Trends in the Processes of Implementing Accounting Information Paradigms in Digitalized Systems

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

Abstract

This article aims to present the trends in the processes of implementing accounting information paradigms in digitalized systems. We are currently witnessing a change in the paradigms of accounting data processing in companies' information systems. There is a transition from linear processing specific to the classical accounting paradigm to multidimensional information systems related to digitalized accounting. Computing systems with distributed processing of data stored in the cloud allow entities to provide data in real time. These computing systems offer users the possibility of making decisions in real time. Company management thus has the possibility of rapid information and reaction to changes in the economic and social environment. Information technologies - ERP Enterprise Resource Planning systems, OLAP online analytical processing, BI business intelligence, CRM customer relationship management - are capable of performing complex processing of accounting data.

Key words: informations patterns, digital
J.E.L. classification: M41, F60

1. Introduction

Business Intelligence (BI) is a collection of hardware and software tools for integrated analysis and reporting of business entity information. The goal is to support informed and fast decision making. (www.hyperledger.org). The main components of BI are:

- Data Collection
- Sources: relational databases, Excel files, CRM, ERP, web applications, IoT, etc.
- Tools: ETL (Extract, Transform, Load) – e.g. Talend, Informatica, SSIS
- Data Storage
- Data Warehouse (e.g. Snowflake, Amazon Redshift, Google BigQuery)
- Data Lake (for unstructured data – e.g. Azure Data Lake, Hadoop)
- Data Analysis
- Descriptive Analytics: What happened?
- Predictive Analytics: What could happen?
- Prescriptive Analytics: What should we do?
- Data visualization
- Interactive dashboards and reports
- Popular tools: Power BI, Tableau, Qlik Sense, Looker
- Self-Service BI
- Allows non-technical users to create reports and analyses without IT help

The benefits of BI are:

- Data-driven decision making
- Identifying trends and opportunities
- Optimizing operational processes
- Increasing efficiency and reducing costs
- Monitoring performance through key performance indicators (KPIs).

2. Theoretical background

ERP (Enterprise Resource Planning) systems are integrated IT solutions that allow the management of all business processes of a company, including accounting. In Romania, the use of ERPs has experienced significant growth, especially due to digitalization and tax compliance requirements. (www.hyperledger.org)

Fixed assets modules allow the registration of fixed assets, the calculation of depreciation (straight-line or declining balance), revaluations, write-offs and transfers between locations.

ERPs integrate functionalities for importing bank statements, automatic reconciliation of payments and receipts, generation of payment orders and export of files for internet banking.

ERPs manage partner records, balances, due dates, automatic invoicing, tracking of receipts and payments, as well as alerts for outstanding invoices. (www.hyperledger.org)

ERP systems automatically generate the mandatory accounting registers: journal register, trial balance, account sheets, accounting notes and inventory register, according to the Romanian chart of accounts. (www.hyperledger.org)

OLAP (Online Analytical Processing) is a technology used for multidimensional data analysis. It allows users to examine data from different perspectives and obtain relevant information for decision-making. OLAP is essential in business intelligence, providing support for complex queries, aggregations and dynamic data visualizations.

In Romania, OLAP is used in various fields such as retail, telecommunications, banking and public administration. Companies use OLAP to analyze customer behavior, for financial forecasts and to optimize operations. (www.hyperledger.org)

The benefits of using OLAP are: fast access to relevant information; multidimensional data analysis; support for strategic decision-making; identification of trends and anomalies; improvement of organizational performance.

Challenges in implementing OLAP are: high implementation costs; the need for a solid IT infrastructure; the complexity of data modeling; the need for staff training.

3. Research methodology

To carry out our research, we based ourselves on discussing data available on the internet and proposing accounting recording solutions.

Among the most used ERP applications in Romania are: (www.ziare.ro)

-SVAP2025: developed by SIMAVI, includes accounting, payroll, management, fixed assets modules.

-SeniorERP: offers advanced accounting, CRM, BI and AI integration functionalities.

-UP2DATE ERP: modular solution with extended functionalities for SMEs and corporations.

-Other local solutions: adapted to Romanian legislation and integrated with ANAF, SAF-T, D112, etc.

Modern ERPs are designed for interoperability with:

- ANAF: automatic transmission of tax returns (D112, D300, D394) and the SAF-T file (D406).

-Banks: automatic reconciliation, statement import, SEPA payments.

-CRM: customer synchronization, orders, invoices.

-HR and Payroll: contracts, timesheets, flyers, vacations.

- WMS: inventory management and logistics traceability.

The payroll modules in ERP allow the automatic calculation of salaries, withholdings and contributions, the generation of flyers, payrolls and the D112 declaration. They also manage employment contracts, timesheets and employee evaluations. (www.ziare.ro)

ERPs provide complete inventory records through input/output documents (NIR, notices, receipts), inventory, traceability and alerts for minimum stocks. Integration with supply and production optimizes logistics flows.

Modern ERPs allow the automatic generation and electronic transmission of tax declarations: D112, D300, D394, D406 (SAF-T), as well as other reports to ANAF, in XML or PDF format electronically signed. (www.ziare.ro)

Examples of use in Romanian companies:

-Banca Transilvania uses OLAP for risk analysis and product portfolio optimization.
-Retailer eMAG uses OLAP for purchasing behavior analysis and inventory management.
-Also, companies in the energy sector, such as Electrica, use OLAP for consumption analysis and forecasts.

4. Findings

According to public sources, the purchases of desktop and laptop IT systems by industries and activity sectors in Romania in the period 2023–2025 are presented in the tables below.

Table no. 1. Manufacturing industry - Distribution by types of computing systems

Type of computing system	**Estimated value (lei)**
Business	684.745
Home	219.635
Gaming	129.197
Ultraportables	129.197
2-in-1	129.197
Total	**1.291.971**

Source: Author's processing public data

Table no. 2. Manufacturing industry - Distribution by operating systems

Operating System	**Estimated value (lei)**
Windows	826.862
Mac OS	335.912
Linux	129.197
Total	**1.291.971**

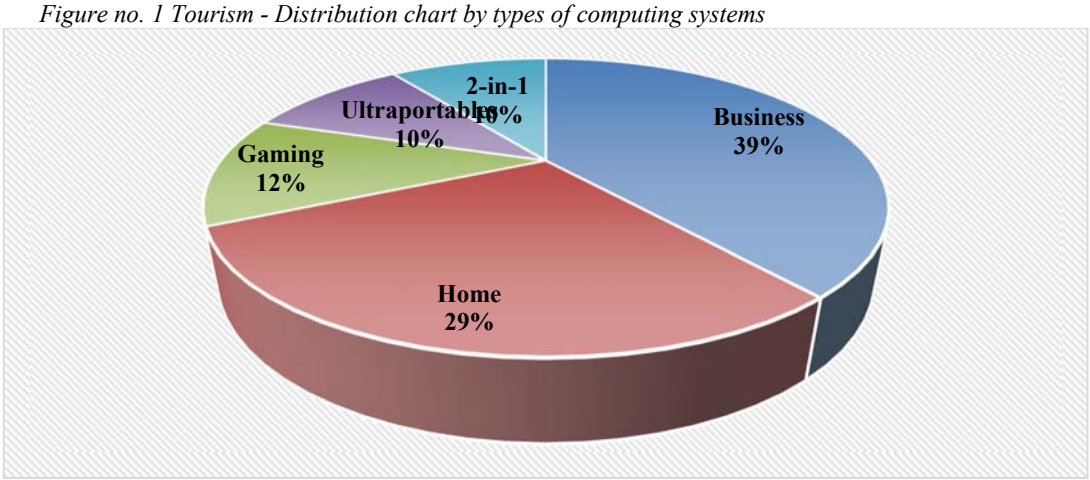
Source: Author's processing public data

Table no. 3. Tourism - Distribution by types of computing systems

Type of computing system	**Estimated value (lei)**
Business	546.989
Home	406.735
Gaming	168.304
Ultraportables	140.253
2-in-1	140.253
Total	1.402.534

Source: Author's processing public data

Figure no. 1 Tourism - Distribution chart by types of computing systems



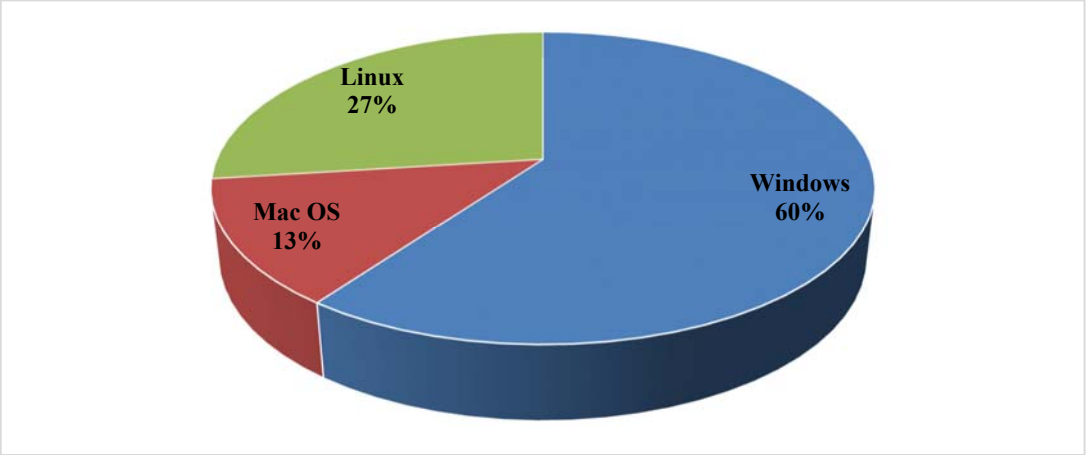
Source: Author's processing public data

Table no. 4. Tourism - Distribution by operating systems

Operating System	Estimated value (lei)
Windows	841.521
Mac OS	182.329
Linux	378.684
Total	1.402.534

Source: Author's processing public data

Figure no. 2 Tourism - Distribution chart by types of operating systems



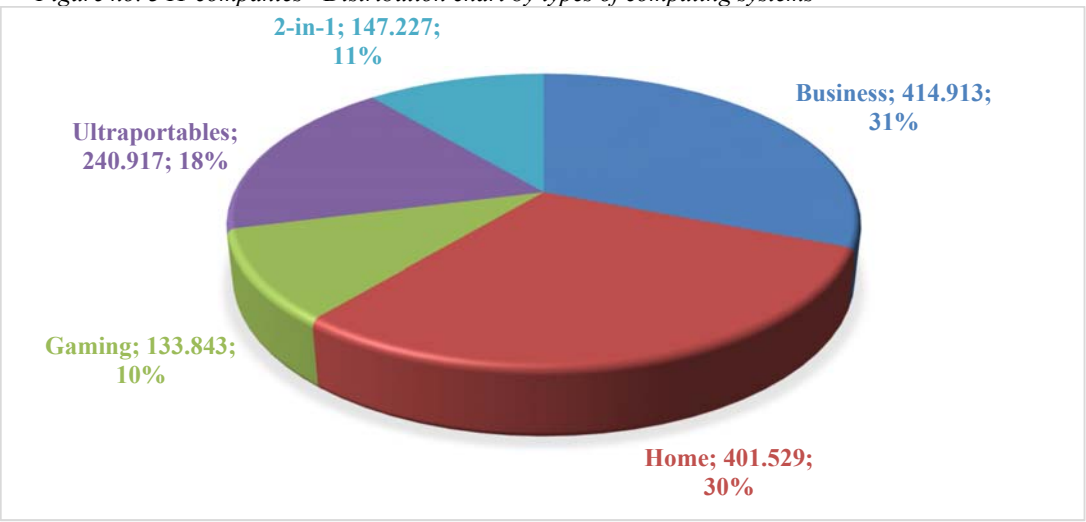
Source: Author's processing public data

Table no. 5. IT companies - Distribution by types of computing systems

Type of computing system	Estimated value (lei)
Business	414.913
Home	401.529
Gaming	133.843
Ultraportables	240.917
2-in-1	147.227
Total	1.338.429

Source: Author's processing public data

Figure no. 3 IT companies - Distribution chart by types of computing systems

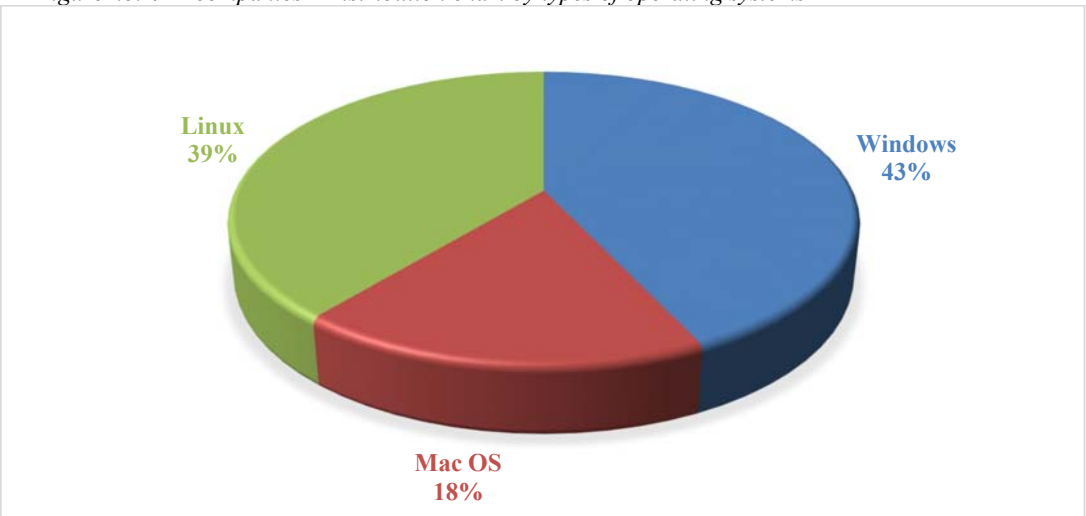


Source: Author's processing public data

Table no. 6. IT companies - Distribution by operating systems

Operating System	Estimated value (lei)
Windows	575.526
Mac OS	240.917
Linux	521.987
Total	1.338.428

Figure no. 4 IT companies - Distribution chart by types of operating systems



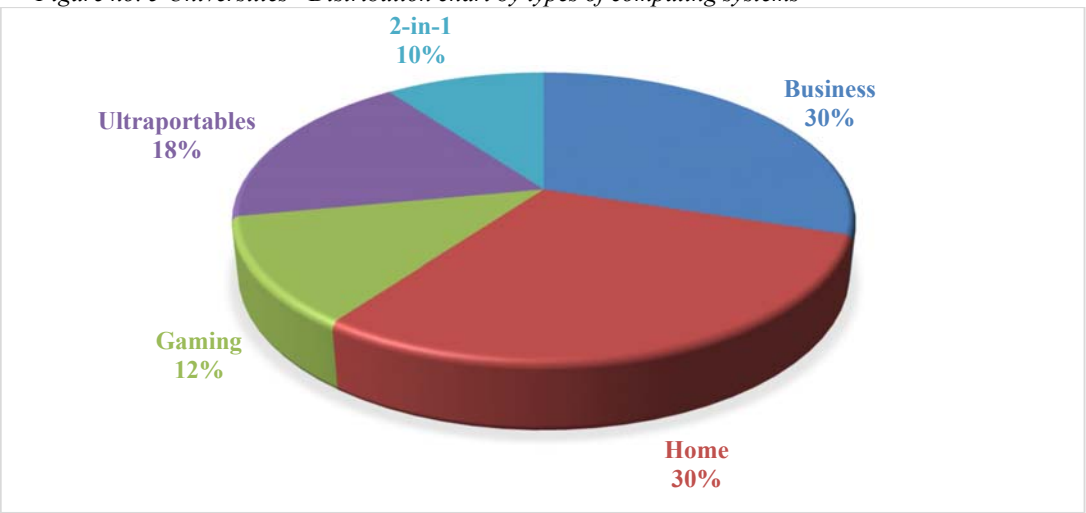
Source: Author's processing public data

Table no. 7. Universities - Distribution by types of computing systems

Type of computing system	Estimated value (lei)
Business	435.939
Home	435.937
Gaming	174.375
Ultraportables	261.562
2-in-1	145.312
Total	1.453.123

Source: Author's processing public data

Figure no. 5 Universities - Distribution chart by types of computing systems



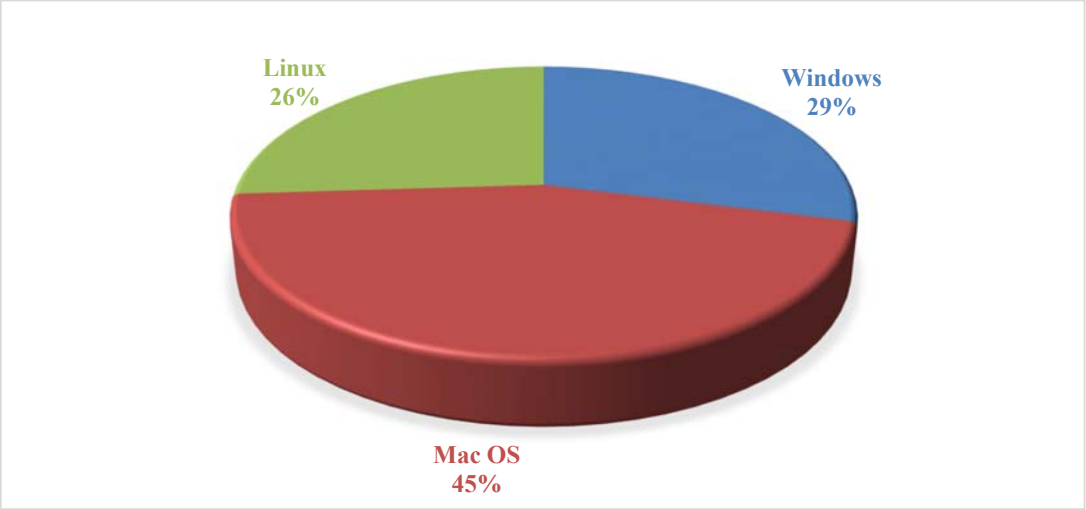
Source: Author's processing public data

Table no. 8. Universities - Distribution by operating systems

Operating System	Valoare estimată (lei)
Windows	421.406
Mac OS	653.906
Linux	377.812
Total	1.453.124

Source: Author's processing public data

Figure no. 6 Universities - Distribution chart by types of operating systems



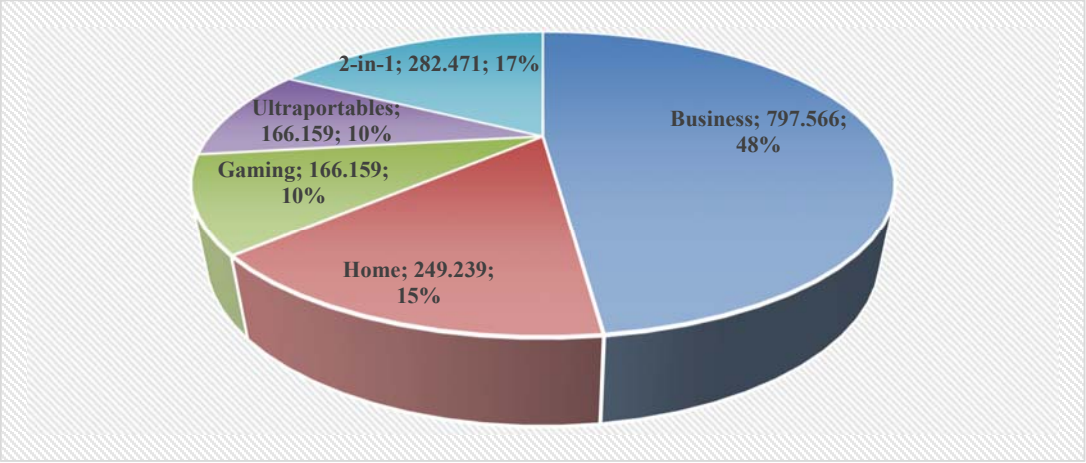
Source: Author's processing public data

Table no. 9. Hospitals - Distribution by types of computer systems

Type of computing system	Estimated value (lei)
Business	797.566
Home	249.239
Gaming	166.159
Ultraportables	166.159
2-in-1	282.471
Total	1.661.593

Source: Author's processing public data

Figure no. 7 Hospitals - Distribution chart by types of computing systems



Source: Author's processing public data

Table no. 10. Hospitals - Distribution by operating systems

Operating System	Estimated value (lei)
Windows	1.296.044
Mac OS	199.391
Linux	166.159
Total	1.661.594

Source: Author's processing public data

The very large acquisitions of computing systems by Romanian entities in the period 2023–2025 represent the technical support necessary for the implementation of new paradigms for processing accounting information in digitalized systems.

5. Case study on accounting information paradigms

Accounting Information

-Accounting Proposals - Author

Table no. 11 Transaction history case study on accounting information paradigms

	Description
15.01.2024	The Ultra78 entity purchased computer systems in the amount of 100,000 monetary units (mu), with records in delocalized databases.
15.01.2024	Records are made in delocalized databases.
12.02.2024	The Ultra78 entity purchased computer systems in the amount of 120,000 mu.
12.02.2024	Records are made in delocalized databases.
16.03.2024	The Ultra78 entity purchased computer systems in the amount of 160,000 mu.
16.03.2024	Records are made in delocalized databases.
20.04.2024	The Ultra78 entity purchased computer systems in the amount of 200,000 mu.
20.04.2024	Records are made in delocalized databases.
10.05.2024	The Ultra78 entity purchased computer systems in the amount of 150,000 mu.
10.05.2024	Records are made in delocalized databases.
18.06.2024	The Ultra78 entity purchased computer systems in the amount of 80,000 mu.
18.06.2024	Records are made in delocalized databases.
15.07.2024	The Ultra78 entity purchased computer systems in the amount of 135,000 mu.
15.07.2024	Records are made in delocalized databases.
16.08.2024	The Ultra78 entity purchased computer systems in the amount of 55,000 mu.
16.08.2024	Records are made in delocalized databases.
11.09.2024	The Ultra78 entity purchased computer systems in the amount of 250,000 mu.
11.09.2024	Records are made in delocalized databases.
18.10.2024	The Ultra78 entity purchased computer systems in the amount of 350,000 mu.
18.10.2024	Records are made in delocalized databases.

Source: working hypotheses

Records

Table o. 12 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	100,000

Source: working hypotheses

Table no. 13 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	100,000

Source: working hypotheses

Table no. 14 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	120,000

Table no. 15 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx -- Computing system providers	120,000

Source: working hypotheses

Table no. 16 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	160,000

Source: working hypotheses

Table no. 17 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	160,000

Source: working hypotheses

Table no. 18 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	200,000

Source: working hypotheses

Table no. 19 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	200,000

Source: working hypotheses

Table no. 20 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	150,000

Source: working hypotheses

Table no. 21 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	150,000

Source: working hypotheses

Table no. 22 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	80,000

Source: working hypotheses

Table no. 23 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	80,000

Source: working hypotheses

Table no. 24 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	135,000

Source: working hypotheses

Table no. 25 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	135,000

Source: working hypotheses

Table no. 26 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	55,000

Source: working hypotheses

Table no. 27 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	55,000

Source: working hypotheses

Table no. 28 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	250,000

Source: working hypotheses

Table no. 29 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	250,000

Source: working hypotheses

Table no. 20 Registration of the acquisition of computer systems

Hypothetical Debit Account	Hypothetical Credit Account	Amount
Computing systems	Computing system providers	350,000

Source: working hypotheses

Table no. 31 Records are made in delocalized databases (BDx

Hypothetical Debit Account	Hypothetical Credit Account	Amount
BDx - Computing systems	BDx - Computing system providers	350,000

Source: working hypotheses

6. Conclusions

The present article presented a set of ideas and data regarding the trends in the processes of implementing accounting information paradigms in digitalized systems.

The expansion of the possibilities of multiple processing of accounting data in the accounting of entities can be observed.

The acquisitions of significant computing systems by the entities in Romania mentioned in our article constitute the technical support necessary for the development of paradigms of digitalized processing of accounting information by entities in Romania.

7. References

- IASB (International Accounting Standards Board), 2011. *International Financial Reporting Standard 13 Fair Value Measurement*. [online] Available at: http://eifrs.ifrs.org
- IASB, 2022. *International Financial Reporting Standards (IFRSs)*. [online] Available at: http://eifrs.ifrs.org.
- Nicolae, T., 2010. *Standarde contabile [Accounting standards]*. Constanta: Ex Ponto Publishing House.
- Nicolae, T.C., 2015. *Contabilitate financiară aprofundată: caiet de studiu individidual: învățământ la distanță(ID) [Advanced financial accounting: individual study book for distance learning (DL)]*. Constanta: Ovidius University Press Publishing House.
- Nicolae, T.C, 2025. *Contabilitate consolidată: caiet de studiu individual: învățământ la distanță [Consolidated Accounting: Individual Study Notebook: Distance Learning]*. Constanta: Ovidius University Press.
- * * * *Law of the Fiscal Code of Romania*
- www.arbc.ro
- www.bnr.ro.

- www.cdep.ro.
- www.ccr.ro.
- www.insse.ro
- www.ziare.ro
- www.hyperledger.org