Reflections on the Perspectives of Accounting Information Processing Paradigms in Digitalized Systems

Traian Cristin Nicolae
„Ovidius" University of Constanta, Faculty of Economic Sciences, Romania
traian.nicolae.profesor@gmail.com

Abstract

The purpose of this paper is to briefly describe a series of observations by the author on the perspectives of accounting information processing paradigms in digitalized systems. Input data processing systems, primary in the accounting of entities, are in an accelerated process of transformation generated by the applicability of new digitalized technologies. The classic paradigm of double-entry accounting, based on the use of a set of accounting registers, is undergoing transformation and amplification of the possibilities of supporting the decisions of users of annual financial statements. Real-time processing of large volumes of input data in accounting allows adapting decisions made regarding business administration to new challenges and emerging trends. Integrated financial reporting of accounting information allows enriching the informational support of decisions made by users based on the information provided by the accounting of entities.

Key words: accountings paradigms, information technology
J.E.L. classification: M41, F60

1. Introduction

The widespread use of information systems – equipment and applications – in accounting constitutes a turning point in the theory and practice of accounting.

We are facing an unprecedented amplification of the capacities of processing accounting data, in online and offline systems, with the provision of output information, financial reporting to users in real time. The profound changes that have occurred in the accounting information systems of entities with varied activity profiles provide a general framework for the amplification of financial reporting. (www.hyperledger.org)

Integrated financial reporting of a collection of data describing different aspects of businesses constitutes a point of raising the informational valences of accounting in supporting users of financial statements in decision-making. (www.hyperledger.org)

2. Theoretical context regarding accounting paradigms in a digitalized system

The existence of digitalized systems for the accounting of companies represents a factor of progress in continuous expansion. (www.hyperledger.org)

We are witnessing an accelerated process of overcoming the classical accounting paradigm. (www.hyperledger.org)

Classical double-entry accounting is currently being reconstructed in a branch of conceptual developments generated by the application of new methodologies of digitalized accounting systems used by various entities in various businesses. (www.hyperledger.org)

The transition to the use of distributed ledgers, of the cloud, constitutes the moment of paradigmatic change in the conceptual approach to financial and managerial accounting.

We are witnessing a process in full expansion through which it is possible to amplify the classical processing of paper-based accounting - classical - towards a digitalized system of integrated reporting of the complex spectrum of aspects of companies' activity.

Integrated financial reporting is in a moment of expansion generated by de-localized IT applications, in particular, by the use of computers with global processing capabilities. Quantum computers are opening a new era of digitized data processing in accounting. (www.hyperledger.org)

3. Research methodology - the evolution of accounting information processing paradigm models in digitalized systems

The research methodology used in this article consists of empirical research of a set of accounting data available on the internet and building accounting models.

Accounting is faced with the challenge of adapting, in profitable conditions, to new digital technologies, such as: virtual networks, the cloud, the Internet of Things, the expansion of 5G networks, but also with the reconfiguration of business models. In addition, users of financial statements are increasingly reorienting themselves towards accounting IT applications and cloud storage spaces. According to publicly available data, investments in the digitalization of accounting infrastructure, systems and processes, through the implementation of new digital technologies, doubled by 2024. (www.ziare.ro)

Competitive pressure on the accounting services market has increased, in particular, through the emergence of new software products, which propose connectivity solutions, through networks or mobile virtual platforms. Also, accounting software applications, which use the Internet for messaging and video services, have redefined the options and attracted users of integrated accounting services. (www.hyperledger.org)

In the accounting of companies, massive amounts of data are collected, relating to the records of financial transaction details, expenses incurred, additional costs incurred, journals of added accounting data, invoicing, data that provides them with a lot of information regarding customers and suppliers. These large volumes of data of different types (structured, unstructured), generated continuously and coming from different sources, are difficult to process, in the absence of BD solutions. (www.hyperledger.org)

In the current conditions of competitive pressure on the market, generated by the challenges of new technologies and the explosion of large volumes of data, the solution foreseen by experts for the accounting of entities is represented by the automation of processes, based on artificial intelligence solutions, the realization of investments in modern networks and in BD solutions for the processing and analysis, in real time, of data sets. (www.hyperledger.org)

4. Findings. Overview of digital accounting paradigms

According to public sources, globally, in the accounting services sector, investments in artificial intelligence solutions, hardware and services will reach almost $31.5 billion/year by 2025. BigData (BD) technologies facilitate the collection, processing and analysis of large sets of financial accounting data, in real time. (www.ziare.ro)

The results of accounting data processing are used in the decision-making process related to improving financial reporting, marketing campaigns for companies' businesses, but also for the management and optimization of the functioning of accounting data processing networks. Users of digital accounting applications can use predictive analytics to predict the evolution models of accounting indicators, for preparing reports, accounting budgets of the activity. A good forecast of the evolution of businesses allows the management of profitable entities to achieve the expected levels of profitability. (www.hyperledger.org)

The digital accounting services industry uses fraud detection systems, tools and techniques, based on data mining and machine learning algorithms, to detect anomalies in the level of expenses and to warn of their massive overrun, in real time. (www.hyperledger.org)

From the perspective of tools for processing very large sets of big data (BD), from public information, the use of modern digital tools in the accounting of entities can be observed as follows: 9% of entities exploit complete BigData (BD) instrumentation for collecting and processing large volumes of data, including BigData Analytics (BDA) processing; 11% of entities use software products applied for DataWarehouse (DW) data warehouses, using BDA software; 80% use classic financial analysis and reporting solutions. (www.ziare.ro)

BD solutions are little used for the accounting of Romanian entities, only 9% currently resorting to them. These solutions have been developed and implemented, both at the group level and at the company level. The implementation of BD solutions was a natural continuation of the development of internal IT systems, starting from DW solutions and BI business intelligence analyses, which currently coexist with the new solutions, each integrating complementary functionalities. Complex financial data analysis solutions are used in accounting by 11% of Romanian entities (according to public sources), which analyze data collected and processed through DW solutions, with complex BDA analysis techniques. (www.ziare.ro)

5. Case study of multiple entry accounting

Table no. 1 Transactions - description for amplifying accounting tools (*Nicolae, 2010)*

Financial operations	**Brief description**
01.01.2025	The entity Flex55 purchased products in installments on 01.01.2025 in the amount of 100,000,000 mu (monetary units) with payment in installments, with recording in the distributed mirror ledger.
01.01.2025	Entries are made in the distributed ledger accounting file.
01.01.2026	Installment 1 of 25,000,000 mu of the installment purchase is paid
01.01.2027	Installment 2 of 25,000,000 mu of the installment purchase is paid
01.01.2028	Installment 3 of 25,000,000 mu of the installment purchase is paid
01.01.2029	Installment 4 of 25,000,000 mu of the installment purchase is paid
31.12.2026	The interest paid in the amount of 10,000,000 mu related to the installment purchase is recorded
31.12.2026	The interest recorded in the distributed ledger accounting file in the amount of 10,000,000 mu is recorded
31.12.2027	The interest paid in the amount of 7,500,000 mu related to the installment purchase is recorded
31.12.2027	The interest recorded in the distributed ledger accounting file in the amount of 7,500,000 mu is recorded
31.12.2028	The interest paid in the amount of 5,000,000 mu related to the installment purchase
31.12.2028	The interest recorded in the distributed ledger accounting file in the amount of 5,000,000 mu is highlighted
31.12.2029	The interest paid in the amount of 2,500,000 mu related to the installment purchase is highlighted
31.12.2029	The interest recorded in the distributed ledger accounting file in the amount of 2,500,000 mu is highlighted
01.01.2030	The comprehensive result is highlighted in the distributed ledger accounting file
01.01.2030	The comprehensive result carried forward is capitalized in the distributed ledger accounting file

Source: Accounting data and accounts represent working assumptions of the author.

Accounting Information

-Accounting assumptions - Author

Table no. 2 Registration of purchase with installment payment

Debit Column	Credit Column	Amount
Technological equipment	*Installment payment providers*	100,000,000
Anticipated interest expenses	*Installment payment providers*	25,000,000

Source: Author's hypotheses

Table oo. 3 Entries are made in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
LeXn - Technological equipment	*Le Xn - Installment payment providers*	50,000,000
LeXn - Anticipated interest expenses	*Le Xn - Installment payment providers*	12,500,000

Source: Author's hypotheses

Table no. 4 Installment 1 of the installment purchase is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 5 Entries are made in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
Le Xn - Installment payment providers	*LeXn - Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 6 Installment 2 of the installment purchase is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 7 Entries are made in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
Le Xn - Installment payment providers	*LeXn - Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 8 Installment 3 of the installment purchase is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 9 Entries are made in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
Le Xn - Installment payment providers	*LeXn - Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 10 Installment 4 of the installment purchase is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 11 Entries are made in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
Le Xn - Installment payment providers	*LeXn - Available in digital currency*	25,000,000

Source: Author's hypotheses

Table no. 12 The interest paid in the amount of 10,000,000 mu related to the installment purchase is highlighted

Debit Column	Credit Column	Amount
Current interest expenses	*Anticipated interest expenses*	10,000,000

Source: Author's hypotheses

Table no. 13 The interest on the purchase in installments is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	10,000,000

Source: Author's hypotheses

Table no. 14 The interest recorded in the distributed ledger accounting file (LeXn) is highlighted

Debit Column	Credit Column	Amount
LeXn - Current interest expenses	*LeXn - Anticipated interest expenses*	10,000,000

Source: Author's hypotheses

Table no. 15 The interest paid is highlighted in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
LeXn - Installment payment providers	*LeXn - Available in digital currency*	10,000,000

Source: Author's hypotheses

Table no. 16 The interest paid in the amount of 7,500,000 mu related to the installment purchase is highlighted

Debit Column	Credit Column	Amount
Current interest expenses	*Anticipated interest expenses*	7,500,000

Source: Author's hypotheses

Table no. 17 The interest on the purchase in installments is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	7,500,000

Source: Author's hypotheses

Table no. 18 The interest recorded in the distributed ledger accounting file (LeXn) is highlighted

Debit Column	Credit Column	Amount
LeXn - Current interest expenses	*LeXn - Anticipated interest expenses*	7,500,000

Source: Author's hypotheses

Table no. 19 The interest paid is highlighted in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
LeXn - Installment payment providers	*LeXn - Available in digital currency*	7,500,000

Source: Author's hypotheses

Table no. 20 The interest paid in the amount of 5,000,000 mu related to the installment purchase is highlighted

Debit Column	Credit Column	Amount
Current interest expenses	*Anticipated interest expenses*	5,000,000

Source: Author's hypotheses

Table no. 21 The interest on the purchase in installments is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	5,000,000

Source: Author's hypotheses

Table no. 22 The interest recorded in the distributed ledger accounting file (LeXn) is highlighted

Debit Column	Credit Column	Amount
LeXn - Current interest expenses	*LeXn - Anticipated interest expenses*	5,000,000

Source: Author's hypotheses

Table no. 23 The interest paid is highlighted in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
LeXn - Installment payment providers	*LeXn - Available in digital currency*	5,000,000

Source: Author's hypotheses

Table no. 24 The interest paid in the amount of 2,500,000 mu related to the installment purchase is highlighted

Debit Column	Credit Column	Amount
Current interest expenses	*Anticipated interest expenses*	2,500,000

Source: Author's hypotheses

Table no. 25 The interest on the purchase in installments is paid

Debit Column	Credit Column	Amount
Installment payment providers	*Available in digital currency*	2,500,000

Source: Author's hypotheses

Table no. 26 The interest recorded in the distributed ledger accounting file (LeXn) is highlighted

Debit Column	Credit Column	Amount
LeXn - Current interest expenses	*LeXn - Anticipated interest expenses*	2,500,000

Source: Author's hypotheses

Table no. 27 The interest paid is highlighted in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
LeXn - Installment payment providers	*LeXn - Available in digital currency*	2,500,000

Source: Author's hypotheses

Table no. 28 The overall result is highlighted in the accounting of the reporting entity

Debit Column	Credit Column	Amount
Overall result	*Current interest expenses*	25,000,000

Source: Author's hypotheses

Table no. 29 The overall result is highlighted in the distributed ledger accounting file (LeXn)

Debit Column	Credit Column	Amount
LeXn - Overall result	*LeXn - Current interest expenses*	12,500,000

Source: Author's hypotheses

Table no. 30 The transfer of the comprehensive result to the accounting of the reporting entity is highlighted

Debit Column	Credit Column	Amount
Retained earnings – negative result	*Overall result*	12,500,000

Source: Author's hypotheses

Table no. 31 The transfer of the global result to the distributed ledger accounting file (LeXn) is highlighted

Debit Column	Credit Column	Amount
LeXn - Retained earnings – negative result	*LeXn - Overall result*	12,500,000

Source: Author's hypotheses

6. Conclusions

Our short article outlines some of the main lines of force of the changes in accounting paradigms as a result of the digital processing of input data.

The multiple effects of the extensive use of digitalized accounting tools – equipment and software applications – can be observed. The intensive use of processing large volumes of accounting data is allowed by equipment with capabilities in geometric progression in terms of data processing speeds and data storage and memorization capacities. These aspects are correlated with data networks, very high-speed internet – wifi and 5G networks.

We are witnessing a spectacular evolution of accounting paradigms in the classical system, with unprecedented ways now possible for presenting financial data, in formats enriched with useful data for decision-making by users of financial statements.

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