A proposed mobile bill payment architecture and business solution based on the new fiscalization process in Albania

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Abstract: Albania has introduced a new tax reform named fiscalization in 2020. The focus of the process is to report the transactions electronically and in real-time to the tax authorities' information systems. The intention is to reduce informality and bureaucracy, two of the key issues in doing business within the country. Considering that the new fiscalization process has a clear aim and stable requirements, the waterfall method is adopted to conduct the research. Beginning with a detailed literature analysis on similar implemented systems, and subsequently proposing a business solution followed by designing a suitable architecture. The proposed business logic solution and system architecture have as focal points mobility and interoperability. The interoperability approach enables the financial institutions' information system to be connected to the proposed system, implying an increased potential number of merchants using it. The use of mobile technologies and the possibility to integrate different digital payment methods increase the number of people taking part in the formal financial system.

Key-Words: fiscalization, mobile, digital payments, interoperability.

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1 Introduction

Fiscalization is a set of measures used to reduce tax evasion in cash and cash transactions. The best way to achieve this is to report all the transactions (invoices) in real-time to the tax authorities. In Albania, from the year 2020, this way of reporting should be the standard way [1]. Fiscalization as a process focuses more on those who do not declare and do not pay their obligations in accordance with the law. The new financial reporting process should ensure better control and more efficient tax inspection, intending to reduce the Value Added Tax (VAT) gap. This is not possible only by using incentive approaches with taxpayers that are willing to be involved in the process. Therefore, a standard electronic model should be introduced for all the stakeholders to exchange the needed data for paying the invoices and declaring the taxes automatically. This standard way of sending and receiving information between different systems of different organizations is expected to be embraced and used by many states by 2025 [2].

Using the fiscalization process through information systems, with real-time and electronic data can help in reducing informality and bureaucracy. The informal economy in the country is among the biggest in the region. It is estimated to reach 50% of the Gross Domestic Product (GDP) [3]. It is a fact that exists a widespread informality, with a significant adverse impact on tax revenues, and not only, but it also affects negatively economic growth and competitiveness. Administrative efficiency is another factor that helps in business facilitation. Figure 1 shows a correlation between hours spent in bureaucracy and tax payment. The good practices from OECD countries show that electronic simplified tax systems reduce administrative and compliance costs.

An electronic invoice system can be implemented in different technology approaches and can be an integral part of the state strategies and policies for reducing cash payments and avoiding the informal economy. Enhancing this system through mobile bill payment methods brings added benefits such as mobility and interoperability facilities. Furthermore, it is seen that cash usage diminishes the productivity of small and medium enterprises when it is used to carry out most of the business transactions [6]. Using digital payments instead also decreases operational costs, raises profits, and promotes productivity [7]. This method leads to cheaper and more secure business transactions [8]. Applying mobile technologies to execute these transactions, makes it easier to access the marketplace and the money, without being obliged to reach bank branches or suppliers' sites physically. Accessing the money remotely helps also to reduce the risk of cash theft [9]. The big picture behind mobility is to store all the customer financial information in the smartphone and then through one of the latest access control techniques such as passwords, fin-

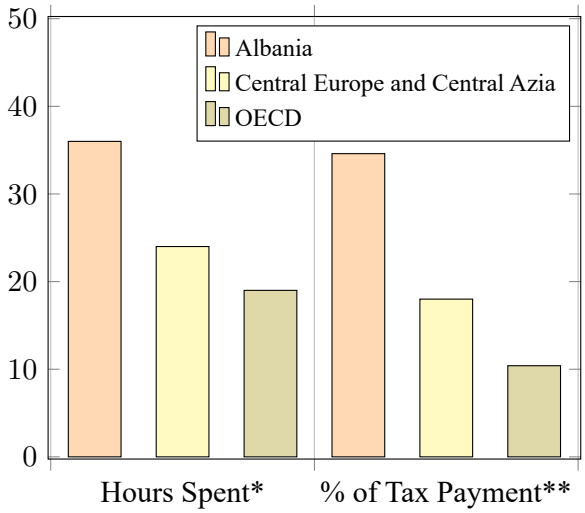

Figure 1: Administrative Efficiency in Paying Taxes [4][5].
*Each unit corresponds to 10 hours spent for paying taxes per year.
*Each unit corresponds to % of tax payment .

gerprints, or facial recognition, the payment can be authorized, and the purchase is completed. Another advantage that comes from this technological solution and goes in the direction of cutting the informal economy is the improved transparency and reduced document-related fraud, because every transaction in a digital financial payment system, can be recorded and traced.
As mentioned in the G20 digitization and informality policy guide [10], individuals and firms can receive help from the digitization process to address barriers such as eligibility and affordability to formal inclusion, through easier identity verification, digital payments promotion, and information environment improvement. Digitization is defined as the application of digital technologies. It helps in the direction of avoiding informality by using mobile money and digital payments, which results in including more people in the formal financial system [11]. Anyhow, avoiding informality is not easy at all. A lot of efforts and policy actions should still be taken in the direction of taxes, institutional development, and employment regulations.
An adequate fiscalization system like the one proposed by the government leads to [12]:

- Reducing taxes. By ensuring that more individuals who are currently operating illegally, without declaring and paying their dues, will now be obliged to make the payments. The formalization of the economy expands the circle of taxpayers, forecasting real chances for tax cuts.

- Identifying irregularities. The technical specifications of the new system will give to the citizens the opportunity to verify whether the invoice, for the goods or services he has paid, has been reported to the tax system. With a few simple steps, starting by scanning the unique invoice parameters, they will be able to verify if it has been reported to the tax system. This will give to the taxpayer the opportunity to exercise his rights as a citizen, and report when someone issues an irregular bill.

- Approaching EU membership legislation. By using an electronic invoice in line with EU norms, will bring the country's legislation closer to the EU legislation.

- Avoiding non-payers. The new electronic invoice system is easier to track payments and find companies that generate insolvency, by not paying bills in the mandatory period.

Other countries in the region are undertaking efforts toward the online fiscalization approach. In Greece from the beginning of 2021 is introduced "my Digital Accounting and Tax Application", an electronic platform where the transactions and the income/expenses of the companies are transmitted and recorded [13]. Serbia has implemented the Fiscalization Act in January of 2022, which introduces the use of electronic fiscal devices [14]. As new features, the taxpayers will have to use a security mechanism to sign fiscal receipts and verify their identity when exchanging information with the Tax Administration. The fiscal receipts will contain a QR code, which the customer can scan and check whether their fiscal receipt has been issued in accordance with the Act. North Macedonia has stated in its tax system reform strategy that one of its priorities will be green taxation, which includes the e-invoice system [15].

2 The Proposed business solution and system architecture

Considering the issues related to tax payment mentioned in the introduction section, they could be drastically improved by the proposed solution that enables the payment of the fiscal invoices through mobile applications and by processing the financial transactions in real-time. The proposed business solution, with its respective system architecture design, is concepted by keeping in mind mobility and interoperability. To better understand the proposed architecture, it will be explained how the fiscalization process works through an activity diagram.
Figure 2 shows the invoice fiscalization process and

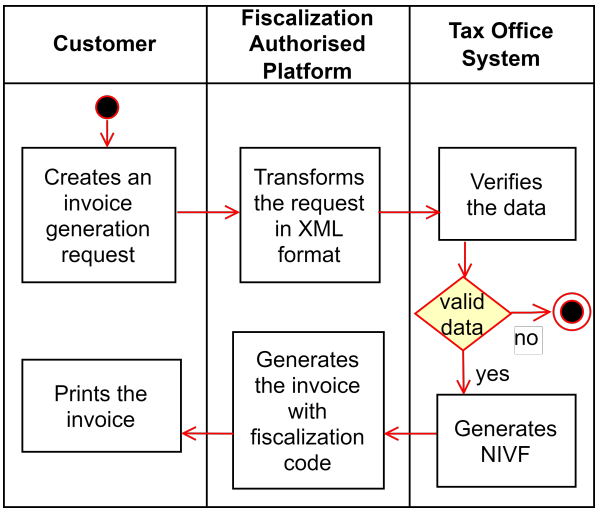

Figure 2: Invoice Fiscalization Process

the communication flow of data that is required between the tax authority system and the authorized solution providers. The steps that should be followed for completing the fiscalization process related to a given invoice are [16]:

- The taxpayer through a third-party application that is previously certified by the government accreditation bodies, sends the data to the tax authority system in an XML format.
- The tax authority system sends back the confirmation of the invoice receipt to the taxpayer, by including in the response the Unique Invoice Identification Number (NIVF).
- The taxpayer issues a printed invoice to the client with the included NIVF.
- A Quick Response (QR) code is generated with all the information required to process the fiscalized invoice.

The registration and the correct completion of the invoice transaction can be verified by scanning the QR code on the invoice from both, the customer, and the merchant. The fiscalization process defines a standard template for QR codes and a protocol for how to complete it. The latter is the most crucial component of the architecture where the business solution is based.

The business logic of the proposed solution is shown in figure 3 and it is composed by the following steps:

1. Scan the barcode of the invoice from the client application (i.e., an e-banking application).
2. Extract from the QR code of the received invoice the VAT number of the merchant that has issued the invoice and the total amount.

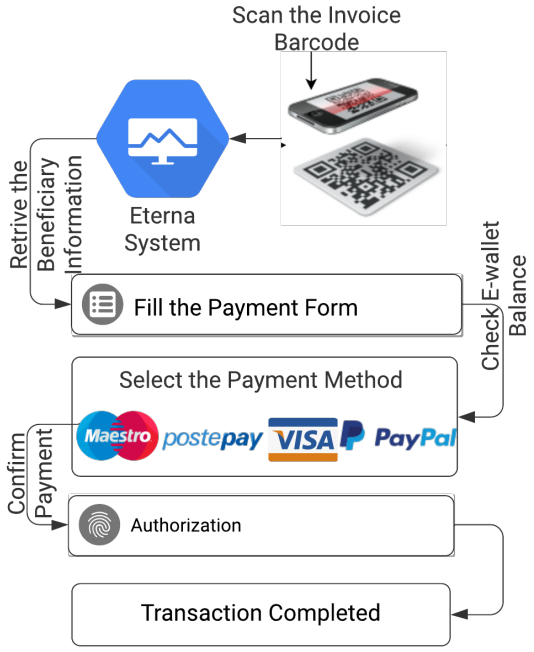

Figure 3: Business logic

3. Collect the merchant information required to fill the beneficiary details of the transfer form in step 4, by searching with the VAT number in the main information system (IS) of the financial institution.
4. Fill the transfer form with the information gathered from step 3, and the amount of the invoice that we got from the previews scanning of the invoice barcode in step 2.
5. Check the account of the client for sufficient balance in order to validate the transfer.
6. Ask for confirmation from the merchant before that the transfer is finally authorized.

To better understand the steps of the business logic, a practical example is described as follows: The client Beta buys 5 articles in the supermarket Alpha. After Beta receives the fiscalized invoice, he opens the mobile app and scans the barcode. The App will get the VAT ID of the supermarket Alpha and the total amount of the articles that Beta has bought. The app gets from the system the E-wallet account of Alpha, the address, and the commercial name. This data together with the VAT ID are the required information needed for the online payment. A fund transfer form is opened and filled automatically with the Alpha's and Beta's data. Then the application checks if the Beta's account balance has sufficient money to pay the invoice amount.

After the control is passed, Beta presses the ”pay” button to finalize the transfer.

The proposed architecture is shown in Figure 4. The

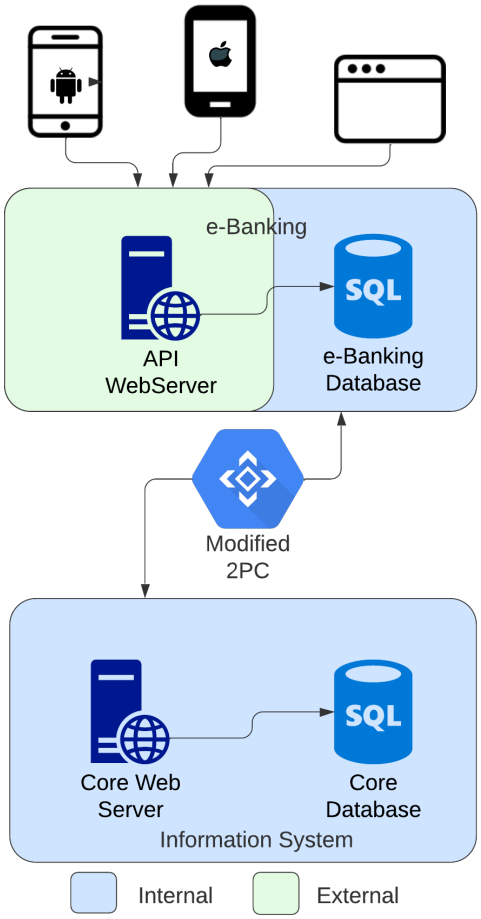

Figure 4: The proposed architecture

IS on the left (i.e., a core banking system) is divided from the e-banking application on the right. One of the main benefits of this solution is interoperability, which in our case is the ability to integrate the e-banking application with different ISs such as core banking systems, ERP systems, fintech systems, etc.

The challenge to overcome regarding the proposed solution is to ensure that the financial transactions must be executed successfully in both systems, the core banking system, and the e-banking application. This implies that when a transaction is performed in the e-banking application, it should be reflected even in the core banking system.

The mechanism proposed to solve the above challenge is the two-phase commit protocol (2PC) [17]. 2PC is a standardized protocol that ensures the atomicity, consistency, isolation, and durability (ACID) properties of a transaction. It is an atomic commitment protocol for distributed systems.

In the proposed architecture, the 2PC protocol requires a role known as a controller. The controller is in charge of the management and data synchronization between the two servers, the one where the core information system is hosted and the one where the e-Banking application is hosted. The controller is assigned to the server that starts the transaction. The 2PC protocol is implemented in two stages. In the first stage, both servers try to write the payment invoice transaction data. If one of the servers is not able to perform this action, it replies to the controller with an ”Error” message. If no error has occurred during the transaction, the server sends to the controller a ”Success” message. In case the server which has the controller role does not receive any message from other participants, it re-sends the request. The second stage begins after the controller receives a ”Success” message from the other server. Right after, the controller sends a command to the servers to permanently commit the transaction that was successfully written in the first stage. As soon as the transaction is committed in both servers, the controller is informed that the commit action is finalized successfully. If one of the servers does not commit, the controller sends a command to both servers to roll back the payment invoice transaction.

Figure 4 shows various ways how to access the e-banking application. This access can be through a mobile app, a web application, a smartwatch app, etc. The proposed protocol for accessing the platform in a secure way is the Secure HyperText Transfer Protocol (HTTPS). This protocol ensures a required standard for secure communication elements such as secure data in transit, phishing protection, and man-in-the-middle attacks. The HTTPS is designed to transfer encrypted information from the web server application to the client application. It uses the HTTP protocol combined with a Secure Socket Layer (SSL), which is an encryption protocol invoked on a web server application that uses HTTPS [18].

From the features defined in the HTTPS protocol, the ones included in the proposed architecture are data in transit encryption and website identity authentication as shown in Figure 5. Encryption of the data in transit ensures that all the data sent and received from the server are encrypted. Meanwhile, website authentication is the security process that allows both merchants and customers to authenticate their identity to the verified server, so they can gain access to their personal accounts.

In Albania, at this moment exists only a mobile bill payment system provided by a second-level bank [19], which offers to the customers the possibility to pay invoices for goods and services only for a limited number of merchants within the country. The customers can scan a QR image created at the merchant’s

cash desk to make the purchases in real-time.
The main difference between this solution and the one proposed in this paper is related to the limited number of branches available for the customers to credit their accounts and the small number of merchants that have embraced their solution. The interoperability approach, proposed in our architecture enables all the financial institutions present in the country to be connected to the system, implying an increased potential number of merchants and customers that will use the system.

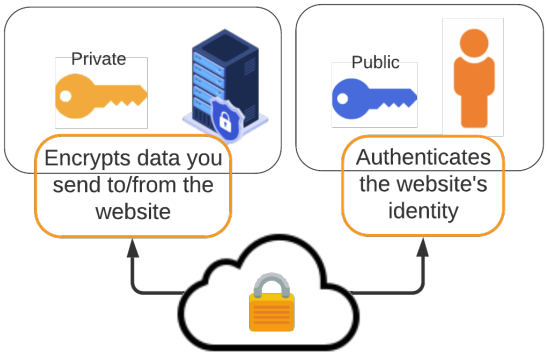

Figure 5: HTTPS components used in the proposed architecture

3 Conclusions and future work

Technical specifications needed from the tax authorities for the fiscalized invoice system are fulfilled by the proposed business logic and architecture shown in this paper. Its implementation will bring many benefits and expected results. Those can be summarized in the following concepts.
Taxes - An improved way of taxes collection across the country, where the principal part is still the VAT. Using an electronic process from the taxation perspective will close faster tax declarations, reclaims, and the traditional onsite audits will not be needed in the future. The increased incomes carried out in other nations are exceptional. Brazil has seen a $58 billion (USD) increment in charge income since the improvement in invoicing and reporting; Chile and Mexico diminished the VAT up to 50%; Colombia found that it seems to be diminished 50% of the country's tax evasion by applying this models[2]. For this reason, in Albania, the VAT collection is forecasted to increase by 10-15%, compared to VAT incomes with the application of the presented system framework.
Informality - It will be decreased by following two primary perspectives: the identification of cash transactions and the decrease of covered up no-cash transactions, inferring an improved control of the fiscal framework. The use of the new fiscalization framework will improve tax control and online validation through risk-based strategies, which enables proof of abusers. In this way, the daily businesses' activities are not disturbed by the tax administration agents.
Economy digitalization - The modern fiscalization system gathers more data from citizens and this leads to more efficient and complete tax reporting. It helps the authorities to improve their service to the taxpayers by using pre-filled documents, which means fewer errors and a faster tax reporting process. The digitization of these processes helps the communication and information exchange with the government and between businesses. This will reduce administrative operations.
Mobility - Smartphones and computing technology has grown at an exponential rate and has affected the financial industry. Nowadays, more people are oriented to not use cash and credit cards because of a wide variety of mobile payments to securely complete their transactions. The proposed architecture goes in this direction.
Interoperability - The proposed system implements the latest policies and rules in compliance with international standards for secure transactions. It is a robust, flexible, and scalable system incorporating innovative techniques in payment systems such as QR codes. It enables fair access to financial transaction channels through the Albania Post cores system for ATMs, online/offline merchants, etc.
Security - By implementing HTTPS in our solution, the primary advantage that we apply in the system architecture is the increased trust of the customers in using the e-banking platforms to boost the revenues of the companies that will implement such systems. Furthermore, to minimize fraud losses and supply user-controlled transactions, the customer is asked to confirm the transfer.
The proposed system is planned to be implemented as part of future work. After that, a protocol will be defined in order to collect data from the day-to-day usage of the system. The gathered data will then be analyzed through statistical models and the findings will be used to further improve the proposed model.

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