, in late 2011. This security was offered in the Albanian market through private placement (Meka & Baholli, 2015).

As the first publicly-offered security, NOA's bond presents the potential for a new phase of growth and diversification in the market; it marks the first step towards the maturation of the domestic financial market, and offers a glimpse of optimism for the future of Albania's capital market.

In April 2023, the Albanian Financial Supervisory Authority (AMF) approved a prospectus for the

country's first-ever corporate bond issuance to be listed on the local stock exchange, the Albanian Securities Exchange (ALSE). The bonds were issued by the local microfinance institution NOA sh.a., which has been operating in the country for 25 years. It provides credit to small businesses, farmers, and families, and has an active portfolio of 65 million euros, serving 14,000 clients. The bond issuance was targeted at private companies and individuals, marking the first of this kind by a corporation in the country. The underwriter for the bond issuance was Albania's Credins Bank, and the public offer listed for trading on the ALSE closed on June 21, 2023, with the signing of the total offered amount of ALL 500 million (US\$4.85 million/EUR 4.5 million). The five-year corporate bond, with a nominal value of ALL 500,000,000, carries a fixed coupon of 8% p.a., with payments due semi-annually ("Karakteristikat e Obligacionit," 2023).

### **3. Impact on market liquidity**

Theoretically, the introduction of corporate bonds in a securities exchange can significantly enhance market liquidity, which is a critical factor in the development and growth of capital markets. In the literature market liquidity refers to the ability to buy or sell a significant amount of securities without causing a substantial change in the price. A liquid market is characterized by a high level of trading activity, which allows transactions to occur with minimal impact on price stability, thus high liquidity is desirable in a market because it facilitates smoother transactions, encourages participation, and helps ensure fair market pricing (Goldstein et.al, 2019; Chordia et.al, 2001).

The issuance of corporate bonds has the potential to increase market liquidity in several ways. Firstly, corporate bonds offer an additional investment option for investors, and so they can attract a broader range of investors, from institutional investors, by way of providing investment alternatives for pension funds and insurance companies, and enabling them to design and offer long-term saving and investment schemes & products (Meka & Baholli, 2013), to individual investors, looking for fixed income investments. The cash flow provided by bond securities correlate well with obligations of many institutional investors (banks, pension funds, and insurance companies, etc.) and helps such investors better match the maturity of their assets and liabilities and manage risks (Huang & Zhu, 2009). Also, as (Meka & Baholli, 2025) put it, bonds are viewed as an opportunity for the investing public to diversify its savings on a wider range of investment alternatives, not only in the risk management perspective, but also in terms of channeling its savings into more productive investments, thus increasing social welfare. This can be because of the fact that corporate bonds offer higher yields compared to government bonds,

even though with a higher level of risk. With this increased participation higher trading volumes can be stimulated, which are a key determinant of market liquidity.

Secondly, corporate bonds can help diversify the product offering in the securities exchange. Until now, the ALSE has been mainly dominated by government bonds, thus offering limited options for investors. The introduction of corporate bonds offers an opportunity for investors to distribute their risk over a wider range of financial instruments. This diversification could attract potentially a larger pool of both domestic and foreign investors, thereby increasing trading activity and market liquidity.

Thirdly, the entry of corporate bonds could also increase market activity through the facilitation of secondary trading, which denotes the purchase and sale of bonds subsequent to the initial issuance. An active secondary market can contribute to overall market liquidity by providing investors with confidence that their bonds can be sold with ease, if necessary. Moreover, corporate bonds can stimulate competition within the market. With more securities available for trading, issuers and investors could engage in more robust competition, culminating in efficient pricing and enhanced market liquidity.

Hence, through the attraction of a wider range of investors, increased trading volume, and the potential stimulation of secondary market activity, the debut of the first corporate bond could significantly contribute to increasing market liquidity on the ALSE.

### **4. Financial market diversification**

Financial market diversification stands as a vital pillar for the stability and resilience of an economy. In this context, diversification signifies the enlargement of financial instruments, services, and participants in the market. This diversity gives way to a broader range of investment possibilities, which has the potential to allure a more varied spectrum of investors, both domestically and internationally. In a diversified financial landscape, risks get distributed across an array of investments, mitigating dependency on a singular asset or class of assets and thus forming a safeguard against financial tremors. Such diversification contributes towards enhancing the steadiness and resilience of the financial sector (Gilles Saint-Paul, 1992).

The introduction of corporate bonds in the Albanian Securities Exchange (ALSE) marks a considerable stride towards financial market diversification as corporate bonds distinctly offer an unparalleled investment prospect. Unlike equity securities, corporate bonds indicate a debt obligation from the corporation to the investor. This implies that the corporation is duty-bound to reimburse the investor with the principal sum of the bond, in addition to periodic interest payments. This can engender a steady income flow for investors, rendering

corporate bonds an appealing investment choice, particularly for investors inclined towards risk-aversion.

To elucidate, the expected impact will be on:

- **Diversification of Financial Instruments and Investment Choices:** Until now, as we have highlighted, the ALSE has been predominantly dictated by government bonds. The introduction of corporate bonds infuses a fresh financial instrument into the market. This allows for a wider array of choices for investors, empowering them to distribute their investments over a more extensive range of asset classes, thus offering them more avenues for diversifying their portfolios. Bonds can present a steady income stream and are usually perceived as less risky compared to stocks, which could make them attractive to more cautious investors. Consequently, investors can navigate their risk and return trade-offs with heightened efficacy.

- **Induction of New Participants:** The issuance of the first corporate bond could also draw new market participants. These could encompass institutional investors such as pension funds and insurance companies with a penchant for fixed income investments, along with individual investors.

### 5. Impact on corporate governance

Corporate governance is a term that encapsulates the set of rules, practices, and processes by which an organization is steered and controlled. This system necessitates harmonizing the interests of numerous stakeholders associated with a company, such as shareholders, management, customers, suppliers, financiers, government, and the community at large. The issuance of corporate bonds can have a profound effect on augmenting corporate governance within firms (Hyun Jin Lee & Insook Cho, 2016; Shu, H.-C., 2023). This holds particularly true when these bonds are listed on a stock exchange like the Albanian Stock Exchange (ALSE), where companies are required to satisfy specific listing prerequisites and adhere to continuous reporting duties. The impact can be anticipated as follows:

- **Heightened Transparency:** Firms that issue bonds are compelled to divulge detailed information to investors regarding their financial health, business operations, and utilization of the funds raised. This intensified disclosure propels greater transparency, a key component of sound corporate governance.

- **Refined Financial Reporting:** Issuers of corporate bonds are mandated to generate periodic financial reports to comply with regulatory stipulations and to keep bondholders informed about their financial status. The imperative to produce precise, timely financial reports can induce improvements in a company's financial management and reporting frameworks.

- **Enhanced Accountability:** Companies issuing bonds bear responsibility to their bondholders. This accountability can foster better decision-making within the company to ensure they meet their commitments to bondholders, encompassing the payment of interest and the repayment of the principal amount upon maturity.

- **Elevated Risk Management:** To lure investors, companies need to exhibit that they have efficacious risk management systems operational. This can lead to the conceptualization and implementation of superior risk management strategies within the company.

In conclusion, the issuance of corporate bonds can operate as a stimulant for improving corporate governance within firms. Sound corporate governance, in turn, can aid in fostering investor confidence and contribute to the overarching stability and resilience of the financial market.

Nonetheless, the influence of corporate bonds on corporate governance does not materialize automatically. It calls for a supportive regulatory milieu and a culture of corporate transparency and accountability. Therefore, endeavors should be undertaken to propagate good corporate governance practices among companies in the ALSE.

### 6. Other considerations

The debut of a corporate bond in a stock market can trigger a variety of potential impacts, both for the issuer and the wider market. Here are some anticipated outcomes:

- **Boosted Liquidity for the Issuing Entity:** As alluded to previously, through the issuance of a corporate bond, a company can secure funds without causing dilution of ownership, which would be the consequence of issuing additional stock. This can furnish the company with the liquidity it requires for various purposes, such as underwriting expansion plans, refinancing existing debt, or venturing into new projects.

- **Market Response:** The market's response to the introduction of a corporate bond can be varied. If the bond is perceived as a sound investment opportunity, it could spark increased trading activity. On the contrary, if investors interpret the bond issuance as a signal that the company is grappling to raise capital, it could exert a negative influence on the company's stock price.

- **Influence on Interest Rates:** Corporate bonds can also exert an impact on interest rates. High demand for the bond could lower the yield (interest rate), making it less costly for the company to borrow. Conversely, if demand is low, the company might have to offer a higher yield to entice investors, which could inflate borrowing costs.

- **Credit Rating Implications:** The issuance of a corporate bond could potentially influence the issuing company's credit rating, depending on the

quantum of debt the company undertakes and its ability to service that debt.

- Regulatory and Reporting Obligations: Issuing a corporate bond often comes with amplified regulatory and reporting responsibilities, which can escalate the company's administrative costs.

The introduction of corporate bonds can also instigate competition among diverse financial instruments, culminating in more efficient pricing and capital allocation. This can augment the overall performance of the financial sector and contribute to economic growth.

However, the successful launch of corporate bonds in the ALSE will necessitate meticulous planning and implementation. It will be vital to ensure that the regulatory framework is amenable to the issuance and trading of corporate bonds. This encompasses regulations related to the disclosure of information, investor protection, and market transparency. Additionally, strides should be made to enlighten potential investors about the risks and rewards concomitant with investing in corporate bonds.

### **7. Conclusions and Recommendations**

• The launch of the inaugural corporate bond in the ALSE holds the potential to substantially influence market liquidity, financial market diversification, and corporate governance. However, tapping into these potential advantages necessitates collective efforts from all stakeholders, encompassing regulators, companies, and investors.

• Regulators bear the responsibility of ensuring that the regulatory framework is amenable to the issuance and trading of corporate bonds. This includes formulating regulations associated with the disclosure of information, protecting investor interests, and promoting market transparency. They should also undertake initiatives to propagate good corporate governance practices among companies listed on the ALSE.

• Companies, in turn, should uphold the principles of transparency and accountability. They ought to deliver precise and timely information to investors and make judicious financial decisions. Furthermore, they should commit to upholding the rights of all stakeholders, inclusive of bondholders.

• Investors, meanwhile, should make efforts to educate themselves about the risks and benefits associated with investing in corporate bonds. They should also keep companies accountable for their performance and adherence to governance practices.

• In conclusion, the introduction of the first corporate bond in the ALSE denotes a significant step forward for the evolution of the Albanian financial market. If handled aptly, it can contribute to the creation of a more diversified, liquid, and transparent market, which can, in turn, aid economic growth and development. However, this move also presents

challenges that need to be cautiously navigated. Consequently, it is advised that future research should focus on the actual impact of the first corporate bond issuance on the ALSE and the lessons that can be gleaned from this experience.

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# OPENING THE “BLACK BOX” OF THE LABOR MARKET IN MACEDONIA: YOUTH UNEMPLOYMENT

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## Abstract:

The youth unemployment in Macedonia has been high and persistent for the last three decades, despite the many active labour policies for young persons. This paper examines the determinants of youth unemployment in the Macedonian labour market using quantitative and qualitative analysis. In order to empirically estimate the relevant determinants of youth unemployment in Macedonia we employ the two-step conditional mixed processes model (CMP) using the school to work transition survey (SWTS) by the International Labour Organization. The quantitative analysis is accompanied by qualitative analysis to further explore and explain the social-economic issues. The qualitative analysis includes semi-structured interviews and focus groups conducted in different regions of Macedonia. The empirical results indicate that gender, age, the wealth of the household, the education level and regional characteristics are the main determinants of youth unemployment in Macedonia. According to the findings of the qualitative analysis, the most of the young people pursue education and live with their families who provide them with financial support to cover their expenses. Consequently, the young persons have a diminished interest to search for a job and this attitude on long run could have a dubious effect and influence on the personal choices. Overall, there is a long school to work transition period, which discourages young people to actively participate in the labor market.

**Keywords:** youth unemployment, job search, discourage workers

## 1. Introduction

Unemployment is a very sensitive worldwide issue, especially in young democratic countries since high unemployment reduces output and income, increases inequality and harms human capital (Kapstein and Converse, 2008). The youth unemployment rate is closely linked with the adult unemployment rate (O’Higgins, 2001), in fact according to the available data youth unemployment rates are almost twice higher than the adult unemployment rates. Essential element in the “Europe 2020 Strategy” is to provide young people with decent and proper job which in turn will contribute to economic growth and stable societies (series of ILO youth employment reports and Decent Work Country Programme 2023-25 North Macedonia). According to the objective of ILO’s Youth Employment Action Plan 2020-2030 it is of utmost importance to “secure a better future of work for young people by promoting a human-centered, pro-youth job rich recovery from the COVID crisis, and beyond”. However, the evidence from the real life reveal that experienced workers are preferred over young– school leaver candidates; young people are most likely to be the first to lose their job in bad times (economic downturns), which in the long run may result in loss of skills, talents, creativity, enthusiasm and possibilities for innovations and growth. In 2021 the youth unemployment rate worldwide

is around 15.6%, namely approximately 75 million young people are unemployed, more than three times higher than the rate for adults, and 408 million young people were employed, whereas 732 million were not in the labor force (Global Employment Trends for Youth 2022, ILO). The primary reason behind young people’s comparatively low labor force participation (LFP) rate is their enrollment in the educational system, which in turn is expected to eventually obtain greater labor market returns. On the other hand, there is a significant number of young people who simultaneously study and work. In 2019 in 86 countries, according to the latest ILO report (2023), almost half of all young people aged 15–24 years not pursuing educational degree or training were not employed.

The aim of this paper is to investigate the determinants of youth unemployment in the labor market in Macedonia, in particular individual characteristics which may impact the (un)employability of a young person such as education level, family financial situation, region of living and similar; which will help to draft policy recommendation aimed at reducing the unemployment rate. The paper is organized as follows: Section 2 presents some stylized facts for Macedonian labor market in general and participation of youth in the labor market in particular. Section 3 gives brief overview of the most prominent literature in the field of youth (un)employment, with special focus

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on developing economies. We explore market situations and developments that might influence the employment status of youth, which are used to derive the potential determinants of youth unemployment. Section 4 gives overview on the research framework (the model and methodology) with special focus on the data employed in this study in order to examine the youth labor market in Macedonia. We use micro-data set provided by ILO for the quantitative empirical analysis and additionally we perform a qualitative analysis for further explanation of the obtained quantitative results. Section 5 summarizes the main findings and their implications for the country's current employment and youth-friendly policies. Finally, we provide an overview of policy recommendations for improvement of the situation in the labor market and reducing the youth unemployment

### **2. Stylized facts about Macedonian labor market**

Macedonia is a small and open economy with the total population of 1.8 mil inhabitants. The country faces many challenges in creating opportunities for social and economic development and growth. One of the main socio-economic tensions is related to the relatively high unemployment rates and double high youth unemployment rates that are reflected by either high idleness of the youth or the high brain drain. Although there are some improvements in the labor market in the last years, in Macedonia still persist high unemployment, low employment and participation rates and substantial gender gaps. In 2022 there are 808,078 persons, of which 692,034 were employed and 116,045 unemployed (State Statistical Office data). The activity rate (15–64) in 2022 was 66.4 per cent, with an activity gender gap of 24.1 percentage points (78.4 per cent for men versus 54.3 per cent for women). Youth inactivity in Macedonia is significant, in fact 73,574 young Macedonians (52 per cent female), or almost one out of five was neither in employment nor in education and training in 2022. Young workers low participation rate can be explained by high rates of young people engaged in fulltime education. This can be perceived as positive investment and the return to it should be good job position, but in most of the cases, young people see the higher education as a “rescue plan” for not to stay unemployed or not to have the possibility for obtaining decent job, and also they see it as a possibility for obtaining visa for travelling and in some cases emigrating in the western countries. These two reasons for idle youth are alarming signs for addressing youth employment opportunities on policy level.

The overall employment rate (15–64) was 56.7 per cent, whereas the employment rate of young people (15–29) was 34 per cent. Both indicators are still significantly lower compared to the EU average of overall employment and youth employment of 69.8 percent and 49.2 percent, respectively.

The unemployment rate in Macedonia, besides the severe impact of the COVID-19 pandemic, has declined over the last decade, but it is still twice as high as in the EU. In 2022 the unemployment rate and youth unemployment (15–29) rate were 14.4 percent and 25.2 percent, respectively.

### **3. Literature review**

There has been an extensive literature devoted to the youth roles in society and in the family through time. The evidence shows existence of discouraging changes that have taken place over time and across cohorts in perceptions about youth's roles or identities. According to O'Higgins (2010) the entry of the young people in the labor market is highly related to the general conditions in the overall economy. Specifically, the youth employment rates are correlated to the aggregate labor supply and the labor market regulations, policies and legislations. The recent COVID-19 pandemic has even more distressed the limited market opportunities for the young people. Specifically, during 2020 worldwide youth employment fell by 8.7 per cent comparing to adults employment rate which declined by 3.7% (Youth Employment in Times of COVID, 2021). The drop in youth unemployment was mainly due to the fact that young people are usually the first to be laid off or not able to find a job due to the closures in sectors that traditionally employ the youth labor force, such as retail, tourism and consumer services. According to Fares and Tiongson (2007), if the situation of the youth unemployment remains in recent future, it can have long-term impact of the lives of today's youth. As, indicated in the ILO (2006) report, that can lead to social exclusion within the society and even increase in deviant behaviors.

Neoclassical economics explains the decision of a person to enter the labor market using utility maximization over the work-leisure choice. If leisure is considered as a “good”, the net effect of an increase in the wage rate over the quantity of labor supplied will: (i) increase if the substitution effect is larger than the income effect and (ii) decrease if the income effect is larger than the substitution effect. Hence, the net effect depends on the own-wage elasticity and the household income (including their family background) elasticity. According to Freeman (1979) one aspect of the youth unemployment problem is related to the lower levels of work activity among young people comparing to adult workers. He further finds that the LFP and employment rates to population rates are lower for youth, compared to those of the adults, while the rates of unemployment are higher. This is further supported by Shimer (2001), who finds a negative relationship between youth population size and youth unemployment rates and advocates that “labor markets containing substantial numbers of young people are likely to be more flexible than those dominated by older workers and therefore in

such markets employers are more willing to create jobs.” According to Shimer, the relative increase in the size of the youth population leads to decrease in unemployment rates; hence the unemployment is the result of the capability of the country to handle the increases in the supply on the youth labor market.

Freeman (1979) suggest two basic reasons for high youth unemployment: from the demand side, the main reason for high youth unemployment rates is the lack of adequate demand for young labor force due to the economic cycles and slow growth; and on the supply side, the main reason for high unemployment is the inappropriate training, lack of skills and experience by the young people. Peterson and Vorman (1992) argue that the increase in the unemployment is could results from structural changes of the economy, as exogenous shocks (financial crisis, recession). The structural changes might lead to potential mismatches on the demand side and in at the same the supply side of the market is not able to respond in real time as changes occur. At some point the mismatch arise due to the technological advancements which cause a change in the demand for labor, namely highly educated and well-skilled workers.

O’Higgins (2001) found that unemployment was decreasing proportionally to the increase in the education level in the OECD country, however he found that this does not hold for developing countries, because the results suggest that there is high unemployment among educated groups. According to the neoclassical theory of individual labor supply the opportunity cost of being out of the labor market increases with each additional finished level of education. Osterman (1980) found that the school-to-employment transition is very important factor for youth unemployment. According to Osterman (1980) the age-LFP relationship seems to be linear because the young workers quitting rate falls as their age increases, showing work dedication increases with age, hence the attitude towards employment changes. MacDonald (1988) explains the effect of regional characteristics (urban-rural) on youth LFP and O’Grady (1993) empirical results support the further the importance of the regional factors in the school to work transition period. DeLamatre (1996) and O’Regan and Quigley (1996) findings suggest that the employment success indeed depends on the perception and the attitude regarding the region of residence, along with the degree of poverty of the particular neighborhood. Specifically, O’Higgins (2001) results suggest that there is a difference in rural vs. urban unemployment rates in the developing countries.. Regardless of the residence area, female LFP is lower compared to males, mainly due to their presence in the informal labor (taking care of the household), while the young males stay longer in the educational system (O’Higgins, 2001). He further advocates that in ethnic

diverse countries, often the ethnic origin is found to be significant determinant of (un)employment, as supported by the large differences in the LFP rates across different ethnic groups. Given the above economic literature, our empirical model considers two broad categories of determinants: (i) personal characteristics (education, age, health condition) and (ii) household characteristics (household wellbeing, size, parents education, number of children – if married).

#### **4. Analysis**

This study considers two broad stages of empirical analysis. The first stage employs conditional mixed processes methods to empirically investigate the potential youth unemployment determinants. Considering the complex nature of youth unemployment, in the second stage of analysis, the quantitative research complemented by qualitative analysis. The qualitative analysis addresses socio-cultural dimensions of the youth unemployment determinants, which otherwise cannot be addressed or fully explained by the quantitative analysis. Specifically, this analysis aims to explain the socio-cultural concept and the traditional relationships detected with the empirical investigation. Furthermore, there are factors such as tradition, expectations, and common discrimination on the basis of ethnicity, age, political determinants, that are rarely introduced in the surveys and even less empirically examine.

##### **4.1. Estimation technique and model specification, data and empirical findings**

The empirical investigation is based on the theoretical review presented in the Section 3 and focuses on obtaining relevant results considering and explaining the potential factors of youth (un) employment. For that end we use the micro data “school to work transition” conducted by the State Statistical Office of Macedonia for the purposes of the International Labor Organization (ILO) and the empirical analysis employs the conditional mixed processes (CMP) model. The CMP model, firstly introduced by Roodman (2009), can handle a variety of models using a maximum likelihood approach. Its flexibility allows for the model to vary depending on the type of observations used. For example, this model allows for a combination of equations that relay on different samples with matching observations. According to Roodman (2009) this procedure is appropriate in the following two scenarios: (i) “those in which a truly recursive data-generating process is posited and fully modelled” and (ii) “those in which there is simultaneity but instruments allow the construction of a recursive set of equations, as in two-stage least squares (2SLS). CMP is fundamentally an SUR estimation program. But it turns out that the ML SUR can consistently estimate parameters in an important subclass of

mixed-process simultaneous systems: ones that are recursive, with clearly defined stages; and that are fully observed, meaning that endogenous variables appear on the right hand side only as observed “, (Roodman, 2009, p.2).

According to the nature of the variables included in the CMP model we will use probit and ordered probit equations.

The probit model is based on assumption that value of the unobserved variable  $Y_i$ , is determined by the explanatory variable  $X_i$  (Gujarati, 2004):

$$Y_i = \beta_0 + \beta_i X_i + u_i \tag{1}$$

where:  $Y_i$  represents the latent propensity to be either 0 or 1, employed or unemployed, highest level of completed education, financial status,  $X_i$  (where  $i = 1,2,...n$ ) are explanatory variables that stand for individual supply factors, such as age, sex, marital status, number of children, regional characteristics and similar.  $u_i$  - is the error term (with mean = 0 and variance = 1)

The explanation of the probability (Pr) of the young person to be unemployed is obtained by the following model:

$$\text{Pr}(Y = 1|X_i) = \Phi(\beta_i X_i) \tag{2}$$

Where:  $Y=1$  if the young person is unemployed and 0 otherwise;  $\Phi$  is the Cumulative Distribution Function of the standard normal distribution and  $\beta_i$  are the parameters of the explanatory variables  $X_i$  that will be estimated by maximum likelihood. The ordered probit inspects the probability that an alternative will be selected:

$$p_{ij} = p(y_i = j) = p(\alpha_{j-1} < y^*_i \leq \alpha_j) = F(\alpha_j - x'_i \beta) - F(\alpha_{j-1} - x'_i \beta) \tag{3}$$

where for the ordered probit  $F$  is the standard normal cdf; the model with  $j$  alternatives will have one set of coefficients ( $j-1$ ) intercepts and  $j$  sets of marginal effects.

According to the basic human capital theory and the empirical findings parents tend to shape the lifestyle of their children depending on their educational, social and financial status. Specifically, if the parents are with higher education it is expected that their children will also stay longer in education to obtain their level of education or above. That also relates to the wealth of the household, namely it is expected that parents with higher education, tend to earn more, and have better network, hence their children have shorter transition school-to-work period. It

is expected that there is on-going competition between siblings, hence if one of the siblings is in education it is highly likely that the other will also participate in education. The impact is expected to be positive, but it is expected to vary across regions (more and less developed) and across gender. The relationship of the household characteristics and the youth employability may exhibit dual direction, that is the household wealth may have a positive or negative impact on the probability of being employed, *ceteris paribus*; Furthermore, it is expected that regardless the level of education, young person from a low income household is expected to be less picky when searching for a job and accepting one, or young person coming from a poor family in small communities can have a low chance for finding a job. It is expected the employability of young people considering the regional characteristics to exhibit inverse relation between the size of the youth population and the economic development of that particular region.

**4.2. Data**

The school to work transition survey used in this analysis was conducted in Macedonia in 2012 on total sample of 2,544 individuals between the ages of 16 to 29 and our empirical model includes 1239 (employed and unemployed individuals-actively looking for a job). As a dependent variable the model employs the probability of young person being unemployed and using the ILO dataset, the dependent variable is based on the questions: “what is the employment status of the person?” and “Is the person looking for a job?” The main drawback of this data is that is old, but this is the only available micro dataset.

All tables should be numbered with Arabic numerals. Every table should have a caption. Headings should be placed above tables, left justified. Only horizontal lines should be used within a table, to distinguish the column headings from the body of the table, and immediately above and below the table. Tables must be embedded into the text and not supplied separately. Below is an example which the authors may find useful.

*Table 1 – Description of the dependent variable*

Employment status of Respondents:	
Employed	733
Unemployed (actively looking for a job)	506

The dependent variable is unemployed defined as follows:

“0” represents employed individuals,                      “1” represents unemployed individuals.

The list of explanatory variables for Macedonian youth labor market model is presented below along with expected signs of the variables.

Table 2 – Description of the variables

Variable	Description	Expected Sign
Age	15-29 year	-
Gender	“0” for female, “1” for male	-
Single - dummy variable	What is your current marital status?	+
nb_of_children	How many children do you have?	+
Poor – dummy variable	How would you describe your household’s overall financial situation?	+
Highest level_comp- dummy variable	“1” for poor, “0” for other What is your highest level of completed formal education/training?	+
Region - dummy	East; Southwest; Southeast; Pelagonia; Polog; Northeast; Skopski	-
Father_edu and Mother_edu	What is the highest education that your parents have? Elementary: no education, elementary level Secondary: vocational school, secondary level and post-secondary level University: university and post-graduate, post-doctoral level	+
unempregion	Callculated regional unemployment rates and assigned to the region dummies	+

### 4.3. Empirical findings

The dependent variable in this model is “a person being unemployed”, which is equal to 1 if the respondent is unemployed and 0 if employed. The set of independent variables includes level of education, gender, age, age squared, marital status, number of children, household financial situation, health and unemployment rate in Macedonia by region. The variables are either binary or ordinal choice. According to the theory, we consider the level of education as endogenous. These variables are instrumented on the second specification with fathers’ level of education and in the third specification with the mothers’ level of education. The CMP regression results are presented on Table 3.

The empirical results suggest that the (un) employment status of an individual is significantly determined by the household wellbeing along with the personal characteristics. There are several determinants that significantly affect the youth unemployment, such as: (i) gender if female the probability of being unemployed decreases by 0.06 comparing to male); (ii) age (for each additional year of age the probability of being unemployed goes up by 0.09); (iii) wealth of the family - if the household is poor the probability of being unemployed increases by 0.5); (iv) level of education - if the individual has only elementary education the probability of being unemployed increases by 0.17; and (v) regional characteristics - if living in one of the regions Polog, Pelagonia or Skopski the probability of being employed goes up by 0.1 and the probability of being unemployed declines by 0.13 in the North region comparing to young people living in Vardarski region.

Table 3 – CMP regression results (dependent variable: unemployed)

Variables	CMP <sup>1)</sup> estimates	Std. error	Marginal effects	Std. error
Elementary	<b>0.601***</b>	0.018	<b>0.167***</b>	0.017
Poor	<b>1.788***</b>	0.000	<b>0.498***</b>	0.000
Age	<b>0.354***</b>	0.006	<b>0.098***</b>	0.006
Agesq	<b>(-)0.008***</b>	0.006	<b>(-)0.002***</b>	0.006
Gender	<b>(-)0.228***</b>	0.002	<b>(-)0.063***</b>	0.002
Single	0.095	0.391	0.026	0.390
Nb_of_children	-0.046	0.469	-0.013	0.468
Health	0.180	0.254	0.050	0.254
East	-0.159	0.254	-0.044	0.255
Southwest	0.191	0.288	0.053	0.287
Pelagonia	<b>0.368***</b>	0.002	<b>0.102***</b>	0.002
Polog	<b>0.3509***</b>	0.008	<b>0.098***</b>	0.008
Northeast	-0.470	0.034	<b>(-)0.131***</b>	0.034
Skopski	<b>0.343***</b>	0.003	<b>0.095***</b>	0.003
Unempregion	<b>0.029***</b>	0.000	<b>0.008***</b>	0.000
_cons	<b>(-)5.799***</b>	0.000		

1) Robust standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 4.4. Qualitative analysis

This section presents the findings from the qualitative analysis based on the conducted focus groups and interviews, which focus was to explain some aspects that could not be explained by the quantitative analysis (Auerbach and Silverstein, 2003). Our qualitative analysis includes processing data gathered from both focus groups and semi-structured interviews conducted in two regions in Macedonia, in fact the focus groups were organized in Skopje and Tetovo. Each focus group had 10 participants with an age range 15-29 and the focus groups were gender and ethnic balanced in order to get the full picture for the youth LFP; in fact to get insights whether same opportunities/obstacles exist for everybody as well as how hard/easy it is to find decent, well paid and secure job. The aim of the two focus groups was the same, namely to give space to the participants to share their experiences related to the process of making the initial steps towards finding the first job, i.e. labour market penetration. In view of the semi-structured interviews the questions were directed towards their personal everyday experiences during the process of looking for a job, on the working spot, if a job was found and the working environment within the organization; possible cases of positive/negative discrimination with respect to: the level of education, the gender orientation, the ethnicity, the location, the age and other similar factors.

#### 4.4.1. Aims of the qualitative analysis

The aim of the qualitative analysis is to address questions related to youth employability conditions such as: How do they perceive the current situation in terms of employment? What are the main challenges for finding the first job? Do young people believe that higher education gives more possibilities for obtaining a good job? To what extent does the situation in the labor market affect their education choices? How easy/difficult is to find the first employment? How "friendly" is the selection process? How transparent is the selection process? To what extent, the employment status affects the level of social inclusion? What are the perceived barriers for young people to participate in the labor market? What are the most immediate needs and priorities that would help in minimizing the gender gaps in terms of LFP? What are the possibilities of facilitating the integration of young people in the labor market?

#### 4.4.2. Sampling and Data analysis

Each focus group consists of 20 young people aged 15-29 in two different cities, Skopje (the capital) and Tetovo. The main purpose of the focus groups was to gather more information regarding the labor market conditions in different regions perceived by various categories of young people. The focus groups were conducted by pair of researchers in

two occasions; each focus group took between 60-80 minutes.

The semi structured interviews were conducted with 20 young people in the same age range likewise the focus groups. Each interview was conducted individually (young person and researcher), with young people from urban and rural areas. The purpose of the interviews was to gather in-depth insights regarding the challenges and issues that young people coming from different regions and backgrounds might face during the job search process. The participants for the interviews were approached through local youth clubs, NGOs, schools. The questionnaire consists of two main parts: (i) demographic part; and (ii) open ended questions - regarding the obstacles they face as young people in search for a job, and suggestion on the necessary supportive instruments for young people to penetrate the labor market. In the process of transcribing the focus groups and interview recordings, it was taken care that the respondents are not identifiable in any part of the paper. After completion of the qualitative report as an integral part of this study, the recordings from the focus groups and interviews were destroyed.

#### 4.4.3. Findings from the focus groups

The findings presented in this section are based on the responses by the young people participating in the focus groups. The results are summarized in several subcategories:

##### • *How easy/difficult is to find the first employment?*

A young person enters the labor market often with enthusiasm and willingness to work and learn, but it is very difficult to compete with elderly candidate applying for the same position. As a major obstacle for the young people tend to be the lack of work experience and the start of the search for a job period is considered to be a vicious circle. Although the company's prospect a vacant job position, does not require any previous work experience as a selection criteria, given that it a junior position, the young people during the interview are asked: "What is your previous experience?" and "How do you know that you can be a good match for the position if you have never worked?". This kind of experience is rather discouraging, since it seems impossible to even find a junior level job. This may cause a further negative implication on the professional and personal development of the young people, since the longer the job search process with respect to the iconic first job position, the less chances for getting a good job related to the individual educational background.

### • *How “friendly” and transparent is the selection process?*

Most of the participants in the focus groups said that job announcements seem to be rather a secret. There are plenty of job announcements advertised with short notice, hence due to lack of time, individuals cannot submit the requested documents on time. Most of the participants agree that job announcements usually do not enclose the whole set of selection criteria and the time of selection process. In about 80% of the time they did not received any feedback about the stage of the selection process, in 10 % of the cases they received the confirmation that their application was received, and in only 10% of the times they were contacted and preceded further with the selection process. The participants find as very discouraging the perception that most of the job vacancy announcements, especially regarding the public administration, are set for already known persons.

### • *Access to information regarding labor market demands.*

Most of the focus group participants said that there is a very limited information about the situations in the labor market. They also pointed out that there is no management in the education, which reflects in hyper production of some professions, issue that should be solved on policy level by restraining the openings at some specific faculties, i.e. humanities, and incentivize students to shift to more technical fields. The interviews also suggested that by making the high school compulsory, there are lot of young people who pursue undergraduate studies and after graduation they are not willing to accept any job that is not in line with their level of education. Consequently, there are many young people whose job search process is pretty long, which may adversely affect the willingness of finding a job. They said that maybe students should be contacted during high school and to be presented with the labor market opportunities. In that context one of the participants mentioned that it would be very useful if we can develop some system similar to the Dutch, where people around their 18th birthday are contacted by scouts, they are offered good and secure job.

### • *Access to information regarding vocational training courses.*

Most of the participants are aware of the vocational trainings and courses offered for free by the state employment agencies, but they are very basic and are not very helpful during the job search process. Majority of participants further explain that sophisticated trainings are usually exclusive for a specific group of people. For example courses

like: data mining, programming, My SQL are usually offered only to IT professional or technical university graduates, hence an economist or lawyer cannot gain skills or prequalify according to the labor market conditions. Furthermore, there are cases of inappropriate prequalifying offers, i.e. undergraduate and graduate students are offered to become sewers or chefs, which indicates a lack of management in the education system, because there is a potential mismatch on the labor market.

*Recommendations regarding increase in youth employment:* Most of the participants emphasize the need for extensive cooperation between educational institutions and the real sector. Companies should offer traineeships and the university curricula should be tailored in accordance to the labor market demand. Some of the suggestions regarding how to increase the employability of the candidates were:

- More restricting university entry selection criteria;
- More labor market specific trainings and courses;
- More communication with pupils in secondary education;
- Education management;
- Cooperation between companies and universities;
- Transparency in the selection criteria;
- Standardized entry exams;

#### 4.4.4. Findings from the interviews

This section presents the findings of the qualitative analysis based on the conducted interviews in the rural and the urban area of Macedonia. That the labor market in Macedonia is highly politicized and not transparent is the general finding from the conducted interviews. People believe that there is no much connection between the education institutions and the real sector. Most of the people are very sceptic that will get a decent and relevant job in the recent period and some of them consider leaving the county in the next 2 years. It is interesting that young people from rural areas are less picky when searching for a job, since due to traditional habits these young people are used to more physical/manual work or agriculture. On the other hand, their counterparts from urban areas are less likely to accept some manual/physical or agricultural job. Most of the interviewees responded that they would rather stay at home than accepting any kind of job. Almost all of the interviewees stated that they feel discriminated in the selection process based on several criteria (age, gender, ethnicity, political thinking, and personal connections). On average, most of the respondents felt discriminated more than once during selection process. The findings of this qualitative analysis suggest the following: the main criterion for obtaining the job position is belonging to a political party; the second most important criterion is the existence of personal connections, and as a third most important criterion

is the educational background, the non-formal knowledge and the volunteer experience. However, there are still positive examples about qualitative and competitive selection procedures. The most promising statements by interviewees for a good employment opportunities and fair selection process are the following:

*"... I believe that if I have a better education I will get better employment opportunities; because of this I decided to pursue higher education, to study hard. Additionally, I participate in extracurricular activities where I can learn more than what is written in the book and share opinions with my university colleagues."*

*"I believe that my volunteering experience brought me closer to obtaining my first entry level jobs. They are not my dream jobs, but I still learn a lot, get working habits and I know that once I get a chance to have interview in the real sector they will value my experience."*

*"I am not afraid of work, and I believe that there is no bad or good job, but it is more about preferences. I am about to graduate and if I do not find a job immediately I will work on the family farm with my parents."*

The quotations above indicate that young people are not easily discouraged by the adverse situations in the labor market in Macedonia, and they believe that education is important and can help them in obtaining better jobs in future. When a person is responsible and want to work hard, being out of the labor market, namely idle and jobless is almost impossible. In long run can be disappointing and discouraging if the person could not find a match job in line with her/his qualifications and skill, and yet there are situations when young people seem to be in a way offended and undervalued by the offer:

*"At the HR office I was suggested to prequalify in sewer, well if I wanted to spend my life in the factory I wouldn't dedicate 4 years of my life to studies, but I would go there strait away."*

*"In one bank I was invited to an interview, and apparently they weren't looking for "a specific major, but more for a person". Although I comply with all the selection criteria, I was not invited for an interview, and then we learnt that the job announcement was meant for somebody in advance."*

*"After 2 weeks of selection process I was told: "you are the best candidate, but we were making the selection likewise a lottery"... than why 2 weeks of selection procedure?"*

People face awkward interview situations that discourage them for future applications in the same organization, which may reduce their job opportunities. They sometimes lose self-confidence and after few unsuccessful interviews they just decide to stay idle and exit the LFP.

There are plenty of job announcements related to the FDIs in the country, but the interviewees commented that they do not see the change in the labor market situations:

*"Despite the fact that the managers in the FDIs companies come from developed countries, once they start working in Macedonia, the human resource department is malfunctioning. Are this a signal of symbiosis?"*

Most of the companies, even though legally are requested to have human resource department, in practice they do not pay attention to the applicants and people that showed interest. In most of the cases they do not receive feedback that the application was received and if they should expect to be invited to the interview or not.

On the other hand, the general opinion of the respondents already in the job position is a bit more enthusiastic. They detect many irregularities in the selection process, low wages, little protection even in the NGO sector, but they advocate that "any job is better than no job". In general, they believe that the state employment office does not help for finding a better job, but at least a person could get informed about the available vacant job positions. Majority of the respondents are engaged in the informal market, family business or honorary based contract, and believe that every experience counts:

*"I prefer to tell that I have worked in a small shop, than that I was not working at all."*

*But there are opposite experience as well: "I thought volunteering and training programs will ease my employment process, but it turned out no one counts that as a working experience."*

In a nutshell, according to the qualitative analysis, the most important factors that affect youth unemployment are: high polarization of the society, lack of consistency between the education system and the real sector. Some of the possible solutions are: better schooling system, better linkage between education and labor market demand, more transparent selection procedure and less political and family connections (especially in the public sector) as all of the above either lowers the chances for getting employment or discourages young people to actively search for an employment.

### 5. Conclusions and policy recommendation

This paper explores the determinants of the unemployment using conditional mixed processes (CMP) method on the data from the school-to-work transition collected by ILO. Additionally, we conduct an extensive qualitative research to investigate some social factors that can explain the youth unemployment, but are not included in the quantitative indicators. The empirical results indicate that gender, age, the wealth of the household, the education level and regional characteristics tend to influence the probability of one's unemployment status. Moreover, the qualitative analysis suggest that given the socio-economic situation in Macedonia, most of the young people live with their families and the family member usually provide them with financial support to cover their expenses and most likely pursue education, hence they have a diminished interest to search for a job. Such an attitude on long run could have dubious effect and influence on the personal choices. Overall, there is a long school to work transition period, along with highly politicized employment channels, which discourages young people to actively participate in the labor market.

Accounting for the findings, we propose two policy measures aimed at reducing the youth unemployment rate. Each policy aims to address determinants of the youth unemployment that are specific for Macedonian labor market. The policy recommendations mainly rely on three key reasons derived from both qualitative and quantitative data. First, the unemployment rate is significantly higher for young people compared to the entire adult population; second, the unemployment rate is persistently high despite some active labor market policies and reforms undergone in the educational system; and finally, transition from school to first formal employment is found to be a complex and difficult process for most of the Macedonian young people.

The first recommendation considers the necessity of intensive cooperation between the educational institutions and the real sector economy. Our recommendation includes 2-stage process; the first stage includes consultation meetings among students in the last year of studies (for ex. high school or university) and professionals where students could extensively discuss the employment opportunities related to their qualifications, skills and level of education. The second stage process constitutes proactive collaboration between the real sector representatives and educational institution advisers in order to provide a tailored internship/apprentice program that will enable the students to gain the required knowledge and skills which in turn will facilitate the process of the first employment. This process has to be implemented across the

entire every educational system (excluding primary education) and every educational institution will have to improve the program they offer and ease the path for the future employees. The budgetary implications are considered low, since the main role of the ministry of education will be to coordinate the process.

The second policy recommendation considers a potential financial support for graduates that will be conditional on the active job search and personal development aiming to ease school to work transition. The financial aid is in the form of a wage subsidy or a social package designated to every young individual not in employment and education, but actively searching for a job should for a period up to one year. In that period the individual should attend the internship/apprentice program, and attend specific courses that will increase its employability skills, but in the same time to look actively for a job. The amount of the financial aid is beyond the scope of this study, since further analysis is necessary to determine the amount of the financial aid. The budgetary implications may be relatively high, but high and persistent youth unemployment is more harmful for the economic growth and social peace.

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# EXPLORING THE IMPACT OF TAX DIVERGENCE IN FINANCIAL REPORTING. A CASE OF ALBANIA (2022)

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## Abstract:

The interplay between tax divergence and financial reporting in Albania has assumed growing importance. This research, grounded in a post-positivist paradigm, seeks to elucidate the connection between these variables and discern which exerts the greater influence. The methodology is a qualitative dimension involved in the analysis of secondary data from businesses and the examination of tax laws and accounting standards. We elaborate the topic by taking on the one hand the main items of Accounting Standards and on the other hand the main items of the tax legislation in force. Furthermore, the research incorporates a quantitative component using a questionnaire to collect perceptions from professionals. This adds a descriptive or cross-sectional element to the research, but the primary emphasis remains on exploration and understanding, making it predominantly an exploratory research type, employing an ex-post-facto methodology.

The study reveals that in the Albanian context, tax regulations wield a substantial impact on the practices of financial reporting. Variations in tax laws often prompt the application of creative accounting techniques, leading to information imbalances that can have ramifications for decision-making. Notable instances have illuminated how tax divergence can yield discrepancies in financial reporting, compelling the necessity for regulatory adaptations and elevated reporting standards.

From this research, several pivotal recommendations have emerged. These emphasize the synchronization of legal and accounting frameworks through the reduction of permissible accounting and tax methods. This strategic alignment aims to enhance comparability while minimizing opportunities for divergence. Management is encouraged to acknowledge the significance of effective tax planning, institute a robustly supervised Code of Ethics, and actively endorse its observance. Tax authorities are urged to invest in expanded training, with an urgent imperative for streamlining tax legislation. This paper offers valuable insights for stakeholders such as investors, management, policymakers, regulators, to enhance financial transparency, benefit and compliance by addressing the impact of tax divergence on financial reporting in Albania.

**Keywords:** tax divergence, financial reporting, tax laws, accounting standards

## Introduction

Contemporary business operations can be characterized as a symbiotic relationship involving the exchange of information between parties possessing pertinent data and those individuals or entities affected by and interested in said information. Those in possession of this information are motivated to present what aligns with their preferences and interests, while those seeking this information aspire to receive accurate, complete, and timely data. Notably, distinct information requirements give rise to various reporting needs, resulting in reports that often exhibit disparities. This tax-accounting divergence can manifest in a multitude of forms, with financial reporting differing significantly from tax-related reporting or, in some instances, representing an amalgamation of both. The impact of tax divergence has become a topic of increasing importance. The impact of tax divergence, especially in the context of different reporting standards beyond accounting norms, has

emerged as a critical concern.

This topic is of great importance because it reveals a complex interaction between tax and accounting practices, which directly affects a company's financial health and investment, financing or other decision-making processes. Understanding these intricacies is essential for both investors, management, regulators and policy makers as it can illuminate how companies optimize their financial statements to minimize tax liabilities while complying with regulatory standards and to enhance tax compliance and the reduction in frauds. Furthermore, this paper sheds light on the ethical and legal implications of these practices.

In the realm of accounting research, the term "tax divergence" is introduced as a novel concept aimed at capturing the nuanced variations between tax laws and accounting standards, consequently resulting in divergent reporting practices. One facet of tax divergence manifests in the form of tax rulings, where mandatory tax law requirements differ from

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corresponding accounting standards, necessitating distinct reporting approaches. Conversely, scenarios may arise where tax laws exhibit flexibility or impose no specific mandates, affording leeway for accounting reporting to precede or deviate from tax-related requirements. Therefore, tax divergence will related to the differences in reporting between tax law requirements and accounting standards requirements leading to two different frameworks and basis for reporting.

The main question and related sub questions of this research study are as follows:

*Main question:* What is the relationship between tax divergence and financial reporting in Albania and which imposes their own rules more on the other?

*Sub question 1:* How does the concept of tax divergence influence financial reporting practices in Albania, and what are its applications in assessing the impact on financial statements and disclosures?

*Sub question 2:* To what extent does the utilization of creative accounting in Albania's financial practices result from or is independent of tax divergence, and what are the underlying motives, methods, and purposes of such creative accounting practices?

*Sub question 3:* Are there any notable cases or examples in Albania where tax divergence has led to significant discrepancies or challenges in financial reporting, and how were they addressed by regulatory authorities or the affected entities?

This research study adopts a post-positivist paradigm, emphasizing reductionism, empirical evidence, and objectivity. It employs an ex-post-facto approach to analyze past events for cause-and-effect relationships. The research combines both quantitative and qualitative methods, primarily focusing on qualitative interpretation of primary and secondary data.

It is primarily an exploratory research approach, delving deep into existing literature, conducting qualitative analysis of secondary data, and utilizing a structured questionnaire to collect insights from professionals. The study aims to comprehensively examine the relationship between Accounting Standards and tax laws in Albania.

In Albania, tax regulations strongly influence financial reporting practices, often leading to creative accounting approaches and information disparities that impact decision-making. Prominent cases highlight the need for regulatory adjustments and improved reporting standards.

### **Materials and methods**

The paradigm of this study is post-positivism, whilst this research study identified as ex-post-facto, which is interpreted as the analysis of what happened in the past to identify cause-and-effect relationships,

takes into account circumstances and collects data to establish relationships, explain behaviors and explore (Kerlinger, 1973; Ormrod and Leedy, 2015).

The type of research is primarily an exploratory research approach. Exploratory research is conducted to gain a deeper understanding of a subject, identify variables, and generate initial insights or hypotheses. It involves a thorough exploration of existing literature and often includes qualitative data analysis to develop a foundational understanding of the topic. In addition to the exploratory aspect, there is also a qualitative dimension involved in the analysis of secondary data from businesses and the examination of tax laws and accounting standards. This qualitative analysis adds depth to the research, allowing for a nuanced understanding of the subject matter. We elaborate the topic by taking on the one hand the main items of the Accounting Standards and on the other hand the main items of the tax legislation in force. The treatment will be of a comparative type, first showing what the accounting reportings asserts and then how the issue lies in the tax legislation. Further, through the scientific method of Lamb 1998, the dominance of reports will be addressed, which report dominates the other and imposes its own rules.

Furthermore, the research incorporates a quantitative component through the use of a questionnaire to collect perceptions from professionals. This adds a descriptive or cross-sectional element to the research, but the primary emphasis remains on exploration and understanding, making it predominantly an exploratory research type. Regarding the questionnaire, it has three sections. The first section of the questionnaire has 6 questions, which have an informative nature about the respondent and the entity where the respondent works. The second section of the questionnaire serves to provide information regarding the use of tax divergence and its application in the form of a creative accounting in Albania. It consists of 11 quantitative and qualitative questions. The third and last section serves to provide information regarding the tax divergence in the theory-practice relationship and impact on financial reporting regarding financial statements or disclosure. The questionnaire consists of 11 questions and serves to obtain information about the spaces that the Albanian tax system has and that are used by the subjects without violating the tax legislation.

The questionnaire addresses 100 subjects and was completed by 96 individuals in different subjects, all with experience in their field, so 96% is the completion rate. These subjects have been in organizations of different sectors of the economy and different types of their form of creation, with different levels of employees and different annual turnover.

The selection of the study's location (Albania) is chosen for several reasons. Albania's recent economic and regulatory transformations, marked by a shift from a centralized to a market-oriented economy, create a unique regulatory environment that warrants in-depth study. The country's status as an emerging market adds complexity, presenting distinct challenges and opportunities for businesses. Exploring the interplay between tax policies and financial reporting in this context can yield valuable insights with broader applicability to other emerging markets experiencing similar transitions. Furthermore, Albania's pursuit of European Union integration introduces an additional layer of complexity, as aligning tax and financial reporting practices with EU standards becomes crucial. Investigating the impact of these dynamics on the regulatory landscape and business strategies provides a rich field for research and analysis.

Limitations worth mentioning are the accuracy and completeness of secondary data can be subjective; limitations in time and financial resources; the respondents in the questionnaire are in small number and we cannot say that it is represented quantitatively; non-answers in the questionnaire and their degree of accuracy is a limitation, as we encountered cases of answers within a questionnaire, which are in contradiction with each other.

This research study collects data from different companies and different tax laws and accounting standards at a specific point in time for 2022. Hence, this data approach is cross-sectional data. Data comes from primary and secondary sources. Initially, the sources of secondary data will be the review of existing literature providing answers to the use of creative accounting and tax divergence and accounting standards and tax laws. Regarding the primary data, it is collected through a questionnaire consisting of 3 sections as mentioned above in the methodology.

### Results and Discussion

The results of the exploratory analysis regarding the relationship of tax laws and accounting standards were that tax legislation dominates and influences the financial reporting as follows:

- Effective tax rate in financial statements might be different to tax rates of tax laws.
- Valuation, initial measurement and subsequent revaluation of inventory is different from tax laws since revaluations, LCM or impairment are not recognized as per tax laws. The case of revaluations or impairment is relevant for all other assets. On the other hand, on derecognition of damaged/obsolete inventory they are non-deductible expenses for income tax unless a specific procedure is followed.

- Differences between taxable income and accounting income can affect a company's cash flow. For example, if a company pays more taxes than it reports as income tax expense, it will have a lower cash flow, which can affect investment decisions.

- Accounting standards foresee the making of corrections by the economic entity, in case of evidence of special events which affect the financial statements drawn up but not yet declared. The tax legislation does not express itself in this case.

- Based on the requirements of accounting standards, differences between tax laws and financial accounting standards may lead to the recognition of deferred tax assets and liabilities in the financial statements.

- Depreciation rates as per tax laws differ from the accounting estimates that accounting standards allows to be made.

- Impairment of financial or non-financial assets of accounting standards, as per tax laws in Albania is not recognized, hence it is non-deductible expense.

- Revenue recognition according to accounting standards is done according to the phased model where the moment of recognition is the moment when the performance obligation for the identified independent components has been met in accordance with the terms of the contract based on its individual value in the market. This moment does not necessarily coincide with the issuance of the invoice. In the case of taxes, recognition is always on an invoice basis.

- According to accounting standard of finance lease, recognized expenses are depreciation and interest expenses; meanwhile, according to taxes, it is the payment of the rent based on the invoice

- Companies may have uncertain tax positions or tax contingencies that are disclosed in their financial statements. These reflect potential tax disputes with tax authorities, which are not recognized under tax.

To summarize the treatment according to Lamb et al. (1998), Nobes and Schwenke (2006) have used two indices. The minimum index is a conservative measure of the tax impact on financial reporting, so tax reporting has little impact on that of accounting reporting. The maximum index is a maximum (liberal) measure, where the impact of tax reporting is maximum over the accounting one.

The minimum index is 1.5, while the maximum is 3.5, so we see that tax reporting has maximum impact on accounting reporting. The cases of accounting identity and leadership of 2 and 3 are excluded, since we are not interested in the impact that accounting has on taxes, but we are interested in the impact that taxes have on accounting. As in most developing countries, Albania is still a country oriented towards tax reporting and that accounting suits it, so accounting in Albania is not regarded as

a valued value that provides useful information but is often regarded only as mandatory and the reason why it is kept is only for the effect of tax reporting. Regarding the questionnaire, it targeted highly educated professionals. Out of 96 respondents, 1 had a high school degree, 24 had a bachelor's, 65 had a master's, and 6 had completed a doctorate. The survey focused on entities subject to tax legislation, with 62 working in companies with turnovers between 8 and 100 million, 15 with turnovers between 100 and 500 million, 6 with turnovers over 500 million, 10 in businesses with turnovers between 5 and 8 million, and only 3 had turnovers under 2 million.

All respondents were aware of the benefits of creative accounting. The main benefits mentioned are tax avoidance, reduced borrowing costs, and increased stock prices. This reflects a unique situation in Albania, where the focus is on minimizing tax payments, unlike in developed countries where the aim is to increase profits for higher stock market ratings. Out of the respondents, 96.74% have used or heard of creative accounting methods.

The primary consequences of using creative accounting, as reported by survey respondents, included tax fines, legal and civil penalties, damage to a company's reputation, job loss due to increased responsibilities, harm to customers, shareholders, and negative long-term perspectives. This suggested that professionals in Albania prioritize fear and penalties over ethical considerations, influenced by vested interests and the long-term viability of their economic entities. The most common creative accounting techniques used in Albania involve altering depreciation policies, off-balance sheet activities, early purchases, and various recognition deferrals, while less commonly employed techniques include capitalizing research and development expenses and non-material asset expenses, among others. The primary motivators for using creative accounting were tax objectives, internal objectives, and financial manipulation.

The survey also revealed that many respondents considered tax legislation in Albania to be ineffective, with only two respondents believing it was effective. This suggests that there are significant challenges in applying tax theory in practice. Regarding tax planning, most respondents viewed it as important but not to the extreme, highlighting the need for a balanced approach. The majority of respondents were aware of the concept of tax divergence and the benefits it could bring, particularly in reducing taxes.

Interestingly, the study found a division among respondents. Some aimed to minimize profit before taxation to pay as little tax as possible, while others were more interested in utilizing state agreements and regulations. This division likely stems from different backgrounds, with some dealing primarily with foreign entities and others with typical

Albanian businesses. The study concluded that tax legislation in Albania needs to be adapted to align with practical realities and avoid conflicts between different laws, particularly the Tax Procedure Law and other tax-related legislation. The findings also emphasized the importance of fostering a better understanding of tax divergence and its implications among professionals.

In aligning with existing literature, the findings of this study echo patterns observed in prior research, suggesting a commonality in the behavior of developing countries. Specifically, the case of Albania reflects a prevailing orientation towards tax reporting, akin to the trajectory seen in many other developing countries. Notably, accounting practices in Albania are predominantly viewed as obligatory, with their primary purpose perceived as serving tax reporting requirements rather than being esteemed for the valuable information they can provide. This aligns with the prevailing sentiment in similar contexts where accounting is often seen as a mandatory compliance exercise rather than a strategic tool for decision-making. The congruence of these outcomes with earlier studies reinforces the broader trend of emerging economies prioritizing tax considerations over recognizing the inherent value of robust accounting practices.

In summary, this study shed light on the motivations and perceptions of professionals in Albania's accounting and taxation sector. It highlighted the need for more effective tax legislation and a balanced approach to tax planning while acknowledging the complexities of applying tax theory in practice. The findings provide valuable insights for policymakers and practitioners in the field.

### **Conclusions**

Based on the results, this research study indicates that tax reporting has a significant influence on accounting reporting. Cases of identity and accounting dominance have been excluded, as our focus is on the impact of taxes on accounting, not the other way around. Like in many developing countries, Albania remains tax-centric, and accounting is adjusted accordingly. In Albania, accounting is not considered a valuable source of useful information but is often viewed as a mere obligation for tax reporting.

A careful analysis of the questionnaire responses reveals a general contradiction. This stems from the fact that our respondents include 28 young professionals, 16 with 11-15 years in the profession, and 23 with over 15 years of experience. This suggests, not empirically or scientifically, but in a general sense, a "conflict" between generations. This "conflict" arises from different educational levels, cultural and professional differences, reflected in their divergent knowledge and interpretation of accounting practices.

If creative accounting aligns with ethical and legal standards and generally accepted accounting principles (GAAP), it can have highly positive effects on companies and stakeholders. Current accounting regulations allow managers to choose and apply different methods in accounting, giving them the flexibility to implement creative accounting techniques. Creative accounting is widely used to “manipulate” (not just in a negative sense) third parties and provide information that suits business interests rather than what is necessary. Tax legislation offers ample flexibility and cannot keep up with the rapid pace of business practices. Taxation practices are dynamic, evolving, while tax legislation remains static.

Employees working in tax administration face significant challenges with experience, general knowledge, and accounting expertise. Even when practice finds support in theory, i.e., there is a legal basis, practical implementation is hindered by bureaucracy, lack of cohesion in the overall process, and a variety of other reasons requiring a holistic integration and solution.

In summary, in Albania, tax divergence and financial reporting are closely intertwined. Tax rules impact financial reporting practices, and the variation in tax regulations can lead to creative accounting techniques being used to exploit gaps in the law, creating information asymmetry. This can affect decision-making. Notable cases in Albania have shown how tax divergence can result in discrepancies in financial reporting, requiring regulatory authorities and companies to address the issues through regulatory changes or improved financial reporting standards. Balancing these elements is essential for transparency and fairness, and practical implementation remains challenging due to various issues.

In our quest to address a widespread issue, a set of crucial recommendations emerged such as combining both legal and accounting systems by reducing the number of allowable accounting and tax methods. This helps increase comparability and reduces divergence possibilities. From the perspective of management, they must recognize the importance of effective tax planning for businesses and encourage its practice and develop a Code of Ethics that is fully applicable and rigorously monitored for compliance. Regarding the perspectives of tax authorities, more training is needed and there is an immediate need for a simplification of tax laws.

Future research should aim to build upon the current findings by delving deeper into the specific drivers such as cultural, economic, political, or regulatory factors. Additionally, conducting cross-country comparisons, exploring the consequences of the tax prevalent orientation. Finally, considering the impact of international accounting standards on the interplay between tax divergence and

financial reporting in developing economies. Such endeavors would contribute to a more nuanced and comprehensive understanding of these complex dynamics, providing valuable insights for practitioners, policymakers, and scholars alike.

### **Declaration of Conflict of Interests**

After taking into consideration all the facts and circumstances, I confirm that this paper carries no ethical issues and all the work done in this study is according to the ethical standards and there is no conflict of interest of any kind.

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# ON-DEMAND CAR SERVICING APPLICATION

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## Abstract:

The majority of people, in our today's fast-paced world, find it difficult to book a suitable date and time for their vehicle to be serviced/repaired that fits their overly tight schedule. Keeping in mind that in order to get their vehicle repaired, the client has no other option but to bring their vehicle to the mechanic on their own and figure out how to pass the time. They may either wait till their car is repaired or return home or to work whilst also determining their travel choices. Exactly these issues generally postpone regular car servicing, which may lead to an increase of unmaintained vehicles on the road, causing additional traffic problems e.g., car accidents. The aim is to build such an application which will provide car owners with a convenient, time-saving and personalized car servicing experience, aiding them in preserving the quality and longevity of their cars. The application eliminates the necessity for customers to drive their vehicles to a certain location by enabling them to arrange a service that is suitable for them. The application will assist service providers in improving their customer service through two software versions. The first is a web-based version for administrators, allowing them to manage bookings and add or delete services. The second version is a mobile application reserved specifically for the mechanics where they can access their assigned services and communicate with customers by sending requests for additional recommended services for their approval. Overall, the application provides a comprehensive approach to car maintenance which allows the customers and the service providers to have a systematic view of the issues at hand as well as a technological enhancement of services that ensure value to the users.

**Keywords:** On-demand car servicing; Mobile app; Car maintenance; Customer support; Pick-up and drop-off service

## 1. Introduction

In today's fast-moving world, the majority of people find it hard to book an appropriate date and time for their car to get serviced/repaired which should fit their overwhelmingly tight schedule. Keeping in mind, in order to get their vehicle serviced, the customer has to bring their car to the mechanic on their own and figure out a way to kill time. They could either choose to wait there until the car gets fixed or go back home or to work whilst also figuring out what their options for travel are. Exactly these issues tend to prolong regular car servicing which may lead to having more unmaintained vehicles on the road also leading to more issues in traffic e.g. car accidents [1].

The most common reason given by consumers for putting off auto maintenance is a lack of time. Nearly half of those polled indicated they were too busy to bring their car in. Money was just marginally behind that cause. 52 percent of those polled stated they couldn't afford it. Another fact is fear and a lack of confidence in mechanics were two other important causes contributing to service delays. Males were

shown to be somewhat more apprehensive and sceptical of mechanics than females, according to the study. It was also revealed that younger people are more afraid and distrustful of automobiles than older people [2].

As nowadays many people are drivers, and everyone understands the struggle of thinking about maintaining the car and finding an appropriate time to take the car to service, especially since having a car is a daily requirement for many people. In today's world, mobile and web applications are vastly in use and there is an application for everything people need. During the research, it was noticed that there is a lack of applications that focus on car servicing/maintenance. Creating an application for this purpose seems like a feasible idea especially keeping in mind the gap in the marketplace. One of the biggest issues is that car servicing is quite time-consuming especially if it is a larger service. For this instance, offering a car pick-up and drop-off would motivate everyone to take better care of their cars and make it overall a less stressful experience for car owners. Alongside this,

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offering some loyalty benefits could also motivate people to service their cars more regularly.

When it comes to automotive maintenance, one of the issues is comfort. There is not always enough information to make effective decisions. Much of this can be attributed to the increased dependability of cars. They're almost like machines. Of course, people cherish their cars, but if owners do not have to worry about it breaking down all the time, they will not have to worry as much about preventative maintenance. Those who are unfamiliar with cars are hesitant to ask questions because they do not want to look foolish. It is vital to question any professional, whether a doctor, financial adviser or vehicle mechanic [3].

Another typical reason why many vehicle owners avoid professional auto technicians is a lack of information about vehicle care and maintenance. If someone has been a long-time vehicle owner and has been successful in addressing automotive problems in the past, they may be tempted to fix the problem themselves. Vehicle engineering and design developments have made automobile models more dependable and safer in recent years, but that does not imply they can repair problems on their own. Unless they are a skilled auto technician, chances they do not know the answers to all vehicle-related difficulties [4].

As the usage of mobile phones is on a constant rise for all daily tasks, a mobile application for car maintenance and repair is missing on the market. The proposed solution for this issue is an On-demand Car Servicing Application. The application has 3 different types of users, the administrator who can manage the offered vehicle repairing services and overview all databases, the employee who oversees vehicle pick up and servicing while directly interacting via service statuses, with the third type of user, the customers. Customers can book a car service based on their current needs, require a car pickup or delivery, and make payments through the application. In the following section, more of the application's system features are introduced.

## **2. Literature Review**

The road to establish a capital market in Albania has been long and marked by both progress and setbacks. It began with the creation of the Tirana Stock Exchange (TSE) in 1996, which was a significant step towards building a securities trading platform. However, the exchange faced numerous challenges during this time. The country was undergoing a significant transition where not only the economy but also society as a whole had to adapt and transform to the new socio-economic model.

This period was marked by early-stage and basic business structures and an underdeveloped financial sector and there was also a lack of government policies or focus to support the growth

of a functional capital market. At this time the market was characterized by low liquidity and limited product diversity, trading chiefly government securities and privatization vouchers. TSE was never connected, either directly or indirectly, with the privatization process as a whole; such a process has been a "forbidden apple" for TSE and, historically, it has been excluded from any possible inclusion with this process (Meka, 2013). Such practices are known to have been successful when implemented in other countries of the Eastern Block. The weak performance eventually led to the closure of the Tirana Stock Exchange in 2014 and the revocation of its license the following year.

Even though this was not a surprise, it marked a significant setback for the Albanian capital market. After a few years of inactivity, in 2017, the establishment of the Albanian Securities Exchange (ALSE) opened a new chapter in the development of Albania's capital market. This time the initiative came from private entities. However, despite the promising start, the ALSE and the Albanian financial market have continued to be characterized by limited diversity and a dominance of government bonds, resulting in a market that offers few options for investors.

The issuance of the first corporate bond in 2023 by NOA sh.a., a microfinance institution, via an Initial Public Offering (IPO), signaled a change in this scenario and probably marked a turning point in the evolution of Albania's capital market. Practically, this is not the first issuance of a private corporate bond, as Credins Bank is the first corporate in Albania to issue corporate bonds, in late 2011. This security was offered in the Albanian market through private placement (Meka & Baholli, 2015).

As the first publicly-offered security, NOA's bond presents the potential for a new phase of growth and diversification in the market; it marks the first step towards the maturation of the domestic financial market, and offers a glimpse of optimism for the future of Albania's capital market.

In April 2023, the Albanian Financial Supervisory Authority (AMF) approved a prospectus for the country's first-ever corporate bond issuance to be listed on the local stock exchange, the Albanian Securities Exchange (ALSE). The bonds were issued by the local microfinance institution NOA sh.a., which has been operating in the country for 25 years. It provides credit to small businesses, farmers, and families, and has an active portfolio of 65 million euros, serving 14,000 clients. The bond issuance was targeted at private companies and individuals, marking the first of this kind by a corporation in the country. The underwriter for the bond issuance was



**3. Objectives**

Some of the main objectives of the application and the expected outcome.

Straightforward user-friendly application with easy-to-navigate interface: One of the most important objectives of the car servicing application is to create a very simple and easy-to-use UI which offers the users a frictionless and effortless way to order a multitude of services regarding any car-related issues. Since the entire application is meant to relieve any stress regarding contacting a mechanical professional which the users might have felt before with traditional ways of acquiring vehicle service, it is believed that the UI needs to attract every possible demographic of car owners. This is why one of the main goals is to create a welcoming UI.

Providing all vehicle service and replaced parts information: It is believed that one of the main drawbacks of international ways of car servicing is the ambiguousness of pricing and exploitation of uninformed customers for profit. That's why a very important objective is to create a transparent service and parts pricing system which is registered by the employee and can be viewed by the users.

Ensuring minimum involvement of customers: Customers are to expect a pain-free experience in terms of scheduling and meeting with a licensed professional anywhere at any time (inside of service company working hours) in which the users will simply hand over their keys to a professional and continue with their day resulting in a satisfied customer.

Providing a customer service rating system: A important goal is to ensure a rating system which is offered after a car is delivered back to the customer so that the different mechanic workshops fit inside of a rating system rated from 1-5. This will ease up the process of picking and choosing a service provider for new users.

**4. Structure**

The main purpose is to build an optimized online mobile application, a car servicing application directed towards the regular user and the employee, and a web application oriented towards the administrator to regulate the information traffic and pricing info. The mobile application is optimized to best suit the user and provides the best user experience. The following use cases table (Table 1) assists in organizing and describing the many use cases.

Primary Actors	Use Cases
Unregistered user	1. Sign up/Register
Registered user	2. Login 3. Change Password
Customer	4. Add Car 5. Book Service 6. Pay 7. Send Message 8. Verify Additional Services
Employee	9. View Bookings 10. Request Additional Services 11. Change Booking Status
Admin	12. Verify Reservation 13. View Database

The purpose of the system features is to make the app easy to use while also addressing any special requirements. All these elements offer a pleasant user experience while also addressing significant concerns encountered with other traditional methods of obtaining automobile service.

After the completed registration/login process the main system features are as follows:

**4.1. Add Car**

The user (customer) shall be able to add all the required information about their vehicle. In addition, the user shall be able to see all of the added vehicles as well as the corresponding information. The user shall also be able to edit the information they already added to the system. Lastly, the user shall be able to remove a vehicle from their account.

**4.2. Book Service**

The user (customer) shall be able to select as many services as they wish, to be performed on their vehicle. The user shall be also able to enter a desired date, time and location where they wish their vehicle to be picked up. The customer will see the full price for the booked service and may proceed to payment.

**4.3. Pay**

The user (customer) shall be able to choose a desired payment option whilst booking a service. When choosing payment via credit card, the user shall be able to input all the needed information about their credit card in order for the payment of the service to be completed.

#### 4.4. Verify Reservation

The user (admin) shall be able to accept or decline the reserved bookings which are sent by the customer. By accepting the reservation, the booking will be automatically saved to the database, and be shown in the employee side "View Bookings" feature.

#### 4.5. View Database

The user (admin) shall be able to view all services performed in the service-providing company. The database represents a history log of all performed services, the name of the customer, the technician who performed the service, the date and time as well as the price of the service.

#### 4.6. View Bookings

The user (employee) shall be able to see all services in the upcoming period. The overview of bookings shall be represented through a calendar for easy accessibility and organization. The employee is able to see booking details which include the customer's name, vehicle type, date and time, and services needed to be performed. In booking details, the employee can make a request for additional services.

#### 4.7. Request Additional Services

The user (employee) shall be able to request additional services from the customer after the examination of the vehicle. In some cases, it is possible for a technician to find unforeseen issues by the customer. In this case, the employee can find additional services to be performed, and send the customer a request which includes all the additional services with their pricing.

#### 4.8. Verify Additional Services

The user (customer) shall be able to accept or decline additional services found after vehicle examination. The customer will get a notification from the company about newfound issues and be able to verify if they want additional services to be performed on their vehicle. The new price of the service will be counted into the original price of the service.

#### 4.9. Change Booking Status

The user (employee) shall be able to update the status of the booked service. The statuses include "Pending", suggesting that the vehicle is in transport to the car servicing company or in line for the service, "On Service", meaning that the vehicle is currently being serviced and "Finished", indicating that the vehicle is ready for a pickup or being delivered to the customer. Through this feature, customers can track the progress and estimate the time of a service being completed.

#### 4.10. Non-functional Requirements

In addition to some system features, the system is expected to follow some of the non-functional requirements which state as follows:

- Usability - The user can select service(s) easily, and easily navigate through application features.
- Security - Only system administrators and certified persons can see user information. The payment information of the users is secured and cannot be accessed by third parties.
- Performance - The website and the mobile application should load and quickly respond to any changes performed by the administrator (e.g., adding new services).
- Scalability - Continuously adding new features that fit the user's specific needs and allowing for a greater number of users to use the platform.

### 5. Implementation

The system is designed in such a way that all system features, both functional and non-functional requirements, are best satisfied. Therefore, below are the following components listed:

- Customer version mobile application - offers vehicle owners to select desired services, book a desired date, time, and location for their vehicle to get serviced and picked up, make payment and communicate with the mechanic by verifying/declining additional service requests.
- Employee version mobile application - offers employees, in this case, mechanics, to view all their assigned services and communicate with the customer by sending requests for additional services which they suggest.
- Admin version web application - offers administrators to verify/decline bookings, add/delete services which they provide and view all the accepted services throughout history.
- Server-side scripting - allows interaction with the system, updating all required information and sending appropriate requests between users.
- Database server - the database will store all the necessary information which can be applied in all versions of the application.

The selected technologies for the frontend components of the applications were ReactJS, for the web application, and Flutter, for the customer and employee versions of the mobile application. One of ReactJS' notable strengths is its ability to construct reusable and modular components. Because of that, it allows code reusability, maintainability and scalability. Another key advantage ReactJS possesses is its virtual DOM (Document Object Model), which effectively updates and renders just the appropriate components when changes occur. This method reduces the requirement for full-page refreshes, improving

application responsiveness and decreasing load times.

Flutter is an open-source framework, developed by Google, used in mobile application frontend development, which allows the programme to be run across multiple platforms. In this case, iOS and Android. This allows easy maintenance and a consistent user experience across several platforms, and development time, effort, and resources are substantially reduced. This results in a highly productive and iterative development process. Flutter's broad collection of adjustable and pre-built widgets, together with its comprehensive library support, enables developers to easily construct feature-rich interfaces.

The server-side component of all versions of the application is Node.js. It is a popular runtime environment for building scalable and efficient backend applications. Node.js has an event-driven, non-blocking I/O approach, which allows it to handle a large number of concurrent connections. This is especially useful for applications that require real-time communication, streaming, or managing several requests at the same time. Because of its lightweight and event-driven architecture, it is well-suited for developing scalable applications.

For the database, phpMyAdmin was selected. It is a popular web-based graphical user interface (GUI) programme built in PHP that is used to manage and administer MySQL or MariaDB databases. It provides an easy interface for conducting numerous database administration operations, making it a helpful tool at all stages of development. phpMyAdmin provides a complete set of database management tools. It allows user account management, assigning rights, running SQL queries, importing/exporting data and optimizing database performance, among other things. These features are critical for efficiently managing and organizing databases.

## **6. Conclusion**

In conclusion, the creation of an on-demand car servicing application intends to transform the auto repair sector by giving car owners a more streamlined, personalized, and convenient experience. Customers can arrange and get servicing and maintenance through the application at their desired location, avoiding the need to travel to a particular service center. Customers can simply handle both normal maintenance and complicated repairs thanks to the vast range of services offered. The program promises to help automobile owners properly maintain the quality and longevity of their vehicles by enhancing accessibility and ease. Additionally, it gives service providers a chance to improve customer service and meet the changing demands of the automobile sector.

The solution to all of the issues was resolved by securing the car owners in booking suitable service appointments due to their busy schedules can result in delayed maintenance and an increase in unmaintained vehicles on the road. The development of a convenient and personalized car servicing application is proposed. This application aims to eliminate the need for customers to physically bring their vehicles to a service center by allowing them to schedule services that fit their availability. By providing a web-based version for administrators and a dedicated mobile application for mechanics, the application streamlines the booking process and facilitates communication between all parties involved.

This comprehensive approach to car maintenance enhances the overall customer experience and enables service providers to improve their customer service. Ultimately, the application seeks to ensure the preservation of the quality and longevity of vehicles while leveraging technology to offer value and efficiency to users. The following technologies were used in the entire development process: Figma (a powerful design tool), ReactJS (a versatile frontend framework), Flutter (cross-platform mobile development framework), phpMyAdmin (database), MySQL and Node.js (backend). Finally, the project was a success by completing all of the tasks mentioned before, a mobile and web application was developed, including several features to maximize the efficiency of the project.

While the On-demand Car Servicing Application provides a comprehensive area of features, here are some of the suggested enhancements to be made in the future or any other related works. Firstly, implementing real-time tracking and notifications may improve trust and transparency dramatically. Allowing consumers to follow the current location and projected arrival time of the service provider gives them peace of mind and allows them to better manage their expectations. Additionally, integrating a reminder notification system for customers who have not maintained their vehicles in a long time could prove to be very beneficial to the application. By doing so, it can actively encourage regular maintenance and ensure the safety and longevity of their vehicles. Lastly, including an expense tracker in the application can provide considerable benefits to customers. Users may obtain financial transparency by effortlessly tracking and understanding their car maintenance expenses with this tool. The expense tracker also makes budgeting easier by allowing users to establish spending limits and receive notifications when expenses surpass predetermined criteria.

With these features, including the mentioned improvements, it will surely revolutionize the way car servicing will be done in the future, ultimately setting this platform apart from the rest and delivering exceptional value to its users.

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# CHALLENGING THE ALBANIAN E.U. CYBERSECURITY PERSPECTIVES

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## Abstract:

Cybersecurity has emerged as a critical concern on a global scale, and Albania is no exception. This paper delves into Albania's current cybersecurity challenges, shedding light on existing vulnerabilities and presenting recommendations to enhance the nation's resilience against cyber threats, considering the country's E.U. perspectives. The paper explores critical facets of cybersecurity, including the vulnerabilities within the country's infrastructure, the regulatory framework, and the prevalent skills gap. By addressing these aspects, a comprehensive overview is provided, outlining Albania's challenges in safeguarding its digital assets.

The methodology used in this paper applies a theoretical approach based mainly on qualitative methods using secondary data and information, analyzing, comparing, and evaluating sources coming mainly from secondary sources, national and international ones. Through this method, the paper aims to offer a nuanced understanding of the cybersecurity landscape in Albania and its E.U. challenges regarding cybersecurity perspectives.

In summary, this research concludes that by addressing cybersecurity challenges, Albania will be more effectively integrated into the E.U. and the global market economy, benefiting well-being and creating a more secure society.

**Keywords:** Cybersecurity, Albania, E.U. Challenges, Cybersecurity Index, Regulations;

## Introduction

It is well-known that the global economy heavily relies on the widespread adoption of Information Communication Technology (ICT) and internet connectivity. The digital agenda of every E.U. country promises to enhance service delivery, promote good governance, improve efficiency, drive innovation and productivity gains, and boost economic growth (European Commission, 2015). However, the availability, integrity, and resilience of this critical infrastructure are under threat (Giaccone, A. 2019). The sophistication of threats to networked systems and infrastructures is increasing. Data breaches, criminal activities, property destruction, and service disruptions pose significant risks to the Internet economy. Albania also suffered continuing cyberattacks, digitally devastating the country's critical computerized public and private infrastructure starting in 2021 (Oghanna, A., 2023). Cybersecurity is crucial for digital trust in various structures (Mulligan, C. 2017). It is considered the cornerstone of the digital economy and determines the level of Trust that digital information users have in various economic and social structures and government regulations. Shein at Tech Republic (2022) shows that Sixty-five percent of defenders report an increase in

cyberattacks since Russia's invasion of Ukraine, according to VMware's eighth annual Global Incident Response Threat Report, released at Black Hat USA 2022. The World Economic Forum has identified cybersecurity as one of the most severe risks to further development. Estimates suggest cyberattack losses could reach \$3 to \$6 trillion by 2021 (World Economic Forum, 2019). The increasing reliance on digital technologies in Albania has brought about unprecedented economic growth and societal advancement opportunities. However, this digital transformation has also exposed the nation to many cybersecurity challenges. To face these challenges successfully, cybersecurity is currently a top priority for the Government AKCESK (2023). Albania is one of the most advanced countries in the Western Balkans region regarding cybersecurity regulations (AKCESK, 2022). Evidence has shown that countries must ensure that their economic objectives align with their security priorities to achieve overall national development and security (World Economic Forum, 2019). Also, there will be a close connection between human and machine intelligence in the future, and the quality of this interaction will depend on various factors, including the level of human resource development (Frontier Economics,

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2011). Currently, organizations are facing a shortage of highly skilled professionals (Hays et al., 2017). They are trying to overcome this by implementing corporate systems for personnel development and talent management and collaborating with higher education institutions. Any disparity between these can lead to significant issues and challenges, so Albania must align its national economic vision with national security priorities for a stable and prosperous future. Considering the mentioned assumptions, this paper aims to explore and analyze Albania's specific cybersecurity challenges, highlighting the need for proactive measures to secure its digital landscape.

### **The E.U. Cyber Security Challenges and Perspectives**

The term 'digital sovereignty' may have different meanings in different contexts, ranging from 'nation-state sovereignty' to 'personal technological sovereignty' (Couture et al.; S., 2018). These contexts extend from individual citizens to social movements and include entire countries. European digital sovereignty has three aspects: people, industry, and politics (EU JOIN, 2017). Strategic autonomy refers to the capacity and capabilities to decide and act on essential aspects of a society's longer-term future in the economy and institutions. Timmers, P. (2019). Digital strategic autonomy can be defined as Europe's capability to acquire products and services that meet its requirements and principles without being subjected to any undue influence from external sources. The needs of consumers may require various products and services, including hardware, software, or algorithms. The European Union Agency for Cybersecurity has identified critical topics in cybersecurity research and innovation to achieve specific strategic objectives. In 2018, the primary aim was to enhance cybersecurity in the E.U. (ENISA, 2018). This document, which is the second in the series, is intended to support the E.U.'s digital strategic autonomy. Artificial Intelligence (AI) is becoming increasingly important for daily and critical services, such as energy production and distribution, transportation management, and healthcare infrastructure. Trusting the data and algorithms that process it is essential for a secure and reliable digital society. The issue in question is the risk of losing control over information and the algorithms processing it. However, the E.U. has taken the initiative to protect E.U. citizens. (ENISA, 2018). Artificial Intelligence (A.I.) plays a crucial role in driving several daily and critical services, such as energy production and distribution, transportation management, and healthcare infrastructure. However, to ensure that our digital society is trustworthy, we must be able to rely on the data and algorithms that process it. The primary concern is the risk of losing control over the information and the algorithms processing it. The European

Union (E.U.) has taken the lead in protecting E.U. citizens, but more work needs to be done to secure our data (ENISA, 2018:11). Data protection is a fundamental right enshrined in Article 8 of the EU Charter of Fundamental Rights (EU COM, 2012). The introduction of the General Data Protection Regulation (GDPR) has created an obligation to protect E.U. personal data. The GDPR has had a worldwide impact on countries and businesses, leading to changes in laws and practices outside of Europe as well.

The digitalization of society has introduced digital controls in many new places, which has created more opportunities for attackers to gain easy access. Unfortunately, product designers focus more on functionality and less on security, making it easier for attackers to exploit vulnerabilities. For example, from 2017 to 2018, 80% of the vulnerabilities found in medical devices were exploiting network access, and 40% could be triggered remotely with basic skills and no particular privileges (Debar, H.2019). Ensuring digital autonomy and sovereignty requires technological leadership and a solid legal and regulatory framework for research and development. The E.U. must guarantee access to a competent workforce to design, operate, and audit critical infrastructure services. Europe is facing a shortage of cybersecurity experts, which makes it challenging to retain these skilled professionals. To tackle this problem, Europe needs to develop its own cybersecurity skills framework. This framework will help create a common language for individuals, employers, and training providers, making it easier to identify the required skills. By doing so, businesses and governments can have access to a sufficient number of skilled professionals, which will help Europe maintain its leadership in the field of cybersecurity (ENISA, 2023).

### **Methodology**

This paper will address answers to the main research question: What are Albania's critical cyber security challenges and vulnerabilities in the current digital landscape, and how can the country enhance its cyber resilience to mitigate and respond effectively to emerging cyber threats of the E.U. 2030 foresight? One methodology used to reduce the cost of cyberattacks is CRI 2.0. It provides a framework for countries to pursue economic growth securely while maintaining resilience. The Cyber Readiness Index (CRI) 2.0 has two main components (Potomac Institute for Policy Studies, 2015). Firstly, it provides national leaders with objective evaluations of their countries' maturity and commitment to cybersecurity and resilience. This information is essential for leaders to protect their increasingly connected countries with a potential for GDP growth. Additionally, the Cyber Readiness Index (CRI) explains what it means for a country to be "cyber-ready" and provides a

blueprint to achieve this status. This methodology provides a valuable and straightforward tool to assess the gap between a nation's cybersecurity posture and national cyber capabilities to achieve its economic vision. The blueprint used for this analysis includes over seventy unique data indicators across seven elements. There are seven key elements to a national cybersecurity framework: national strategy, incident response, e-crime and law enforcement, information sharing, investment in research and development (R&D), diplomacy and trade, and defense and crisis response.

The assessment of each country's cyber readiness is based on primary sources, grounded on empirical research and documentation. Countries are evaluated based on three levels of cyber readiness: insufficient evidence, partially operational, or fully operational. The CRI 2.0 methodology evaluates 125 countries' cyber readiness based on their maturity and commitment to cybersecurity, resilient infrastructures, and services. More information about CRI 2.0 is in Figures 1 and 2 (Potomac Policy Institute, 2015). Albania is not included in these assessments due to the methodology used in the CRI 2.0. The selection of countries includes the top 75 countries from the International Telecommunication Union (ITU, 2023) ICT Development Index (IDI), highlighting the importance of connectivity. Albania was not included in this assessment. Nevertheless, as we can see, facing the challenges of cyber-attacks, no country was ready, as a conclusion came from the CRI 2.0 Report 2-15. This report was chosen as an initial reference part for the measurements. The CRI 2.0 methodology consists of seven essential elements. Each element has at least ten supporting indicators for evaluation. These indicators provide a blueprint of a country's cyber readiness when combined. Below, you will find a detailed description of each essential element and its supporting indicators. Additionally, the text includes country examples that showcase innovative and multicultural solutions for achieving cyber-readiness. Although these examples are not exhaustive, they demonstrate unique country-level approaches. Having a clear and published National Cyber Security Strategy that aligns with the country's economic vision and security requirements is a crucial indicator of a country's readiness in the cyber domain. A country's digital economy and future depend on the Internet, broadband networks, mobile applications, I.T. services, software, and hardware, which form the foundation of the digital infrastructure (OECD, 2015). A National Cybersecurity Strategy outlines how to allocate resources to prioritize national cybersecurity objectives, improving a country's security and resilience. The Strategy should identify the national cybersecurity objectives and the governance structure for their implementation (U.N., 2021). It is important for a country to have a strong incident response capability in place in order

to show its readiness to tackle cyber threats. Such capability is often managed by one or more teams, such as the National Computer Security Incident Response Teams (National CSIRTs) or Computer Emergency Response Teams (Naseir, 2023). These teams, collectively known as CSIRTs, manage incident response in natural or manufactured cyber-related disasters that affect critical services and information infrastructures. (ITU, 2023).

Ensuring a country's cyber readiness involves three essential elements. One of the critical elements is the country's commitment to safeguard its society against cybercrime. As cybercrime is a global problem that transcends national borders, it requires international solutions. Therefore, countries must demonstrate their commitment to secure their society against e-crime by taking collective international actions. One way of measuring a country's readiness to tackle cybercrime is by assessing its commitment to implementing transnational solutions. Legislation plays a vital role in creating a framework for organizations to comply with regulatory standards. It can include rules against particular criminal behavior or establish minimum regulatory requirements. Setting up and maintaining information-sharing mechanisms is a critical factor in determining a nation's readiness for cyber threats. These mechanisms help exchange intelligence and information between different sectors of the Government and industries, which can help identify, assess, and respond to targeted activities. Sharing threat and intelligence information can help us understand how different sectors are targeted, how information is lost, and how we can defend our information assets better. There are four models for information sharing that have emerged to address cyber threats and secure information assets. Capacity development is an essential component of legal, technical, and organizational measures within the Global Cybersecurity Index and is a driving force for digital development. Capacity development programs aim to build local skills, knowledge, and confidence, which can help close the skills gap and build a more inclusive technology ecosystem. Moreover, delivering inclusive digital services increasingly relies on a skilled workforce. Capacity development frameworks for promoting cybersecurity may include awareness-raising, research and development programs, education and training programs, and certified professionals and public sector agencies. These frameworks can be used to measure their effectiveness. (Hays et al., 2017). Another vital element that indicates a country's readiness to deal with cyber threats is establishing a national priority for and investment in cyber security basic and applied research, as well as ICT initiatives broadly. The advancement of ICT has transformed almost every sector of the economy, revolutionizing businesses, governments, education, and how citizens live, work, and play.

These innovations drive economic growth and can enhance resilience, laying the foundation for solid security measures. Cybersecurity spans sectors, geographic, and resource levels, so cooperation is needed at the private, public, regional, and international levels. More outstanding cooperative initiatives can develop much more robust cybersecurity capabilities, helping to deter repeated and persistent online threats and enable better investigation, apprehension, and prosecution of malicious agents. (ITU GCIv5, 2022).

### **The Global Cybersecurity Index Indicators**

The Global Cybersecurity Index (GCI) is a benchmark that measures and compares countries' commitment to cybersecurity across the five pillars of the Global Cybersecurity Agenda (GCA). The ITU framework aims to build synergies between current and future initiatives and focuses on five pillars: legal, technical, capacity building, organizational, and cooperation. To calculate the GCI, a questionnaire with 82 binary, pre-coded, and open-ended questions was used (ENISA, 2023). This provided a value for 20 indicators, selected based on relevance to the five GCA pillars, the main GCI objectives and conceptual framework, data availability and quality, and the possibility of cross-verification through secondary data (Hathaway, M.2015).

The Foresight Exercise Methodology Overview was implemented through a series of workshops and interviews between March and August 2022. Experts in the PESTLE fields (political, economic, social, technological, legal, and environmental) were consulted during these sessions. The methodology used comprises of four phases. The first phase is called "collaborative exploration," which involves researching and gathering information on current trends while integrating expert knowledge, feedback, and validation. The second phase, called "group forecast workshops," involves bringing together groups of experts with experience in one of the PESTLE dimensions. They discuss, explore, assess, and prioritize the identified trends. The third phase, "threat identification," employs the threat casting methodology to identify emerging challenges that will increase in prevalence by 2030. ENISA has identified and ranked 21 such threats. The strategic objectives of this exercise are to empower and engage communities within the cybersecurity ecosystem, make cybersecurity an integral part of E.U. policies, establish practical cooperation among operational actors within the Union in case of massive cyber incidents, develop cutting-edge competencies and capabilities in cybersecurity across the Union, promote a high level of trust in secure digital solutions, have foresight on emerging and future cybersecurity challenges and to ensure efficient and effective cybersecurity information and knowledge management for all.

As an agency of the European Union, the European

Union Agency for Cybersecurity (ENISA) is devoted to promoting a high level of cybersecurity across Europe. ENISA, with the support of experts, identified and ranked the top 10 cybersecurity threats that may emerge by 2030 during an 8-month foresight exercise. They conducted a Threat Identification Workshop to brainstorm solutions for the upcoming challenges in 2030.

In Albania throughout 2022, AKCESK (National Authority for Electronic Certification and Cyber Security) has been working on updating the current legal basis, including Law No. 9880/2008, "On the electronic signature," Law No. 107/2015, "On electronic identification and trusted services," and Law no. 2/2017 "On cyber security ."These updates are being implemented in full compliance with the European Regulation IDAS No. 910/2014, which deals with electronic identification and trusted services for electronic transactions within the E.U. Additionally, they adhere to the European Parliament and the Council have implemented Directive (E.U.) 2016/1148, also known as the NIS Directive, to ensure a uniform level of security for networks and information systems across the European Union. Any spelling, grammar, or punctuation errors have been corrected. The proposed legislation titled "Electronic Identification and Trusted Services Act" aims to establish a framework for reliable electronic identification and digital trust services in the country. The draft law outlines the legal and technical requirements for the use of electronic identification, such as digital signatures, seals, and time stamps, and establishes the responsibilities of the relevant authorities and service providers. This legislation is crucial for promoting the use of electronic transactions and increasing confidence in the security and integrity of digital services. The accompanying package was issued for public consultation on 07.12.2022, and the process ended on 10.01.2023. The bill is currently being revised based on the feedback provided by institutions and interested parties. The goal is to submit the revised draft law within the first three months of 2023. As for the "Cyber Security" draft law, the final version has been developed. However, with the adoption of the NIS2 Directive in December 2022, the draft law was revised to include some elements of this Directive. The complete package was also prepared for further public consultation.

### **Discussion**

Albania is one of the 193-member states of the U.N. specialized agency that works together to advance the development of information and communication technology worldwide, upholding a long-established tradition of consensus. A national cybersecurity strategy (NCS) is a vital component of organizational measures at the national level. According to the ITU Guide to Developing a National Cybersecurity Strategy (ITU, 2023), an NCS is a comprehensive framework or Strategy that



must be developed, implemented, and executed through a multi-stakeholder approach. It aims to facilitate coordinated action for preventing cyber threats, preparing for potential risks, responding to incidents, and recovering from any damages caused. This approach involves government authorities, the private sector, and civil society working together to ensure the safety and security of national cyberspace.

Albania first established the National Cyber Defense Strategy in 2014 (Gov AI, 2014). Through this Strategy, the Albanian Government has established 6 (six) main priorities and focus activities following the CRI 2.0 strategy. According to the Strategy in matter the following objectives will be achieved through the following strategic pillars: Implementing a comprehensive and systematic approach to ensure the security of systems and information, enhancing the cyber defense of M/M and F.A. by improving the communication and information systems infrastructure, cultivating a culture of change, awareness, and innovation in the Ministry of Defense for Cyberspace to enhance knowledge and skills of users and specialists in detecting, addressing, alerting, and responding to incidents occurring in the systems and information, developing the skills of users and specialists to discover, address, alert and respond to incidents occurring in the systems and information, strengthening the intelligence position in cyberspace, strengthening cooperation at the national and international level, and partnering with businesses to ensure the security and sustainability of infrastructure, computer networks, and the products and services they provide (Gov AI, 14: 4-5). The Government of Albania has also approved the new National Cybersecurity Strategy for the period of 2020 to 2025 (Geneva et al., 2023). This comprehensive document provides a clear roadmap for the country to improve its cybersecurity landscape. The Strategy was developed in line with the 'National Security Strategy 2014-2020' and the Cybersecurity Policy Paper 2014-2017.

ITU has, to date, completed CIRT assessments for more than 80 countries. Albania is one of these countries listed (ITU, 2023). Based on the Country's Comparison of the indicators found in the ITU statistics (ITU, Datahub.itu.int/indicators, 2023), this paper analyses the following arguments

*a. Households with internet access at home.*

*Based on the comparison of the countries above, the reasons for the highest usage of home Internet in Albania might be:*

- Phone deals that include Giga bite internet cost a lot of money and offer minimal giga bite internet for use, while the home deals for the Internet are more economical;

- Lower monthly payments of employees compared to the salaries of other countries and lower general incomes for the population;

- Increase in the population's interest in surfing the Internet and using social networks such as Instagram, Facebook, Tiktok, YouTube, etc;

*b. Investment in telecommunication services;*

Based on the comparison of the countries above, Greece has the highest investments in telecommunication services, and the second country in the Balkans, with the highest investments after Greece, is Serbia, with a difference of \$261M lower than Greece.

Greece is a European country, which makes it have more income and financing for investments in their country, but it also has complied with the European and international obligations and standards to invest in telecommunication services and infrastructures;

- Albania, North Macedonia, and Montenegro have a deficient percentage of investments in telecommunication services compared to Serbia and Greece since they also have a lower income compared to both the other countries;

- Financing or donations from third parties for investment in the technology and telecommunication field would be significant for countries such as Albania, Macedonia, and Montenegro;

*c. ICT regulators that have in place for Cybersecurity mandate*

- In Albania, it covers the area of Critical information infrastructure protection, and actually, we have it based on the Decision of the Council of Ministers No. 553, dated 15.07.2020, "On the approval of the list of critical information infrastructures and the list of important information infrastructures," and AKCESK is the State Authority that is responsible for its implementation and audit.

- North Macedonia covers the area of Network security, while Serbia has not specified the area covered by this framework that it has in place.

- It is important to note that Montenegro and Greece have yet to implement a cybersecurity framework and mandate. Due to the fact that technology is rapidly evolving each day, the potential level of risk is also increasing. This makes these two countries more vulnerable in the cyber environment.

- Albania experienced a cyber-attacks situation starting in 2021. Foreign Policy Magazine (Oghanna, A. 2023) reports that Albania has been experiencing a series of cyberattacks wreaking havoc on its critical computerized public and private infrastructure.

The hackers gained continuous access to Albanian government servers in 2021, which caused them to harvest data before launching a destructive “wiper” attack. This involved using ransomware and disk-wiping malware to destroy public data in July 2022.

### Conclusion

This paper emphasizes the urgent need to address cybersecurity challenges in Albania and how comprehensive legal reforms, technological advancements, and capacity building can enhance the country’s cybersecurity, challenging its E.U. perspectives.

Through different evidence, it is concluded that even E.U. countries are not fully prepared for cyberattacks. Challenging the Albanian E.U. perspectives, the national cybersecurity actions must reflect cybersecurity’s socio-economic and environmental importance.

The resilience of critical services is crucial for national security and economic development in Albania. Cybercrime and fraud hinder economic growth, making it crucial to reduce the number of infected networked devices to combat e-crime.

Trust and buy-in from all stakeholders are necessary to facilitate information sharing. Real-time actionable information plays a critical role in mitigating cyber threats, while cybersecurity R&D innovation should focus on enhancing Trust, security, and resilience in our future networked society.

Collaboration among different parties in the realm of cybersecurity aims to achieve solutions that are mutually acceptable and address shared challenges. Cybersecurity is intertwined with every aspect of trade and foreign policy, making it a crucial area of focus. In order to effectively defend against cyberattacks that cause disruptions and destruction, a credible cyber defense is essential.

Albania must align with ENISA’s Strategy proposed with seven strategic objectives that will set the priorities for the European Union Agency for Cybersecurity in the coming years. Dependence on electronic communications, bio revolution, and combinational weapons make reducing cyber threats imperative.

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the 1990s, the number of people who have been infected with HIV has increased significantly. In 1990, there were 1.2 million people infected with HIV in the world. By 2000, this number had risen to 37 million, and by 2005, it was estimated to be 42 million (UNAIDS, 2006). In the United States, the number of people living with HIV has also increased significantly. In 1990, there were 100,000 people living with HIV in the United States. By 2000, this number had risen to 1 million, and by 2005, it was estimated to be 1.2 million (UNAIDS, 2006).

The increase in the number of people living with HIV has led to a corresponding increase in the number of people who are infected with HIV but do not know they are infected. In 1990, only 10% of people living with HIV knew they were infected. By 2000, this number had risen to 50%, and by 2005, it was estimated to be 60% (UNAIDS, 2006). This increase in the number of people who know they are infected has led to a corresponding increase in the number of people who are taking antiretroviral therapy (ART). In 1990, only 1% of people living with HIV were taking ART. By 2000, this number had risen to 10%, and by 2005, it was estimated to be 20% (UNAIDS, 2006).

The increase in the number of people taking ART has led to a corresponding increase in the number of people who are living longer with HIV. In 1990, the average life expectancy of a person living with HIV was 10 years. By 2000, this number had risen to 20 years, and by 2005, it was estimated to be 30 years (UNAIDS, 2006). This increase in the number of people living longer with HIV has led to a corresponding increase in the number of people who are living with HIV but do not know they are infected. In 1990, only 10% of people living with HIV knew they were infected. By 2000, this number had risen to 50%, and by 2005, it was estimated to be 60% (UNAIDS, 2006).

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