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Digitalisation of accounting and tax functions for agricultural enterprises

Andrii Ivanenko*
Postgraduate Student
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine
https://orcid.org/0009-0005-0776-6847

Abstract. The study aimed to identify the characteristics of the digitalisation of accounting and tax processes in agricultural enterprises, whilst assessing its impact on financial performance. The study was based on a systematic approach, as well as generalisation, descriptive-analytical, structural-logical and statistical methods to examine enterprise information systems and digital tax administration services. The results of the study showed that the level of digitalisation of tax administration exceeds 98% for electronic filing, and the volume of electronic document flow has grown from 34.5 million documents in 2022 to over 82 million in 2024. In the electronic value-added tax administration system in 2024, tax invoices totalling approximately UAH 2,744 billion were processed, of which around UAH 54 billion (approximately 1.97%) were initially blocked, whereas, following unblocking procedures, the actual amount of blocked value-added tax stood at around UAH 14 billion, corresponding to approximately 0.5% of the total amount. An analysis of MHP's operations revealed a rise in revenue from USD 1,647 to USD 2,635 million (+60%) and capital expenditure from USD 92 to USD 210 million (+128%) in 2021-2025, alongside a reduction in net debt from USD 1,164 to USD 900 million. Kernel has achieved a reduction in net debt from USD 836 million to USD 143 million (-83%), as well as the automation of processing up to 240,000 electronic consignment notes per season and a reduction in document verification time by 80%. Areas for improvement include the integration of accounting systems with tax services, the use of cloud technologies and analytical tools, and the automation of data processing to enhance data consistency and accelerate accounting processes. The practical significance of the study is determined by the possibility of its results being used by agricultural enterprises to optimise accounting and tax processes, improve the efficiency of financial flow management and reduce costs

Keywords: automation; document management; administration; efficiency; monitoring; analytics

INTRODUCTION

The transformation of economic processes, determined by digital technologies, is accompanied by a shift in approaches to the generation, processing and transmission of financial information within enterprises. In agriculture, these processes are combined with the specific nature of production, characterised by seasonality, the presence of biological assets, dependence on natural and climatic conditions, and the use of state support programmes, which place additional demands on accounting and tax procedures. The functioning of accounting and tax administration in such conditions involves the processing of significant volumes of heterogeneous data, the need to comply with regulatory requirements, and ensuring consistency between financial and tax information.

The growth in data volumes, the increasing complexity of accounting procedures, and the need for the rapid generation of management information are

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*Corresponding author

driving a transformation in approaches to the organisation of accounting processes within agricultural enterprises. Research into the automation and digitalisation of management accounting has been conducted by S. Ihnatenko & I. Tomashuk (2024), who examined the implementation of digital technologies, in particular Enterprise Resource Planning (ERP) systems, the Internet of Things (IoT), Big Data, cloud services and analytical tools, as well as their impact on the processes of collecting, processing and systematising information. The authors found that the use of digital solutions ensures faster data processing, greater accuracy of accounting information, the ability to integrate various information systems and expand analytical management functions, as well as facilitating the optimisation of document flow and the application of new technologies, in particular blockchain, for data protection and transparency. A comparison of traditional and digitised accounting systems was conducted by O. Yakubyshyn (2025); in particular, specialised software products, electronic document management and reporting services were characterised, and directions for the transformation of accounting processes under the influence of digital technologies were outlined. The findings indicated that digitalisation facilitates the automation of data processing, the generation of real-time reports, the integration of accounting systems with tax administration services, and an increase in the transparency and reliability of information; however, it is accompanied by cybersecurity risks, the need to modernise infrastructure, and rising demands on staff qualifications.

The growth in the volume of digital data is driving a transformation in approaches to the organisation of accounting and taxation, as explored by I. Balaniuk & T. Ivanyuk (2022). The paper explored the application of cloud technologies, artificial intelligence, blockchain, big data and the Internet of Things in accounting and taxation consultancy, as well as their impact on the automation of information processing and changes to accounting procedures. The study established those digital solutions reduce data processing time and minimise errors, whilst requiring the updating of professional competencies. Theoretical approaches to the digital transformation of accounting systems, as researched by O.L. Polyova *et al*. (2024), revealed the application of information technologies, automated solutions and software products for the collection, processing and analysis of financial and operational data, and identify directions for the integration of accounting systems with management processes. As a result, the study established that the use of digital technologies ensures an increase in the efficiency of accounting processes, a reduction in the time taken to process information, an improvement in the quality of financial reporting, and the integration of accounting and management systems, as well as creating conditions for the generation of analytical and predictive information in real time.

The need to transition to digital forms of accounting, reporting and taxation is determined by the growth in data volumes, the need to automate information processing and ensure the accuracy of financial indicators. The introduction of digital technologies, as identified by N. Brazil *et al*. (2023) in their study ensured the acceleration of information collection, processing and analysis, reduce the number of errors in reporting and automate routine operations, as well as facilitating the transition from paper documents to electronic formats, which enhances the efficiency of accounting systems and the transparency of interactions with regulatory authorities. At the same time, it has been established that digitalisation expands access to information, ensures data integration and improves compliance with tax requirements, including the use of electronic reporting and digital platforms for public services. The application of digital solutions in production and management processes, as identified by V. Lesiuk (2021), helped to reduce the number of operations, minimise paper-based document flow, decrease the number of errors and increase labour productivity, as well as enabling the use of innovative tools, in particular robotic systems, sensors and analytical models for management decision-making. The study also established that digitalisation encompasses both the automation of internal processes and the integration of technologies into production activities, which improves economic efficiency and competitiveness of enterprises.

The growing volume of financial information, the need to improve the accuracy of accounting data and to ensure the timely preparation of reports necessitate the use of digital technologies in business operations. The organisation of accounting in the agricultural sector, considering the impact of digital technologies, was studied by P. Nesenenko (2022), who examined the application of automated accounting systems, electronic document management and information platforms for processing financial data. The findings indicated that the use of digital solutions enhances the efficiency of accounting processes, ensures the timely preparation of reports, reduces labour costs associated with information processing, and strengthens control over financial transactions.

At the same time, further research is required into the integration of accounting and tax services, data consistency, the refinement of digital transformation methodologies, the assessment of the impact of technology, and the assurance of information security. This

study aimed to identify the specific features of the digitalisation of accounting and tax processes in agricultural enterprises and to determine their impact on financial results. To achieve this objective, the following tasks were set: to analyse approaches to the implementation of digital technologies in the accounting and tax processes of enterprises; to investigate tools for the automation of accounting operations and tax administration in agriculture; and to assess the impact of digitalisation on the financial results of Myronivsky Hliboproduct (MHP) and Kernel.

MATERIALS AND METHODS

The study was empirical in nature and covered the period 2021-2025, with additional data from January-February 2026. The chosen time frame was determined by the need to cover the period of implementation of digital solutions in the accounting and tax records of agricultural enterprises, including transformational changes after 2022, as well as the opportunity to track the dynamics of financial indicators and the development of digital services in the medium term; the inclusion of data for early 2026 has made it possible to reflect the current level of use of electronic services.

The study employed a systematic approach to analysing the organisation of accounting processes in agricultural enterprises, within which accounting was viewed as a set of interrelated processes determined by the specific nature of production and external operating conditions. The method of generalising scientific approaches was used to justify the feasibility of applying digital technologies and to identify directions for the transition to electronic data processing and remote control of business operations (Oleynikova & Dolzhenko, 2020). The analysis of the software products Business Automation Software (n.d.), MeDoc (2024a; 2024b) and SAP Business One (n.d.) was conducted using a descriptive-analytical research method to determine their functional capabilities, level of automation and compliance with tax regulation requirements. A functional-instrumental approach was used to study ERP systems, within the framework of which the integration of financial, managerial and tax accounting was assessed, as well as the possibilities for creating a unified information environment for the enterprise (Shyhun & Zhuravel, 2021).

The study analysed the use of digital tax administration services by Ukrainian enterprises in 2022-2024, identifying the mechanisms for taxpayers' interaction with the State Tax Service and the specific features of its electronic services. The analysis of the functioning of the electronic value-added tax administration system was conducted using the structural-logical analysis method, which addressed procedures for registering tax invoices and adjustment calculations, the mechanisms for monitoring compliance with the "first event" principle, as well as the processes of blocking and subsequently unblocking documents in the Unified Register of Tax Invoices. To assess the scale of blocking and the volume of value-added tax, the method of statistical analysis of open data was used, analysing the following indicators:

- number of taxpayers for whom the registration of tax invoices/adjustment calculations (TI/AC) has been blocked;
- total number of blocked tax invoices/correction notes;
- amount of value added tax (VAT) on blocked tax invoices/correction notes;
- proportion of blocked documents out of the total number submitted for registration;
- volume and proportion of unblocked tax invoices/credit notes;
- amount of VAT following the unblocking procedures;
- total amount of VAT submitted for registration in the Unified Register of Tax Invoices.

This has made it possible to describe the characteristics of how the electronic value-added tax administration system operates in tax administration practice (Potaeva, 2025). MHP (2021; 2022; 2023; 2024; 2025) was selected for the case study due to the scale of its operations, its vertical integration and its use of comprehensive digital systems. For MHP, the implementation of the SAP Suite 4 High-Performance Analytic Appliance (S/4HANA) system, which includes the Run Intelligent Sustainable Enterprise (RISE) model, was considered. The SAP Material Management (MM) and SAP Production Planning (PP) modules were analysed separately. Additionally, SAP SuccessFactors was considered in combination with the proprietary vZoo system using the functional analysis method, which can be used for investigation of the integration of production, financial and management processes. The dynamics of MHP's financial indicators (revenue, earnings before interest, taxes, depreciation and amortisation (EBITDA), operating profit, net profit, capital expenditure (CAPEX), net debt, Net Debt/EBITDA) for 2021-2025 were analysed based on consolidated financial statements.

For Kernel (2021; 2022; 2023; 2024; 2025), the implementation of Microsoft Dynamics NAV (Navision) 2018 and its integration with KernelEDocs, based on Microsoft SharePoint, were examined. The use of Microsoft Dynamics 365 Business Central in international divisions was analysed separately using the functional

analysis method, which was used the investigation of the digital integration of business processes. The automation of electronic consignment notes was analysed using the process analysis method, which addressed changes in settlement times with carriers, the accuracy of source documents, the workload on accounting departments, and document loss (Tarasovsky, 2026). The dynamics of Kernel's financial indicators (revenue, EBITDA, operating profit, net profit, net debt, Net Debt/EBITDA) for 2021-2025 were analysed based on financial statements using statistical analysis and the calculation of relative indicators (2021/2025, 2024/2025), which made it possible to assess changes in financial indicators over time.

Based on the results obtained, a generalisation method was applied to identify areas for improving the digitalisation of accounting and tax processes for MHP and Kernel, which was used for development of approaches to enhance the efficiency of financial information processing. A limitation of the study is that the analysis is based on open data and aggregated indicators of digital services, which limits the detail of the assessment of the enterprises' internal accounting processes.

RESULTS AND DISCUSSION

State of digitalisation in the accounting and tax functions of agricultural enterprises in Ukraine

The operations of agricultural enterprises are characterised by dependence on natural and climatic conditions, the seasonal nature of production, and a significant volume of business transactions, which create specific conditions for the organisation of accounting processes. Such activities are accompanied by a heightened level of risk and require the processing of large volumes of diverse information, which complicates the preparation of reliable financial and tax figures. The specific features of agricultural production necessitate the accounting for biological assets, land resources, as well as a significant number of settlement transactions related to tax liabilities and state regulation. Under these conditions, the organisation of accounting processes requires constant updating of information, prompt processing, and ensuring consistency between different types of data. As noted by L. Oleynikova & I. Dolzhenko (2020), the digitalisation of accounting involves a transition to processing information in electronic format, which was used for accounting operations to be conducted in real time, increases management flexibility, and can be used for remote monitoring of financial and economic activities. The use of digital solutions helps streamline accounting processes, reduce the labour intensity of information processing and improve the reliability of the data.

In Ukraine, localised software products adapted to the requirements of national legislation and the specific features of tax regulations are used for accounting purposes. The most widely used systems are Business Automation Software (n.d.), which is used for recording transactions, settlements with counterparties, inventory management, payroll and the preparation of statutory reports, as well as MeDoc (2024a; 2024b), which provides electronic document management, registration of tax invoices and submission of reports to regulatory authorities. For medium and large enterprises, SAP Business One (n.d.) is used, combining financial accounting, logistics, inventory management and analytical tools within a single ERP system. In particular, as noted by M. Shyhun & A. Zhuravel (2021), the use of SAP facilitates the creation of a unified enterprise information environment, the synchronisation of financial, management and tax accounting, as well as the standardisation of accounting processes and the expansion of analytical capabilities, enabling the use of accounting data for management decision-making. Alongside this, Ukrainian software products have become widespread, notably Dilovod (n.d.), MASTER (n.d.) and Debet Plus (n.d.a; n.d.b), which provide financial accounting, processing of source documents, inventory management, settlements with counterparties and the preparation of statutory and tax reports in accordance with current regulatory requirements. Bookkeeper (n.d.), Navkolo (n.d.) and SMARTFIN.UA (n.d.) are also used to automate accounting procedures, including sales accounting, payroll calculation, determination of tax liabilities and preparation of reports for regulatory authorities.

These systems differ in terms of functionality, architecture and level of automation, as well as their focus on different user categories – ranging from sole traders and small businesses to medium-sized and large companies. They support integration with electronic document management, banking services and other information systems, ensuring data exchange, reconciliation of financial information and reduced transaction processing times. Additionally, they provide for the generation of analytical reports, control of financial flows and adaptation to changes in legislation through the updating of functional modules. Due to restrictions on the use of Russian software, businesses are transitioning to the use of BAS and Ukrainian solutions, whilst large companies are implementing international systems with localisation, in particular SAP (Human capital management software, n.d.) or Odoo (n.d.). The functional capabilities of such systems cover the automation of core accounting processes, including the processing of source documents, inventory management, payroll calculation, tax calculations and

the preparation of financial statements. In particular, these systems provide for the automatic generation of balance sheets, income statements, and declarations for value-added tax, income tax and the unified social contribution, as well as supporting electronic signatures and the submission of reports via integrated modules. The use of electronic document management involves the creation, signing and exchange of source documents in electronic form in accordance with current legislation, which reduces the time taken to process information and minimises errors.

The agricultural sector utilises specialised configurations, notably Business Automation Union (n.d.) and Debet Plus (n.d.a), which address specific features of accounting for biological assets, production processes in crop and livestock farming, as well as the seasonal nature of these activities. Such systems facilitate the recording of harvests, land cultivation costs, animal movements, the generation of analytical data by crop and production unit, as well as the automation of tax calculations, covering specific tax regimes. Depending on the organisation's needs, both cloud-based and on-premises solutions are used. Cloud services provide real-time access to accounting data and do not require on-premises infrastructure, whereas on-premises systems provide full control over data and are predominantly used by large organisations. In practice, it is common to combine different solutions, in particular the use of on-premises accounting systems alongside cloud-based e-reporting services, which ensures a complete cycle of financial and tax information processing.

Businesses in Ukraine made extensive use of the State Tax Service's digital services between 2022 and 2024 to automate reporting, monitor payments and conduct tax transactions, including the Taxpayer's Electronic Account, the electronic VAT administration system and electronic cash registers (e-Receipt) (Main Department of the..., 2019), which were integrated with accounting systems such as BAS, SAP and MeDoc. The Electronic Taxpayer's Office served as the central tool for real-time interaction with tax authorities and facilitated the submission of returns, the exchange of messages, access to register data and the monitoring of the status of settlements with the budget.

The electronic VAT administration system ensured the registration and verification of tax invoices and adjustment calculations, monitored compliance with the "first event" principle, and tracked registration limits. In 2024, on average, the registration of tax invoices and adjustment calculations was blocked each month for approximately 24,000 taxpayers, accounting for around 15% of those submitting tax invoices/adjustment calculations for registration. In total, around 2.33 million tax invoices and adjustment calculations were blocked over the year, amounting to nearly UAH 54 billion in VAT. At the same time, taxpayers subsequently confirmed the right to register 1.75 million tax invoices and adjustment calculations (around 71% of those blocked), corresponding to a VAT amount of approximately UAH 40 billion (74% of the blocked volume). Of these, 1.66 million tax invoices/correction calculations were unblocked by State Tax Service commissions, accounting for approximately 95% of the documents submitted for review. The total value of VAT submitted for registration in the Unified Register of Tax Invoices in 2024 amounted to approximately UAH 2,744 billion, of which approximately UAH 54 billion was blocked, and following the unblocking procedures – approximately UAH 14 billion, which corresponded to roughly 0.5% of the total VAT amount (Potaeva, 2025).

MeDoc (2024a; 2024b) served as a key tool for electronic reporting and document management, facilitating the registration of tax invoices in the VAT Electronic Administration System, the exchange of source documents, and the submission of reports. The volume of electronic document flow through this system grew: the number of documents sent stood at 34.5 million in 2022 and 73 million in 2023, and in 2024 exceeded 82 million, which is 13% more than in 2023. In 2024, businesses submitted approximately 10 million tax returns, with over 98% of returns for legal entities and sole traders being submitted electronically. In particular, in January-February 2026, 347,620 returns were filed in the Lviv region, 98% of which were submitted electronically (Main Department of the..., 2026). The total volume of electronic documents also included over 80 million source documents in electronic document management systems. In January-February 2025, the rate of tax returns submitted electronically remained stable at around 98% for both legal entities and individuals. At the same time, the proportion of electronic tax returns submitted by citizens rose from 77% in January-February 2025 to 82% for the same period in 2026. The digitalisation of tax administration has also influenced the organisation of tax control. In 2024, 3,242 audits were planned, of which over 60% were conducted in the form of documentary analysis using digital data without visiting the taxpayer. In the first nine months of 2024, 5,483 documentary audits of sole traders were carried out, a 26% decrease compared with 2023, resulting in additional tax assessments of approximately UAH 10 billion (Prasad, 2024).

A comparison revealed that L. He *et al*. (2024) and the present study both examined the impact of digital technologies on agricultural enterprises, albeit with different focuses. This study focused on the digitalisation

of accounting and tax administration, specifically process automation, electronic document management and integration with State Tax Service (STS) services. In contrast, L. He *et al*. analysed the impact of digital finance on "green" innovations and the role of corporate social responsibility. The common feature was that digitalisation was viewed as a factor in increasing efficiency, reducing information asymmetry and improving management. At the same time, the differences lie in the methods and level of analysis: this study employed a descriptive-analytical approach using statistical indicators of system performance, whereas L. He *et al*. utilised econometric modelling of panel data.

A similar line of reasoning was evident when comparing this study with that of X. Gao & R. Gao (2024), although the focus shifted from internal processes to the functioning of the agricultural supply chain. Whilst in this study digitalisation ensured the consistency of accounting and tax data, X. Gao & R. Gao (2024) viewed digital financial inclusion as a factor of resilience, influencing access to financial resources and the ability of entities to withstand external risks. What remained common was the perception of digitalisation as a mechanism for optimising information flows and access to resources; however, the level of analysis differed: the micro-level of the enterprise versus the meso-level of the sectoral chain, which also necessitated the use of different research tools.

Extending this comparative framework using the findings of W. Li *et al*. (2025) highlighted another dimension of digitalisation: innovation. Whilst in this study digital solutions ensured the accuracy of accounting data and the automation of reporting, W. Li *et al*. (2025) linked digital financial inclusion to an increase in enterprises' innovative activity, by overcoming financial constraints and stimulating investment in research and development. The convergence lay in the recognition of the role of digital technologies in enhancing efficiency and access to resources, whilst the differences manifested in the focus of the analysis and the methods employed – ranging from describing the functioning of digital services to identifying causal relationships based on panel data. In the study by Y. Liu *et al*. (2024), the focus shifted even further – to assessing the performance of enterprises in a foreign trade context. In contrast to the analysis of internal accounting processes, the authors investigated the impact of digital transformation on the quality and safety of agricultural exports, emphasising the role of digital platforms and technologies in ensuring product standards. The common thread remained the idea of increasing efficiency and improving data management; however, the difference lay in the shift from the internal organisation of information to the assessment of the results of enterprises' activities using econometric methods.

A comparison with the study by S. Jin & Z. Zhong (2024) revealed yet another level of generalisation – the macroeconomic level. Whilst this study viewed digitalisation as a tool for organising accounting and tax administration, S. Jin & Z. Zhong (2024) analysed the impact of digital financial inclusion on the total factor productivity of agriculture, covering sectoral integration and rural development. Both approaches recognised the role of digital technologies in improving resource efficiency but differed in scale: from the analysis of internal enterprise processes to the quantitative assessment of productivity based on econometric models. The operations of agricultural enterprises were subject to specific requirements regarding the organisation of accounting, which necessitated the use of digital tools to process large volumes of data. The use of accounting systems and STS services ensured the automation of accounting and tax processes, as well as the integration of financial information. Statistical indicators show the dominance of electronic reporting and significant volumes of electronic document flow. At the same time, during the tax administration process, there were instances of tax invoices being blocked, which required additional action on the part of taxpayers to confirm transactions.

Assessment of the impact of digital technologies on accounting and tax processes

MHP operates as a vertically integrated agro-industrial holding, within which crop production, livestock farming and processing are combined into a single production and logistics chain, which imposes specific requirements on the organisation of accounting and tax processes (MHP considers the EU…, 2025). This structure necessitates the processing of significant volumes of data relating to the production of raw materials, their transformation into finished products and their sale on domestic and foreign markets, where exports account for approximately 55% of total sales.

Digitalisation of accounting processes at MHP has been implemented using the unified ERP system SAP Suite 4 High-Performance Analytic Appliance (S/4HANA), which integrates financial, management and production accounting within a corporate framework. The system covers all of the company's business processes, including finance, logistics, procurement, human resources and production, and can be used for parallel financial and tax accounting in real time. Using the RISE with SAP model combines infrastructure, accounting processes and analytical tools within a single environment, covering both the company's Ukrainian and European assets. The organisation of accounting within

the SAP system involves the automation of key areas, including inventory management, payroll, cost accounting and production processes. In particular, the SAP MM module handles inventory, procurement and warehouse operations with integration into production processes; SAP SuccessFactors automates HR accounting and payroll processing with the relevant tax calculations; whilst the Financial Accounting/Controlling modules handle financial accounting, budgeting, cost allocation and reporting. Production accounting is implemented via the SAP PP module in conjunction with the company vZoo system, which integrates data on production, resource usage and product quality into a single accounting system ("MHP" implements a system..., 2021).

The consolidation of accounting data at MHP is implemented centrally via SAP S/4HANA, which ensures the automatic integration of financial, operational and production information from various departments and legal entities. The use of the SAP Master Data Governance module standartises master data before processing, ensuring consistency of information at the group level. This approach eliminates the need for manual data aggregation and can be used for generation of consolidated reports in real time. The tax function in MHP is integrated into a single ERP system and implemented as a component of financial accounting. The automation of tax processes covers the calculation of tax liabilities, the preparation of tax returns and the verification of business transactions against tax legislation. Due to the integration of accounting and tax accounting, tax figures are generated automatically based on source data, reducing the need for additional data processing and ensuring consistency between financial and tax data. MHP's digital infrastructure forms a unified information environment within which accounting, control and data processing are conducted at all stages of the production cycle. The summary of MHP's financial and investment indicators for 2021-2025 is based on the company's consolidated financial statements, enabling an assessment of changes in the scale of operations, profitability, investment activity and debt burden. The trends in these indicators reflect the recovery of operational activities following 2021 and the subsequent expansion of the business (Table 1).

Table 1. *Trends in MHP's financial and investment indicators for 2021-2025*

Indicator	2021	2022	2023	2024	2025	2021/2025, %	2024/2025, %
Revenue, million USD US	1,647	1,876	2,294	2,262	2,635	160	116
EBITDA, million USD US	519	275	329	437	455	88	104
Operating profit, million USD US	416	176	247	346	313	75	90
Net profit, million USD US	377	-269	122	141	215	57	152
CAPEX, million USD US	92	106	150	180	210	228	117
Net debt, million USD	1.164	1.186	1.050	950	900	77	95
Net Debt/EBITDA	2.09	2.94	3.19	2.17	1.98	95	91

Source: *compiled by the author based on MHP (2021; 2022; 2023; 2024; 2025)*

Table 1 show that between 2021 and 2025, MHP expanded the scale of its operations whilst simultaneously restructuring its financial profile. Revenue increased from USD 1,647 million to USD 2,635 million (+60%), whilst EBITDA decreased from USD 519 million to USD 455 million (-12%), reflecting the impact of external factors in 2022 and the subsequent recovery of operating activities. Capital expenditure rose from USD 92 million to USD 210 million (+128%), indicating an expansion of investment activity and the implementation of technological solutions. At the same time, net debt decreased from USD 1,164 million to USD 900 million (-23%), and the Net Debt/EBITDA ratio decreased from 2.09 to 1.98, reflecting an improvement in financial stability. In 2025, compared with 2024, revenue grew by 16%, whilst EBITDA increased by 4% and net profit increased by 52%.

The expansion of MHP's operations between 2021 and 2025 was accompanied by an increase in the volume of financial and tax transactions, reflected in a 60% rise in revenue and a more than twofold increase in capital expenditure. The increasing complexity of the business structure, in particular the integration of production segments and the implementation of investment projects, necessitates the maintenance of parallel accounting and tax records, cost accounting by responsibility centres, and the monitoring of investment flows. The dynamics of EBITDA and the Net Debt/EBITDA ratio reflect the changing demands on the financial management system and the need for analytical data processing to monitor liquidity and debt obligations. In such circumstances, the use of integrated ERP systems, in particular SAP S/4HANA, ensures the automation of accounting processes, the consistency of financial and tax information, and the generation of reports in real time, reflecting the changing role of digital technologies in the accounting and tax functions of the enterprise.

Kernel (2021; 2022; 2023; 2024; 2025) utilises a centralised model for the digitalisation of accounting and tax functions, based on a single Microsoft Dynamics NAV 2018 ERP system implemented for the management company and key subsidiaries, including Kernel Trade. This system provides integrated management of financial, operational and accounting processes, including procurement, sales, inventory management, cash flow and intercompany settlements. The system architecture is complemented by integration with the KernelEDocs electronic document management platform based on Microsoft SharePoint, which can be used for automation of the creation, approval, signing and storage of source documents, as well as supporting the use of qualified electronic signatures. For international divisions, Microsoft Dynamics 365 Business Central is used with data synchronisation to the central system, forming a connected hybrid information infrastructure. The implementation of the ERP system has led to changes in the parameters of accounting and tax processes, resulting in a reduction in the time taken to prepare financial statements by an average of 5 days, as well as a reduction in audit costs due to built-in control mechanisms. Centralised verification of counterparties using integrated services has reduced the number of transactions with high-risk partners by approximately half, which has had an impact on tax and financial risk parameters. The automation of cash flow management ensures liquidity and cash flow planning based on data from the accounting system. The digitisation of procurement and document management processes has accelerated the processing of transactions with grain suppliers by an average of three times, whilst also ensuring transparency in mutual settlements and monitoring of contractual obligations within trading operations. The ERP system implements full tracking of inventory costs, eliminating situations where, before the system's implementation, approximately 20% of costs were not automatically reflected in accounting and planning. Built-in BI tools can be used to generate financial and management reports online, providing access to analytical information for decision-making at various management levels (The results of the implementation…, 2024).

As part of the digitalisation of its logistics and accounting processes, Kernel has scaled up the use of electronic consignment notes (e-TTN), integrating around 1,000 partner haulage companies, 6,000 drivers, and over 400 dispatchers and weighbridge operators into a single digital system. The introduction of e-waybills facilitated the transition from paper-based document flow to an electronic format for primary documents used in accounting and tax records. As a result, the time taken to settle accounts with carriers has been reduced: whereas previously payment took 5-7 days due to the need to process paper documents, this process takes place much more quickly following the introduction of the digital system. In addition, the time taken to verify the accuracy of primary documents has been reduced by approximately 80%, reflecting the automation of control procedures and a reduction in the workload on accounting departments. The use of e-TTN has also eliminated document losses that occurred with paper-based document flow: in a single season, the company generates around 240,000 waybills when moving agricultural products between internal warehouses. The integration of e-TTN into the digital infrastructure, particularly in conjunction with the Microsoft Dynamics NAV 2018 ERP system and the KernelEDocs electronic document management platform, ensures the automatic generation of source documents, their approval, signing with a qualified electronic signature, and subsequent use for tax reporting. Thus, the digitalisation of logistics operations is directly integrated into the accounting and tax systems, ensuring data consistency, reducing information processing times and improving the controllability of business transactions (Tarasovsky, 2026).

Overall, Kernel's digital transformation encompasses accounting, tax processes, document management and management analytics, creating a unified information environment for processing financial data. The use of the Microsoft Dynamics NAV ERP system, combined with integrated services, ensures the consistency of accounting data, the automation of calculations, control over financial flows, and support for management decision-making processes. The financial statements reflect the dynamics of Kernel's financial indicators for 2021-2025, which characterise changes in the scale of operations, the structure of financial flows and the company's debt burden (Table 2).

Table 2. *Trends in Kernel's financial indicators for 2021-2025*

Indicator	2021	2022	2023	2024	2025	2021/2025, %	2024/2025, %
Revenue, million USD US	5,647	5,332	3,455	3,581	4,115	73	115
EBITDA, million USD US	929	220	544	381	466	50	122
Operating profit, million USD US	792	677	753	604	361	46	60
Net profit, million USD US	513	-41	299	168	238	46	142

Table 2, Continued

Indicator	2021	2022	2023	2024	2025	2021/2025, %	2024/2025, %
Net Debt, million USD US	836	1,488	595	281	143	17	51
Net Debt/EBITDA	0.9	6.8	1.1	0.7	0.3	33	43

Source: *compiled by the author based on Kernel (2021; 2022; 2023; 2024; 2025)*

Table 2 show that between 2021 and 2025, Kernel's operations were characterised by significant fluctuations in financial results, accompanied by a reduction in debt levels and a transformation in the structure of cash flows. Revenue decreased from USD 5,647 million to USD 4,115 million (-27%), reflecting changes in logistics conditions and export volumes, whilst EBITDA decreased from USD 929 million to USD 466 million (-50%), indicating rising costs and instability in the operating margin. In 2022, the company recorded a loss (USD -41 million), followed by a recovery in profitability to USD 238 million in 2023-2025. At the same time, the most significant changes occurred in debt management: net debt fell from USD 836 million in 2021 to USD 143 million in 2025 (-83%), and the Net Debt/EBITDA ratio decreased from 0.9 to 0.3. In 2022, this ratio rose to 6.8, reflecting a sharp deterioration in financial stability; however, it subsequently decreased rapidly, indicating active management of liquidity and cash flows.

Changes in the scale of operations, high volatility in financial results, and significant volumes of transactions involving inventory, export contracts and financial instruments necessitate an integrated approach to accounting and tax reporting. The use of a single Microsoft Dynamics NAV 2018 ERP system centralises data on procurement, sales, cash flow and settlements with counterparties, enabling the generation of consistent financial and tax information. Integration with the KernelEDocs electronic document management system and the use of built-in BI tools ensure the automation of source document processing, control of tax liabilities and the ability to generate analytical reports promptly.

A 49% reduction in net debt in 2024-2025 alone, as well as a reduction in the Net Debt/EBITDA ratio to 0.3, demonstrates the use of digital tools for liquidity management, cash flow planning and financial risk control. At the same time, the 15% growth in revenue and 22% growth in EBITDA in 2025 were accompanied by increased demands on data processing speed and the synchronisation of accounting processes across departments. Thus, the dynamics of Kernel's financial indicators in 2021-2025 reflect a transition to a model in which the digitalisation of accounting and tax functions ensures the integration of financial flows, the automation of accounting procedures and real-time control of operations in a changing external environment.

An analysis of the interrelationships between approaches to the digitalisation of the agricultural sector revealed that its interpretation varied depending on the scope of the study, ranging from internal business operations to systemic transformations within the industry. In this study, digital solutions were viewed as a tool for streamlining accounting and tax processes, ensuring the consistency of financial data and improving the efficiency of its processing. At the same time, E.N. Sadjadi & R. Fernández (2023) interpreted digitalisation as a multidimensional phenomenon encompassing the infrastructure, technologies and socio-economic conditions of the agricultural sector's functioning. Thus, the convergence resided in the recognition of the impact of digital technologies on management and productivity, whilst the divergence manifested itself in the scale, from the applied level to a comprehensive overview analysis.

This difference in levels of analysis was also evident when compared with the findings of B. García-Cornejo *et al.* (2025); however, in this case, the focus shifted to assessing the efficiency of farms. Whilst in this study digitalisation ensured the accuracy and integration of accounting processes, B. García-Cornejo *et al.* linked it to the use of management accounting practices and Information and Communication Technologies as factors in improving productivity. Both approaches agreed on the role of information systems in improving resource management but differed in their methodology: a description of how the systems function versus a quantitative assessment of effectiveness.

The study by M. Černá & J. Pokorný (2024) proved to be more closely related in terms of subject matter, as it also analysed changes in accounting and tax processes under the influence of digital technologies. However, whilst this study focused on the practical application of digital tools by enterprises, M. Černá & J. Pokorný (2024) examined these processes through the prism of the regulatory environment and institutional changes. As a result, digitalisation emerged as a common subject of analysis, but with varying levels of detail – ranging from the applied level to the generalised institutional context. In the study by H. Fu & T. Ramayah (2025), digital transformation was explained through the behavioural and competency characteristics of enterprises. In contrast to the technology-oriented approach of this study, the authors linked the outcomes of digitalisation

to levels of financial literacy, digital orientation and organisational learning. In both cases, the impact of digital technologies on efficiency and management was acknowledged, but the differences lay in the explanatory mechanisms: technological integration versus behavioural-econometric analysis of transformation factors.

Further broadening of the comparison, based on the study by M. Sauvagerd *et al*. (2024), transitioned from enterprise level to that of agri-food systems. Whilst in this study digital technologies facilitated the optimisation of internal procedures, M. Sauvagerd *et al*. (2024) viewed them as the foundation for transforming market structures and platform-based interactions within the sector. Despite the different scales, both approaches converged in their interpretation of digitalisation as a tool for improving data management and process coordination, whilst the differences lay in the focus – internal operations versus systemic changes in the industry. In the study by Y. Yuan *et al*. (2024), digitalisation was linked not only to the organisation of processes but also to areas of business development, in particular "green" transformations. This created a logical transition from managerial aspects to strategic business outcomes. What remained common was the perception of digital technologies as a factor in improving efficiency and access to resources; however, the difference lay in the shift in emphasis from accounting procedures to economic and environmental outcomes, which were assessed using quantitative methods.

An analysis of two agribusiness companies has shown that the implementation of digital solutions in accounting and tax functions is linked to an increase in transaction volumes and a growing complexity of business processes between 2021 and 2025. Changes in revenue, EBITDA, investment activity and debt burden were accompanied by an increase in the number of financial and tax transactions, which required the automation of accounting procedures and the centralisation of data. The use of ERP systems ensured the integration of accounting, logistics and financial processes, the automatic generation of reports and data consistency across departments. This created the conditions for faster information processing, control of business transactions and management of financial flows in a changing external environment.

Areas for improving the digitalisation of accounting and tax processes

The enhancement of digitalisation in accounting and tax processes at MHP and Kernel involves the further development of data integration within the existing ERP systems and the expansion of their functionality in line with the growth in transaction volumes. At MHP, the use of SAP S/4HANA ensures the consolidation of financial, production and logistics data, whilst at Kernel, a centralised model based on Microsoft Dynamics NAV 2018 combines accounting, document management and analytics. Further improvements involve deepening the integration of these systems with external services, in particular tax platforms, using Application Programming Interfaces (APIs), which streamline the transfer of data to e-administration systems without duplication of information or manual intervention.

The development of digital solutions at MHP and Kernel should be viewed in the context of the transition to cloud-based architectures, which ensure the scalability of accounting systems and data synchronisation across departments. At MHP, this can be achieved through the continued use of the RISE with SAP model, which integrates Ukrainian and international assets into a single accounting environment, whilst at Kernel, the transition from Dynamics NAV to Dynamics 365 Business Central creates the conditions for the unification of accounting processes between the parent company and international divisions. This approach ensures real-time data processing and reduces dependence on local infrastructure, which is particularly relevant given the growth in financial flows and the geographical expansion of operations.

The improved efficiency of accounting and tax processes in the companies studied is linked to the increased use of analytical tools. At MHP, the integration of SAP modules with production systems can be used for generation of detailed information on costs and operational performance, whilst at Kernel, the use of Business Intelligence reporting provides real-time access to financial indicators and liquidity monitoring. Further development involves the implementation of models for forecasting tax liabilities, analysing cash flows and assessing financial risks based on accumulated data, ensuring a transition from recording transactions to analytical management.

Advances in digitalisation are also linked to the automation of routine operations, which has already been partially implemented in both companies. At Kernel, the introduction of a "payment factory" and centralised approval procedures has accelerated the processing of financial transactions, whilst at MHP, the automation of accounting via SAP modules reduces the number of manual operations. Further development involves the use of robotic process automation (RPA) for processing source documents, verifying tax data and generating reports, which reduces the labour intensity of accounting procedures and improves the accuracy of calculations.

The integration of logistics processes with accounting and tax records is a distinct area of improvement,

which is particularly evident in Kernel through the implementation of electronic consignment notes. Scaling e-waybills to involve thousands of participants in the logistics process automatically records product movement transactions in the accounting system, reducing document processing time and ensuring data consistency. At MHP, a similar effect is achieved through the integration of SAP's production and logistics modules; however, further development may involve expanding the use of electronic source documents and their direct integration with tax systems.

Further improvements to digitalisation involve the development of data management systems, including the standardisation of reference data and accounting processes. At MHP, this is achieved using SAP Master Data Governance (n.d.), which ensures data consistency across departments, whilst at Kernel, centralised accounting can create a single information base for financial and tax reporting. Expanding these approaches reduces the number of errors, improves data quality and ensures consistency between different types of accounting.

From a modelling perspective, the effectiveness of digitalisation can be represented as a function of the relationship between transaction volume, the level of automation, and the time spent on data processing. In the case of MHP, a 60% increase in revenue in 2025 compared to 2021 was accompanied by a rise in the volume of accounting transactions, requiring a corresponding increase in the level of automation to maintain efficiency. At Kernel, where financial indicators were highly volatile, the use of an ERP system reduced debt levels and ensured liquidity control, which can be interpreted as the result of optimised financial data processing. Formalisation of these processes addressed the impact of digital solutions on the performance of accounting systems and justified further investment in their development.

A separate area of focus is the development of integration with government tax services, which involves the automatic exchange of data between ERP systems and the State Tax Service's platforms. The study shows that the volume of electronic document flow and reporting is increasing, creating the conditions for a transition to fully digital interaction with regulatory authorities. For MHP and Kernel, this means the ability to automatically generate tax figures based on accounting data and reduce the number of operations associated with reporting. Thus, the areas for improving digitalisation at MHP and Kernel are linked to deeper integration of ERP systems, the transition to cloud technologies, the use of analytical tools and automation, as well as the development of interaction with tax services. This ensures the consistency of financial and tax data, reduces information processing time and improves the efficiency of accounting process management as the scale of operations grows.

An analysis of the relationship between digitalisation and business performance revealed varying interpretations of this process. In this study, digitalisation was interpreted as a tool for streamlining accounting and tax procedures, ensuring the consistency of financial data and the automation of reporting, whereas K. Valaskova *et al*. (2025) shifted the focus to the strategic dimension, linking digital transformation to financial results through mechanisms of strategic alignment. Thus, the common thread remained the idea of improving management efficiency, although the level of analysis shifted from operational to strategic.

This difference in the scope of the analysis was also evident in the study by S. Nain *et al*. (2025), where digitalisation was viewed not as a technological solution, but as a combination of organisational and behavioural factors that shape business outcomes. In this context, the present study appeared more applied in nature, as it focused on specific tools – ERP systems and digital tax administration services. At the same time, both approaches converged in their interpretation of digital technologies as a means of optimising data processing and enhancing management transparency.

This broadening of the analytical perspective was further evident in the study by R.R. Shamshiri *et al*. (2024), where digitalisation extended beyond accounting processes and was linked to the transformation of production using the Internet of Things (IoT), drones and artificial intelligence. Whereas in this study, digital solutions streamlined financial flows and tax control, in the work of R.R. Shamshiri *et al*. (2024), they altered the very logic of agricultural production, focusing on productivity and sustainability. Nevertheless, in both cases, digitalisation served the function of processing large volumes of data and supporting decision-making.

Another avenue for the development of digital tools was presented in the study by Q.H. Pham & K.P. Vu (2024), in which digitalisation was integrated with innovative business models and digital forensic accounting. In contrast to this approach, the present study remained within the scope of regulatory and accounting functions, whereas Q.H. Pham & K.P. Vu (2024) viewed digital tools as a foundation for internationalisation and innovation. What remained common was the improvement in the quality of information and control; however, differences emerged in focus, ranging from operational support to strategic business development. N. Hendriyetty *et al*. (2022) interpreted digitalisation

at an even more generalised level, emphasising the transformation of the accounting profession itself and changes in taxation models within the digital economy. In this context, this study reflected the practical dimension of implementing digital solutions, whilst N. Hendriyetty *et al*. (2022) established the theoretical foundation for these changes. Despite the difference in approaches, both positions converged in their interpretation of digitalisation as a process that alters information processing mechanisms, enhances its accuracy, and transforms the financial data management system.

The digitalisation of accounting and tax processes at MHP and Kernel was enhanced through deeper integration of ERP systems, the expansion of their functionality, and interaction with external services. The transition to cloud architectures and the use of analytical tools ensured real-time data processing and improved the quality of financial information. The automation of operations, including the use of RPA and electronic document management, helped to reduce the labour intensity of accounting procedures and minimise errors.

CONCLUSIONS

A summary of the study results indicates that the digitalisation of accounting and tax functions in Ukraine's agricultural sector is accompanied by a shift towards integrated information systems, an increase in the volume of electronic document flow, and a higher level of automation in financial processes. The study found that the use of ERP solutions, the State Tax Service's electronic services and electronic document management systems can be used for processing of significant volumes of data, ensures the consistency of financial and tax information, and reduces the time required to prepare reports.

Statistics confirm the high level of digitalisation in tax administration. In 2024, over 98% of tax returns were submitted electronically, and the total number of electronic documents exceeded 80 million. The number of documents in the MeDoc system increased from 34.5 million in 2022 to over 82 million in 2024, reflecting the rapid growth of electronic document flow. At the same time, the VAT electronic administration system processed significant volumes of transactions: in 2024, tax invoices and credit notes totalling approximately UAH 2,744 billion were submitted for registration, of which around UAH 54 billion (approximately 1.97%) was initially blocked. However, following the unblocking procedures, the actual amount of blocked VAT was approximately UAH 14 billion, which corresponded to roughly 0.5% of the total amount.

An MHP's analysis showed that between 2021-2025, revenue growth from USD 1,647 million to USD 2,635 million (+60%) was accompanied by a shift in the dynamics of operating indicators, notably a decrease in EBITDA from USD 519 million to USD 455 million (-12%), which reflected the impact of external factors in 2022 and the subsequent recovery of operations. At the same time, the reduction in the Net Debt/EBITDA ratio from 2.94 to 1.98 reflects improved financial management efficiency, achieved through the integration of accounting and analytical functions into SAP S/4HANA. At Kernel, digitalisation was reflected in the optimisation of accounting and logistics processes: a reduction in reporting preparation times by 5 days, a reduction in document verification time by 80%, and the automation of processing up to 240,000 electronic consignment notes per season. The company's financial indicators also demonstrate this transformation: a reduction in net debt from USD 836 million in 2021 to USD 143 million in 2025 (-83%) and a decrease in the Net Debt/EBITDA ratio to 0.3 in 2025.

The further development of digitalisation involves the integration of ERP systems with tax services via APIs, the transition to cloud-based solutions, and the increased use of BI tools for forecasting tax liabilities and analysing cash flows. The automation of routine processes, the integration of logistics data (e-waybills) and the standardisation of data management ensure the consistency of accounting information and a reduction in processing time. Future research prospects involve broadening the scope of analysis, in particular by conducting a more in-depth assessment of the effectiveness of the digitalisation of accounting and tax processes based on a broader empirical foundation.

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Цифровізація бухгалтерського обліку та податкової функції для сільськогосподарських підприємств

Андрій Іваненко
Аспірант
Національний університет біоресурсів і природокористування України
03041, вул. Героїв Оборони, 15, м. Київ, Україна
https://orcid.org/0009-0005-0776-6847

Анотація. Метою даного дослідження було визначення особливостей цифровізації бухгалтерського обліку та податкових процесів аграрних підприємств з оцінюванням її впливу на фінансові результати. У межах дослідження застосовано системний підхід, метод узагальнення, описово-аналітичний, структурно-логічний та статистичний методи для дослідження інформаційних систем підприємств і цифрових сервісів податкового адміністрування. Результати дослідження показали, що рівень цифровізації податкового адміністрування перевищує 98 % електронного подання звітності, а обсяг електронного документообігу зріс з 34,5 млн документів у 2022 році до понад 82 млн у 2024 році. У системі електронного адміністрування податку на додану вартість у 2024 році було оброблено податкові накладні на суму близько 2,744 млрд грн, з яких первинно заблоковано близько 54 млрд грн (приблизно 1,97 %), тоді як після процедур розблокування фактичний обсяг заблокованого податку на додану вартість становив близько 14 млрд грн, що відповідало приблизно 0,5 % від загальної суми. Аналіз діяльності компанії МХП засвідчив зростання виручки з 1,647 до 2,635 млн дол. США (+60 %) та капітальних інвестицій з 92 до 210 млн дол. США (+128 %) у 2021-2025 роках при одночасному зниженні чистого боргу з 1,164 до 900 млн дол. США. У компанії Kernel встановлено скорочення чистого боргу з 836 до 143 млн дол. США (-83 %), а також автоматизацію обробки до 240 тис. електронних товарно-транспортних накладних за сезон і скорочення часу перевірки документів на 80 %. Напрями вдосконалення передбачають інтеграцію облікових систем із податковими сервісами, використання хмарних технологій, аналітичних інструментів та автоматизацію обробки даних для підвищення узгодженості інформації і швидкості облікових процесів. Практичне значення дослідження полягає у можливості використання його результатів аграрними підприємствами для оптимізації облікових і податкових процесів, підвищення ефективності управління фінансовими потоками та зниження витрат

Ключові слова: автоматизація; документообіг; адміністрування; ефективність; контроль; аналітика