INTEGRATION OF MODERN INFORMATION TECHNOLOGIES INTO THE FINANCIAL-ACCOUNTING SYSTEM OF THE ECONOMIC ENTITY: OPPORTUNITIES AND RISKS

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Abstract
The integration of new information technologies into the financial-accounting management system of an entity is essential for improving the efficiency, accuracy, and transparency of accounting processes. The rapid and effective adoption of these technologies can transform the accounting profession, positioning professionals as trusted advisors to top management and contributing to the success of entities in the digital era. Integrating information technologies into financial-accounting information management systems is a defining factor in the evolution of the accounting profession in the digital age. The adoption of these technologies not only enhances the efficiency and accuracy of accounting processes but also significantly contributes to improving organizational performance and decision-making capabilities within entities. An applied model is proposed, focusing research on current issues related to the e-Invoice system (eFactura) and the pre-filled VAT return provided by ANAF, using new solutions for resolution through the integration of blockchain technology.

Keywords: : financial-accounting system, artificial intelligence, cloud, blockchain, decision-making process, e-Invoice, e-Settlement

JEL Classification: M41

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1. Introduction

The accounting profession is undergoing rapid transformation, largely due to productivity gains facilitated by new technologies. In the near future, accountants will be freed from repetitive, process-oriented tasks. Information technology enables the automation of many accounting processes, thereby reducing human errors and saving time. Accounting software automates tasks such as transaction recording, account reconciliation, and financial report generation, allowing accountants to focus on activities considered strategic. Over the past decades, technology has radically transformed the way accounting activities are conducted.

Artificial intelligence (AI) and robotic process automation enable the automation of complex and repetitive tasks and processes with remarkable accuracy, thus reducing operational costs and increasing efficiency. In the digital era, AI and big data have revolutionized many fields, including accounting. The integration of AI with big data allows accounting firms to analyze vast amounts of unstructured data that were previously impossible to manage. According to Marr (2020) [1], "big data has fundamentally changed how companies manage and analyze financial data, enabling a deeper understanding of economic performance and risks." Artificial intelligence, especially machine learning algorithms and natural language processing, plays an important role in managing and analyzing big data. According to Gepp et al. (2020) [2], "AI-based automation and natural language processing are transforming accounting by reducing human errors and providing more accurate and detailed analyses."

Cloud technology has become a necessary component in the development and operation of financial-accounting information systems (FAIS). This technology offers numerous advantages, including improved accessibility, cost reduction, scalability, and enhanced security. Cloud-based systems allow users to access financial and accounting data from anywhere at any time, as long as there is an internet connection. This facilitates remote work and collaboration among geographically dispersed teams. According to Smith (2020) [3], "cloud technology enables accountants and managers to access necessary information in real time, thereby improving decision-making and operational efficiency." The implementation of cloud solutions can lead to a significant reduction in infrastructure costs. Companies no longer need to invest in expensive servers and storage equipment because cloud service providers offer scalable solutions based on a pay-as-you-go model. The use of cloud technology in financial-accounting information systems brings numerous benefits. However, entities must be aware of associated challenges, such as connectivity issues, recurring costs, and data security concerns.

Although blockchain technology might seem like just another trendy business term that could fade over time, accountants cannot afford to ignore it. Blockchain has already been integrated into the field of accounting and is expected to continue playing an important role. It is mainly used for the secure recording and distribution of transactional data, thus offering significant potential for professional development as a reliable tool for tracking financial-accounting information.

2. Literature review

Advances in digitization and the development of information systems, combined with increased competition in the business environment, have significantly influenced organizational activities by eliminating manual labor and excessive paper use for presenting

relevant information. Financial-Accounting Information Systems (FAIS) contribute to monitoring and planning daily activities, allowing managers to obtain a clear and accurate picture of the entity's status. These systems enable users to efficiently plan resources, reducing waste and inefficient usage. In their architecture, information systems have become indispensable for the daily operations of entities, playing a role in improving the flow of information and the decision-making process.

The growing volume of data and documents that need to be processed in shorter timeframes, along with organizational growth, have led to the intensive use of information systems. Another reason for implementation was to provide the "possibility to meet organizational objectives in real-time" *(Bordeleau et al., 2020)* [4], due to the speed and accuracy with which data is processed. The modular structure of the financial-accounting information system and the integration of processed data into a database allow for more efficient dissemination of information between departments, offering "a correct and complete picture of the entity's situation" *(Kanellou & Spathis, 2013) [*5].

The necessity of using information systems arises from the increased volume of data and documents that must be processed within a shorter timeframe, based on organizational development. Each component of this system integrates vital functionalities for carrying out the specific activities of each department within the entity, thus ensuring transparency and traceability of the generated information. The Financial-Accounting Information System integrates the entity's processes and functions into a single information system, providing a holistic and integrated view through the use of a unique database. By implementing the financial-accounting information system, entities can benefit from more accurate reports, reduced data processing time, and improved information quality for decision-making.

The influence of information technology on accounting is evident, as this sector is profoundly affected by technological advancements. This brings both challenges and advantages for professionals. Modern technologies enable data processing within shorter timeframes, at lower costs, and with minimal errors—critical objectives for large companies and those providing accounting and auditing services where the data volume is significant *(Gonçalves et al., 2022)* [6].

The field of accounting is experiencing significant transformations, reflected in innovations in work procedures and how professionals adopt and integrate new technologies. This topic is important because of the considerable influence of technological progress on financial-accounting processes, significantly altering the roles and competencies of professionals in this domain. In the digital age, accounting professionals must be prepared to meet business environment requirements. Beyond the advantages offered by new technologies, they must develop new competencies, understand transformations in their field, and adapt to emerging technologies. Accounting and auditing experts need to develop skills in security to mitigate vulnerabilities brought by new technologies and effectively manage security incidents related to financial-accounting information. Although the security of such information is not a new concept, the context of disruptive technologies has turned it into a contemporary and critical issue.

Today, businesses focus on using and processing large volumes of data, and the role of accountants is increasingly shifting toward data interpretation, overseeing new software programs, and advising clients. In digital accounting, professionals use advanced IT systems based on new technologies throughout the entire accounting process *(Andreassen,*

2020) [7]. Access to new technologies and data processing solutions enables advanced analyses, complete and rapid data validation, and the ability to share information quickly with clients in a secure IT environment *(Jackson et al., 2022)* [8].

The study of emerging technologies in accounting has been addressed by multiple researchers and academic institutions. *Alles and Gray (2016)* [9] investigated the impact of emerging technologies, such as blockchain and big data, on auditing and accounting. Their work focused on how these technologies can improve the efficiency and accuracy of accounting processes. Kai Larsen, Michael G. Morris, and Majed Moqbel studied the use of mobile and cloud technologies in accounting, exploring how these technologies influence accounting practice and auditing (*Larsen et al., 2017*) [10].

The Assurance Services Executive Committee (ASEC) of the American Institute of Certified Public Accountants (AICPA) has developed several papers and guidelines regarding the use of emerging technologies in accounting and auditing, including the use of artificial intelligence and robotics *(Westland, 2024*) [11]. Accenture and PwC have published detailed reports on how emerging technologies such as artificial intelligence, robotic process automation (RPA), and advanced data analytics are transforming the accounting and auditing industry.

Dietrich and Grüninger (2019) [12] studied the impact of blockchain and other emerging technologies on accounting, exploring both opportunities and challenges these technologies bring. Professors from various universities worldwide have research departments focusing on emerging technologies in accounting and auditing.

3.Research methodology

The study focuses on exploratory and descriptive research aimed at examining and presenting the effects of integrating information technologies into the organization of the financial-accounting information management system. The combination of exploratory and descriptive research allowed for a thorough and comprehensive approach, providing a more detailed understanding of the subject under study. The complementarity of the two research types enabled an in-depth comprehension of the impact of transformations in the organization of the financial-accounting information management system through the integration of information technologies, particularly blockchain technology.

Mixed methods of data collection were used, including documentary research (analysis of specialized literature and relevant resources) and applied research. The analysis of specialized literature and relevant resources involved reviewing and synthesizing studies, reports, articles, and documents pertinent to the research topic. Documentary research provided a robust theoretical framework for the paper, ensuring that the arguments were grounded in existing knowledge.

In addition to documentary research, the paper integrates applied research to obtain concrete data and insights from the practical experience of accounting professionals and domain experts. In this regard, the proposed applied model centers the research on current issues related to the e-Invoice system and the pre-filled VAT return by the National Agency for Fiscal Administration (ANAF), utilizing new solutions for their resolution through the integration of blockchain technology.

By combining qualitative and quantitative research, this mixed-method approach facilitated the achievement of the research objectives and the validation of the established hypotheses.

4. Proposals for Innovative Solutions Regarding the Integration of Modern Information Technology Components within a Financial-Accounting Information System

4.1. Procedure for Accessing Emerging Solutions for Financial-Accounting Information Management

Identifying a reliable solution for managing financial-accounting information that integrates emerging information technologies involves a meticulous process of research and evaluation. To select the most suitable financial-accounting information management solution for an entity, several stages must be followed:

✓ Stage 1 – Internal Requirements Analysis and Objective Setting, which involves:
- *Identifying current issues:* Evaluating existing financial and accounting processes to pinpoint areas needing improvement;
- *Consulting departments*: Engaging with all relevant departments to understand their specific needs;
- *Defining functional requirements:* Preparing a detailed list of requirements such as types of necessary reports, transaction volumes, compatibility with other systems;
- *Setting short-term objectives:* Improving data accuracy, reducing processing time, optimal SAF-T solution, e-Invoice compatibility;
- *Setting long-term objectives*: Scalability, compliance with international regulations, integration with other management systems.

✓ Stage 2 – Researching Available Solutions, through:
- *Technical options evaluation:*
  - ERP (Enterprise Resource Planning) solutions: comprehensive solutions integrating all business functions, including accounting;
  - Cloud accounting solutions: flexible and accessible from anywhere, such as QuickBooks Online, Xero, NetSuite;
  - Automation applications: automating repetitive processes such as bank reconciliations and invoicing;
  - Business Intelligence platforms: analyzing and visualizing financial data to support informed decision-making.
- Consulting reviews and case studies: examining how similar entities have implemented and benefited from these solutions.

✓ Stage 3 – Selecting the Appropriate Solution – involves a complex series of operational analyses:
- *Functionality assessment:*
  - Creating a comparison matrix to evaluate each solution's functionalities against the entity's requirements;
  - Requesting software vendors for demonstrations and trial versions to test the solutions.
- *Cost analysis:*
  - Initial costs: licenses, implementation, training;
  - Recurring costs: subscriptions, maintenance, technical support.
- *Security measures evaluation:*

- Data encryption: ensuring the solution provides encryption both in transit and at rest;
- Backup and recovery: verifying backup procedures and recovery protocols in case of incidents.

• *Regulatory compliance:*
- Checking compliance with national and international accounting standards;
- Audit and reporting capabilities: the ability to generate audit reports and track user activities.

• *Market analysis:*
- Monitoring current trends and innovations in the field; identifying key providers and their market shares; analyzing growth forecasts for financial-accounting management solutions.

• *Competitiveness evaluation:*
- Benchmarking: comparing the performance of selected solutions with direct competitors;
- SWOT analysis: identifying strengths, weaknesses, opportunities, and threats of each solution.

✓ Stage 4 – Solution Implementation

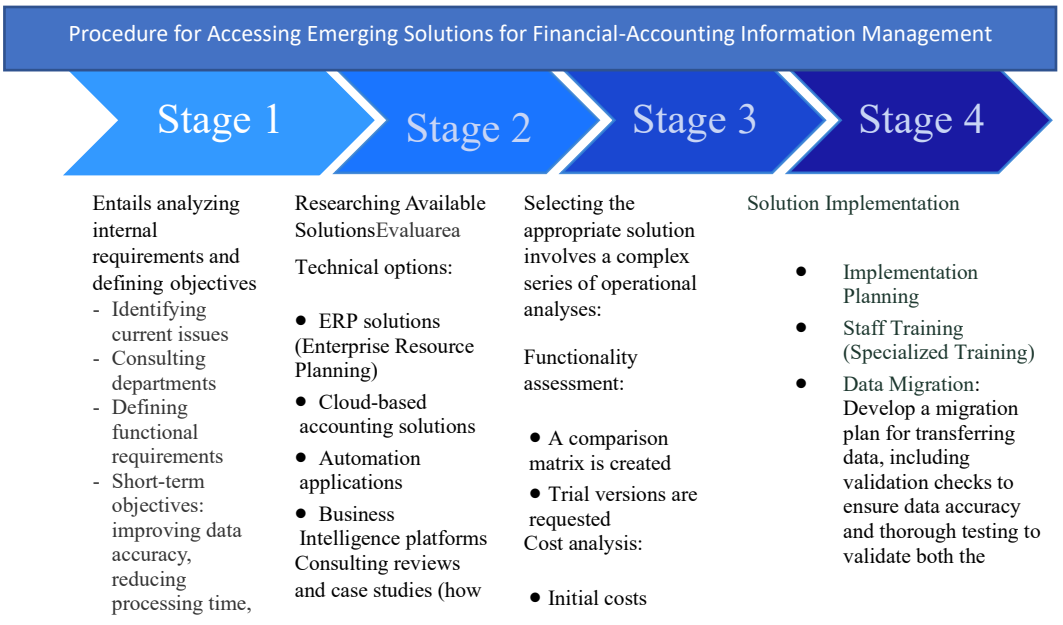
• *Implementation planning*: Developing a detailed project plan with timelines and allocated resources, clearly defining implementation phases from testing to launch.

• *Staff training:* Including specialized training sessions for directly involved personnel, ongoing support, and resources for troubleshooting.

• *Data migration:* Creating a data migration plan ensuring data accuracy, with thorough testing to validate migrated data and system functionalities.

The conceptual scheme of the procedure for accessing emerging financial-accounting information management solutions within an entity is presented in Figure 1.

Figure 1. Conceptual Diagram – Procedure for Accessing Emerging Financial-Accounting Information Management



optimal SAF-T solution, e-Invoice compatibility - Long-term objectives: scalability, compliance with international regulations, integration with other management systems	similar entities have implemented and benefited from these solutions)	● Recurring costs Security measures assessment: ● Data encryption ●Backup and recovery Regulatory compliance: It is verified whether the solution complies with IAS and/or IFRS standards. Market analysis: Current trends and innovations in the field are monitored. Competitiveness evaluation: ● Benchmarking ● SWOT analysis	migrated data and the system functionality.

Source: author's own processing.

4.2. Model for Integrating Blockchain Technology into the Financial-Accounting Information Flow

In the context of financial and accounting activities, blockchain offers numerous advantages. By using a distributed ledger, blockchain enables the secure storage and sharing of financial information among multiple stakeholders, eliminating the need for intermediaries and reducing the risk of fraud. Furthermore, automating processes through smart contracts can streamline accounting operations, reducing both costs and human error.

4.2.1. Proposed Scenario for the Applied Study

The confirmation of invoicing data and payments/collections (CDFPI) is a common way to provide additional security in relation to state authorities and ensures the ability to confirm the truthfulness and authenticity of the transactions performed. This helps reduce the risk of VAT associated with certain invoices becoming non-deductible, among other things. The main function of an accounting system for confirming invoices and payments/collections (SCCFPI) is to prevent situations where an invoice fails to meet deductibility conditions, potentially generating unjustified costs for the entity.To avoid non-deductibility, many accounting ecosystems rely on one or more centralized entities to verify compliance with deductibility conditions. However, this can grant significant power and influence to these entities, making it difficult for users to challenge irregularities, especially when information is incorrectly recorded or intentionally manipulated.

This applied study focuses on current issues in the eFactura system and ANAF's pre-filled VAT return (eDecont), and within this context, proposes new solutions using blockchain technology.A public blockchain can maintain a permanent, secure, ordered, and transparent record of transactions, available at any time to all interested parties for viewing and verification.

In the basic protocol, we proposed an architecture for invoice recording based on a general-purpose blockchain. The blockchain platform builds trust between parties through the correct execution of transactions. We used a smart contract to complete the invoice and payment/collection confirmation process, and to prevent situations that could lead to VAT non-deductibility.

The smart contract includes mechanisms for auditing and dispute resolution to ensure confidentiality while keeping relevant information always accessible. In the second protocol, we added a relayer to the proposed architecture for easier integration. We also improved identity management and authentication by using the concept of Verifiable Credentials (VC) to better comply with Know-Your-Customer (KYC) regulations. In this architecture, participants use Decentralized Identifiers (DIDs) and the DIDComm protocol for secure, asynchronous off-chain interactions.

In business-to-business financial relationships, it is common practice to pay for goods or services with a delay, for example, several months later. In this case, the service provider (seller), if using the VAT cash accounting scheme, can defer VAT liability until the invoice is collected. This system provides cash flow flexibility, particularly for small entities.

To implement the system for confirming invoicing data and associated payments/collections, a server will be used that integrates blockchain technology and carries out several procedures to achieve the proposed objectives, namely:

- Payment Confirmation Procedure (PCP)
- Deferred Payment Procedure (DPP)
- ANAF Notification Procedure (ANP)

Each of these procedures has a specific role and will support the proper execution of invoice and payment confirmation.

The Payment Confirmation Procedure is used to notify partners about the collection of payment related to an issued invoice. Upon completion of this procedure, the ANAF Notification Procedure will also be triggered. If one or both entities involved in the transaction apply the VAT cash accounting scheme, ANAF, through the eDecont system, will have the necessary information to accurately pre-fill the VAT return, making VAT liability effective.

The Deferred Payment Procedure establishes a confirmation between the transaction partners, enabling them to mutually confirm payment execution and determine the VAT liability date (for entities using the VAT cash scheme). Upon completing the DPP, the PCP will be resumed to notify ANAF of VAT liability.

The ANAF Notification Procedure is intended to confirm to the authority responsible for the pre-filled VAT return (eDecont) the VAT liability of the finalized and paid transaction. All these procedures will be executed via smart contracts.

The data recorded by the smart contract will ensure high availability of relevant information that the buyer needs to know, such as payment due dates. Because the system handles sensitive data, encryption is applied before storing this data on-chain.

Additionally, a cryptographic commitment of the CDFPI confirmation agreement between the two partners is stored as proof. This summary of the CDFPI agreement stored on-chain can be used to manage future disputes between the seller, buyer, and ANAF. The summary must be signed by both the seller and the buyer.

As mentioned, a CDFPI relationship involves three parties:

- A buyer, which can be an individual or a business entity receiving goods or services on cash or credit;
- A seller, a business entity providing goods or services either for cash or on credit;
- A CDFPI server, which can be a professional accounting association or a state institution (e.g., Ministry of Finance).

Typical interactions between these parties are as follows:

1. Invoice registration in the eFactura system;
2. Receipt from ANAF's server of the invoice validation code confirming its upload to the eFactura system;
3. The seller sells a product or service to the buyer and issues an invoice containing the unique registration code in the eFactura system. The invoice is transmitted to the buyer through the eFactura system as well as physically. The buyer verifies the invoice's registration in eFactura;
4. If payment is made instantly, the PCP (Payment Confirmation Procedure) is triggered, confirming the payment to both parties and activating the ANP (ANAF Notification Procedure).
If payment is made later, the DPP (Deferred Payment Procedure) is triggered, and upon actual payment, the PCP is resumed;
5. Once the payment is made, the ANP (ANAF Notification Procedure) is triggered to confirm VAT liability for the completed and paid transaction to the authority responsible for pre-filling the VAT return;
6. ANAF generates the pre-filled VAT return.

There are multiple issues and challenges in the CDFPI process. For instance, it often requires multiple manual steps. Moreover, data is spread across different systems and databases. There are also trust-related problems in the confirmation of invoicing and payment data.

The seller and buyer must trust that both will promptly update the information needed to confirm payments in a timely manner for ANAF to generate the eDecont. When the buyer confirms the payment, the seller must verify that the transaction was actually executed, as a buyer could confirm payment without actually making it. This is a key issue that a CDFPI system must address to prevent VAT fraud.

Typically, we can assume that both the seller and buyer can only be considered trusted parties when both confirm the transaction payment, as both have an economic stake in the CDFPI process—one deducts VAT, while the other is liable to pay it. In this context, a public blockchain appears to be a natural solution for addressing these issues, as it can track CDFPI processes and also prevent potential fraud. A distributed ledger makes the database highly available, logically unique, and secure against tampering.

Thus, the operations for confirming invoicing data and payments/collections (CDFPI) can be completed faster, with fewer errors, and still retain the authenticity and credibility of traditional manual contracts. Concretely, a CDFPI system based on ledgers should:

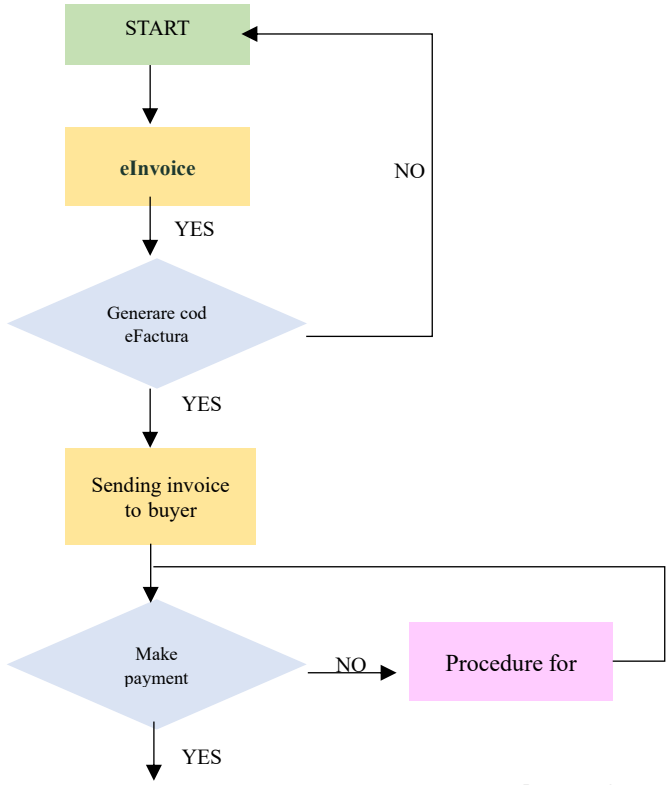
- Operate without errors;
- Provide confidentiality and protection of personally identifiable and business information;
- Offer non-repudiation for dispute management;
- Be decentralized and secure against corruption;
- Comply with KYC regulations;
- Be cost-effective;
- Support easy user integration.

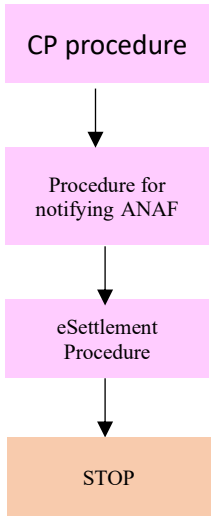
4.2.2. Proposed Architecture

In the proposed architecture, we have the three classic entities of the eDecont scenario - namely: the buyer, seller, and ANAF, a new entity (Payment Confirmation Server), and smart contracts implemented on a public blockchain.

A detailed explanation of the proposal and the associated logic diagram is presented in Figure 2.

Figure 2. Logical Diagram of the CDFPI System





Source: author's own processing.

At a high level, the proposed protocol must operate by following these steps:
✓ the seller sends the invoice to the client through the eFactura platform;
✓ the seller sends a request to the buyer to confirm the receipt of the claim or to confirm that it will be collected later;
✓ the buyer publishes a cryptographic summary of the payment on a web service;
✓ the seller waits for the payment confirmation from the buyer;
✓ at the time of payment, both the buyer and the seller certify the payment execution via a smart contract;
✓ the server sends confirmation to ANAF for pre-filling the data related to this transaction.
In the designed architecture, after verifying the declaration of the invoice to ANAF through the eFactura system, we assume the buyer is trusted for the payment confirmation process. Also, we assume a public blockchain for the proposed architecture, but it should be noted that blockchain cryptocurrencies will not be used for payments. The proposed architecture is a recording system, and actual payments are made off-chain using fiat transfers between bank accounts. All interactions to complete the CDFPI will be managed through a smart contract. All parties can trust the correct execution of the transactions managed by the smart contract because the blockchain platform guarantees this execution.
If the invoice was taken into account, the buyer must pay the invoice into the registered entity's bank account via the smart contract. Therefore, all involved parties must review the smart contract code and ensure its correctness. The smart contract address is also part of the negotiation between the seller and buyer. This is because every transaction that changes the state of a public blockchain has a cost. One of the main objectives of the architecture design is to minimize the number of transactions needed to confirm billing data and payments/receipts. A large part of communications between the different parties occur off-chain.

As a general rule, in the presented design, the CDFPI is kept as simple and resource-efficient as possible for ANAF. In particular, within the proposed architecture, ANAF will not require specific digital certificates for confirming billing data and payments/receipts and will not perform digital signatures related to this process. Instead, the payment confirmation server will provide a simple web service for accessing minimal information about invoices and their related payments. This allows ANAF to verify the information provided by the seller/buyer in the submitted returns.

Another aspect to consider is that when using a public ledger, transparency is gained, but at the same time, all interested parties have access to the stored data. In the process of confirming billing data and payments/receipts, there is sensitive commercial information that must be appropriately protected. To protect privacy, sensitive data is not stored directly on the blockchain. Instead, some data is symmetrically encrypted before being stored on-chain, some data is stored off-chain, and cryptographic commitments are used to provide proof of existence.

Once an invoice and payment confirmation are registered, it is guaranteed that:

✓ it has been declared to ANAF and is deductible;

✓ it is accepted by both buyer and seller;

✓ relevant parties have access to the relevant data and proof of its existence;

✓ there is no way to contest the CDFPI once the smart contract has been registered.

Additionally, to perform the registration process, all parties will have real identities (e.g., tax identification numbers), and both seller and buyer will also have blockchain accounts (which are pseudonymous identifiers). Finally, we assume that an invoice contains the following information: seller and buyer identity, invoice number, issue date, payment due date, total amount, and other details about the services/goods provided by the seller to the buyer. We assume that the seller's identity and invoice number are sufficient to uniquely identify the invoice; therefore, the use of unique invoice numbers should be applied. Furthermore, the buyer's identifier, due date, and total amount are necessary for ANAF's pre-filling of the eDecont form. Additional information can be added to the invoice without affecting how the designed architecture works.

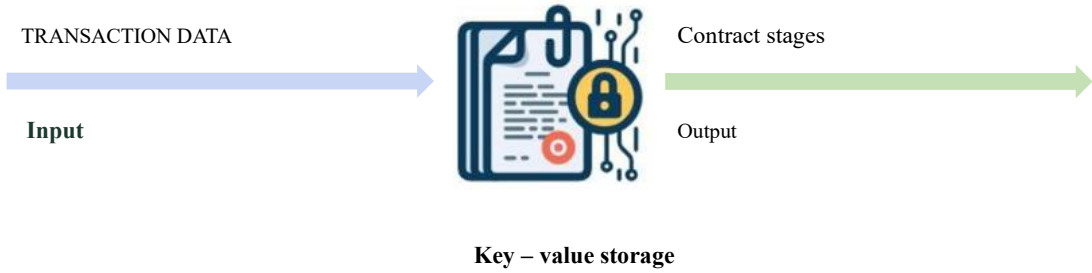
The proposed architecture is set in a financial context and is therefore subject to strict regulatory restrictions. In particular, according to Know-Your-Customer (KYC) regulations, involved parties must be well-identified with each other, and their agreements must be maintained for audits and law enforcement purposes. To comply with KYC, the seller and buyer will record the correspondence between their real identity (IDA) and their pseudonymous identifier on the blockchain (@A). We use the term Blockchain Certificate to refer to these links between real identities and pseudonymous identities.

In the proposed architecture, we rely on the buyer and seller to create these links because both should pay/deduct VAT; thus, we assume they have an interest in certifying transactions. On the other hand, by design, the established protocol avoids ANAF digitally signing the Blockchain Certificates or any other data. Blockchain Certificates are used privately and exchanged only between a seller and a buyer after they intend to conclude an agreement. Additionally, an entity can have multiple Blockchain Certificates with different blockchain addresses for extra protection against linkage attacks.

The protocol is built around a smart contract implemented on a public blockchain. The smart contract will contain registration data for a set of invoices. No one (including the deployer) will have special powers over the contract. In particular, no one will be able to

interfere with the smart contract's operation or modify the data of the invoice set and payment terms.
The proposed architecture is designed to operate on a public blockchain. Public blockchains have costs, so the established protocol must be cost-efficient. Generally, there are three different places where data is stored on the blockchain *(Figure 3):* transaction input data, key-value storage, and transaction output logs. Each of these places has a different purpose and cost.

Summary of smart contract storage options:



Source: author's own processing.

The transaction input data are the data within the transaction that provide inputs for executing the smart contract logic for the current transaction. Transaction input data are very inexpensive compared to key-value storage, which is by far the most costly type of storage. Key-value storage provides persistent storage to the smart contract that lasts across transactions. Key-value storage is part of the blockchain's current global state and, as such, can be used by the smart contract logic to execute future transactions.
Finally, transaction output logs are data generated after the execution of a transaction. Both transaction input data and transaction output logs are part of the blockchain data and, as such, are highly available and immutable. However, these data are not part of the blockchain's current global state, meaning blockchain nodes are not required to keep this data in their current state once the transaction has been executed. This is why these data are inexpensive to store and also why log data from a previous transaction is not available to the logic executing a subsequent transaction.
In the presented protocol, we use a combination of the three aforementioned storage locations to provide an efficient implementation while maintaining privacy and security of the architecture. Specifically, we use a single persistent key-value slot to prevent fraud. CDFPI data are recorded using a transaction output log.
It is worth mentioning that transaction output log data usually have indexed fields that allow external entities to perform fast searches based on these indexed fields. In the protocol, we use a pseudonymous invoice identifier as an indexed log field to speed up data lookup.
Data recorded by the smart contract will provide high availability of relevant data that the buyer needs to know, such as the seller's bank account and payment due date. Since a bank

account contains sensitive information, we must encrypt this data before storing it on-chain. Additionally, we store proof of the agreement summary in the form of a cryptographic commitment.
Storing the smart contract summary on-chain can be used to manage potential future disputes between the seller, buyer, and ANAF. This agreement summary must be signed by both the seller and the buyer.
Finally, it should be noted that the smart contract stores the blockchain addresses of the seller and buyer on-chain as part of the transaction registration. In the established protocol, we use transactions that include signatures using the blockchain identities of both the seller and buyer, and we recover their blockchain addresses from these signatures.

The detailed process of the complete CDFPI using the above protocol is as follows:
Phase 1: eFactura registration The CDFPI process for a specific invoice begins with the registration phase and is followed by the payment confirmation phases. Each phase consists of multiple steps, which are described in Figure 1 and explained below. At the beginning of the CDFPI phase, the seller requests the buyer to publish the billing information through their web service. The publication is quite similar to how Blockchain Certificates are published, except that additional information related to the CDFPI process is required.
Phase 2: confirmation of billing data and payments/receipts This phase starts with the seller contacting the buyer to confirm payment or confirm the payment due date. The seller should naturally provide the invoice details, including the invoice number, total invoice amount, and the payment due date to the buyer. Ultimately, we need the invoice registration data to be available to the parties: the buyer for VAT deduction, the seller for VAT payment, and ANAF for eDecont pre-filling, so that all three parties have evidence in case of disputes. To do this efficiently, we store this data as smart contract transaction output logs.
Phase 3: payment In the third phase, after verifying the information registered by the smart contract, the buyer pays the seller. Subsequently, both the buyer and seller will confirm the payment on time, and ANAF will be informed through the notification procedure. If either the buyer or seller is a VAT beneficiary at collection, ANAF will use the data for pre-filling the eDecont.

4.2.3. Dispute Management

It should be noted that our registration protocol is not secure against malicious buyers, because if the buyer and seller publish false information, ANAF can only challenge this after thorough investigations. As a result, ANAF must trust that the buyer and seller will voluntarily comply. A malicious buyer, for example, may fail to pay the seller but still confirm the payment. A malicious buyer may also deceive ANAF by creating a fake seller and a large number of nonexistent invoices. Then, the fake seller receives payment confirmations, but the corresponding payments are not made by the malicious buyer, who commits VAT tax fraud.
If the buyer is not trustworthy, a mechanism should be used to enforce good behavior (such as a publicly available reputation system). On the other hand, a seller may be concerned about a malicious buyer who might withhold payment. In this case, the seller reveals the message sent by the buyer to a court of law. The following steps are then sufficient to resolve the case:

1. Verification of the invoice certificate;
2. Verification of the terms of the agreement;
3. Verification of the seller's address;
4. Verification of the buyer's address;
5. Verification of the signature: the court holds all necessary information about the payment confirmation agreement and can verify the buyer's signature on this information;
6. Determination of the responsible party;
7. Retrieval of registration information from the smart contract and its logs. The contract address is certified, and the judge has the buyer's signature on it;
8. Trial: the buyer will be convicted based on the non-repudiation of digital signatures and the tamper-proof evidence from the smart contract.

5. Conclusions

The motivation for this research was influenced by the difficulty and necessity of adapting to emerging technologies specific to the digital age. Accounting professionals must comply with new requirements imposed by both the external and internal environments, as well as integrate modern information systems that, through frequent updates, provide advanced functionalities and options for intelligent data analysis. In achieving this objective, medium- and long-term trends were identified, highlighting the technical requirements and skills necessary for accounting professionals, and emphasizing the importance of the applicability and functionality of new information technologies.

Digitalization through the use of financial-accounting information management systems, which integrate advanced technologies such as artificial intelligence and blockchain, is crucial for the evolution of the accounting profession in the digital era. Accountants must adopt these technologies to remain relevant and bring added value to their entities, contributing to strategic decision-making and maintaining compliance with the ever-changing fiscal and accounting requirements.

The future of accounting will involve increased adoption of increasingly advanced technologies. Whether referring to artificial intelligence, automation, data analytics, or cloud computing, these innovations will significantly boost productivity and underscore the need for accounting professionals to develop their skills in emerging information technologies. Several aspects deserve attention: technology will support accountants without replacing them, productivity will increase, data security will improve, the most efficient accounting professionals will be those open to change, and while technology will not replace accountants, their roles will evolve over time.

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