

This study considers cash flow management processes at small and medium-sized businesses in the context of digitalization. The subject of the study is a set of digital solutions that enable the optimization of cash flow management processes by enterprises. The task addressed relates to the economic feasibility of using automated cash flow management platforms for small and medium-sized businesses. To this end, the work identified the features of existing financial accounting tools and analytical cash flow management platforms.

An example of using the Finmap online platform proves the advantages of visualizing financial information, which is easily perceived even by non-financial specialists. Automation of transaction accounting makes it possible to minimize manual labor and errors by 90% and allows business owners to receive structured information about the financial results of their activities and cash flow. The time required to analyze a company's financial condition and make decisions is reduced by 50% through quick access to key metrics and their visual display.

The prospects and feasibility of implementing digital solutions in cash flow management have been proven by modeling and simulation using Bizagi Modeler software. This tool made it possible not only to reflect the optimized cash flow management process using automated tools but also, by analyzing metrics, to quantitatively assess the minimization of process execution time and resource utilization. In the practical domain, this is an effective tool for substantiating a management decision on the feasibility of using digital solutions, with elements of training business owners and staff on their integration into operational activities

Keywords: cash flow management, small and medium-sized businesses, BPMN modeling, automated financial systems, SME digital transformation

SUBSTANTIATING THE USE OF AUTOMATED PLATFORMS FOR CASH FLOW MANAGEMENT AT SMALL AND MEDIUM-SIZED BUSINESSES

Inna Aleksieienko

Corresponding author

PhD, Associate Professor

Department of Finance and Credit

Simon Kuznets Kharkiv National University of Economics

Nauky ave., 9-A, Kharkiv, Ukraine, 61165

E-mail: inna01alekseenko@gmail.com

Valeriia Baranova

Doctor of Economic Sciences, Professor

Department of Banking Business and Financial Technologies

Education and Research Institute "Karazin Banking Institute"*

Olena Trokhymets

Doctor of Economic Sciences, Professor

Department of International Economics and World Economy*

Department Management and Marketing

Katowice Business University

(Akademia Górnośląska im. Wojciecha Korfańskiego w Katowicach)

Harcerzy Września 1939 str., 3, Katowice, Poland, 40-659

Daria Bukreieva

PhD, Associate Professor, Vice-Rector for Perspective Development

Department of Economic Analysis and Finance

Dnipro University of Technology

Dmytra Yavornytskoho ave., 19, Dnipro, Ukraine, 49005

Olha Viunyk

PhD, Professor

Department of Economics, Management and Commercial Activities

Central Ukrainian National Technical University

Universytetskyi ave., 8, Kropyvnytskyi, Ukraine, 25006

*V. N. Karazin Kharkiv National University

Svobody sq., 4, Kharkiv, Ukraine, 61022

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1. Introduction

Digitalization is a determining factor in the development of business entities of any scale. Digitalization is not only a trend but also an effective tool for ensuring a high level of competitiveness, improving processes and business. For companies with large-scale activities, the process of implementing digital solutions is more lengthy, expensive, and complex. A large number of business processes, their fragmentation by

elements, large volumes of data, their migration and processing require complex technical solutions for setting up a working automated system. Despite this, statistics prove that the level of digital intensity at large businesses in the European Union countries is higher. According to 2023 data, the share of enterprises that achieved the highest level of digital intensity was 26.4%; high – 42%; low – 22.8%; the lowest – 8.8%. The reverse statistics are demonstrated by the indicators of the level of digital intensity of small and medium-sized busi-

nesses: the highest level – 4.4%; high – 19.7%; low – 33.9%; the lowest – 42.1% [1].

The reasons for such trends are the unpreparedness and lack of professional competencies by small and medium-sized business owners to implement digital transformation projects, as well as insufficient internal and external resources [2–6]. The evolution and spread of digital technologies offer an opportunity to improve business processes, interaction, and communication. Along with this, there is an increase in the level of intellectualization and informatization of work [7].

It is believed that the implementation of digital technologies has a long-term perspective of return on invested capital from their implementation and is inherent in the strategic development plans at large enterprises. While small and medium-sized businesses are increasingly focused on short-term operational issues and do not consider digitalization as an investment, which is an urgent need for the survival and development of business in the conditions of the modern economy. We believe that small and medium-sized businesses have advantages due to the ease of implementing digital tools, limited number of operations, implementation of cloud solutions without complex integration, which do not require significant training costs.

A selective analysis, highlighting of barriers and incentives for the implementation of digital solutions in the activities of small and medium-sized businesses is extremely relevant. The results of the digital transformation of small and medium-sized businesses in different geographical locations are quite widely covered in reports from leading global organizations [8–10]. Familiarization with such reports radically expands the understanding of how significant and appropriate the implementation of specific digital tools is for solving business problems. The case studies reported in them allow one to learn from the successes and mistakes of others. They examine the factors that contributed to successful implementation, and which became barriers. This helps avoid common traps and plan specific digitalization strategy more effectively.

This issue is also important in the context of cash flow management. It is for small and medium-sized businesses that financial problems with a lack of cash, which arise due to a lack of information about their movement and receipts, are regular. Studies show that 61% of small and medium-sized businesses face financial difficulties because of ineffective cash flow management [11]. The lack of a proper management system complicates the organization of business processes, accounting, and data analysis, control over financial indicators, and personnel management. This leads to inefficient use of resources, loss of customers, and delays in the development of the company. The inability to enable effective management also complicates strategic planning and making informed decisions.

Effective cash flow management is critical to ensuring the liquidity, solvency, and financial stability of business entities. The implementation of effective digital solutions in cash flow management helps increase operational efficiency, reduce costs, improve forecasting and planning. Digital tools offer new opportunities for automating routine operations, the “manual” execution of which is not possible in an operational manner, may be accompanied by errors and provide a biased picture of the results of activities.

In the context of global digitalization, the issue of business process automation does not lose its relevance. The variety of offers from IT service companies regarding the automation of business financial management processes

highlights the need to substantiate those that most effectively contribute to increasing efficiency through automation.

2. Literature review and problem statement

The authors of [2, 3], based on a multidimensional analysis of the results of empirical research, determine the probability of introducing information and computer technologies into the activities of small and medium-sized businesses. The key factors in this case are the desire/intention to use information and computer technologies of business owners, the existing information technology infrastructure, the possibility of integration with the Internet, the level of use of electronic sales and purchases. It is proven that the introduction of information and communication technologies has a positive effect on innovative development, productivity, access to international markets, and the overall growth of small and medium-sized enterprises.

Paper [3] outlines the factors and mechanisms that determine or constrain the process of integrating digital technologies into the activities of small and medium-sized businesses. Although the study identifies key factors that influence the introduction of technologies, it does not provide specific answers as to which types of technologies are most effective for specific business goals. The presence of restraining factors does not contribute to the implementation of digital tools, and their large number and variety of business needs create objective difficulties in providing universal recommendations.

The process of implementing digital tools in the activities of small and medium-sized enterprises is described in more detail and universally in work [4]. The authors not only identified the factors, how they influence, but also divided the integration of enterprises into Industry 4.0 into stages. In addition, for each stage, the corresponding prerequisites and resources necessary to achieve the next stage were determined. However, it is not specified which digitalization tools are available, prioritized, or implemented by small businesses at a certain stage of development. An option for overcoming obstacles to the implementation of digital business management tools is to study the properties and conditions of use of individual ones, taking into account the specific needs, financial capabilities, and level of technological readiness of a particular enterprise. This approach is used in the following studies.

In [5], the effect of implementing such forms of digitalization as digitalization in production and logistics, digital value chains, and big data analytics is substantiated. Having chosen to investigate these digitalization indicators and their impact on promoting innovations in small and medium-sized enterprises, the authors leave artificial intelligence, cloud computing, and blockchain unexplored.

That issue was partially resolved in [6], which proved the effectiveness of using artificial intelligence in managing business cash flows. It is shown that cash flow management is not only about internal budgeting and forecasting processes. Artificial intelligence helps establish fast communication with consumers, provides a wide range of analytical data and analysis of them, which achieves the implementation of successful marketing strategies, and therefore an increase in cash receipts for the business. The questions of what artificial intelligence tools or platforms are used for this, their properties and conditions of application remained outside the scope of the study. This reduces the practical value of the conclusions on the effectiveness, accessibility and necessity

of digitalization of small and medium-sized businesses. Such studies are too large-scale for a separate work due to the need to test numerous artificial intelligence tools and justify them for business needs taking into account certain criteria.

The criteria that guide owners of small and medium-sized businesses in the process of choosing and implementing digital tools are studied in works [12, 13]. From the point of view of operational, financial and innovative efficiency on the activities of small and medium-sized businesses, the impact of digital transformation was studied in work [12]. The authors emphasize that the implementation of digital technologies is not limited to the use of a single infrastructure and therefore involves the injection of significant investments in digital technologies. Following the “cost-benefit” criterion, further justification requires the selection of such a set of digital tools that would allow business owners to increase operational efficiency and organizational sustainability. Digital technologies have already proven their ability to significantly increase business efficiency by optimizing business processes. The main thing is to specify the conditions of their application in such a way that they meet the unique needs and requests of each owner. Research into this area was conducted in [13]. Without specifying specific digital tools, the authors prove that the main criterion for choosing them for business owners is ease of use.

A powerful cash flow management toolkit based on the use of a specific set of digital technologies is reported for consideration in paper [14]. It contributes to the body of knowledge by proposing a cash flow management system for construction projects outside the construction site based on blockchain and building information modeling technologies. The paper describes in reasonable detail the financial results of using digital technologies. Blockchain provides transparency, security, and immutability of financial transactions, while information modeling contributes to the integration of detailed information about the project, which allows for more accurate forecasting and control of cash flows at different stages. However, the specificity of the industry to which the described procedures for implementing digital cash flow management technologies are applied, the significant cost and complexity of implementation limit their direct application for most medium-sized businesses and are inaccessible to small ones.

The authors of [15] emphasize the need to introduce effective cash flow management tools in the context of economic uncertainty for small and medium-sized businesses, using modern financial management tools. It is through process automation that the effectiveness and validity of decisions based on carefully collected data without the risk of error increases. Among the tools that the authors consider useful are software for tracking costs, budgeting and forecasting; cloud solutions for accounting, project management and customer relations; tools for online collaboration, data analysis, and e-commerce. Among the unresolved issues is the practical application of digital financial management tools for small and medium-sized businesses with the specification of application platforms for their use.

This is the approach used in work [16]. The authors see financial management based on data analysis as the key to the growth and stability of small and medium-sized businesses. Using the example of practical cases, the work justifies the choice of financial management automation tools appropriate for implementation by small and medium-sized businesses. To solve financial difficulties in cash flow management, the feasibility of using enterprise resource planning systems (cloud ERP solutions) has been proven. By automat-

ing invoice generation and payment tracking, the company has reduced overdue invoices and errors. The system has improved both operational efficiency and profitability by providing actionable information on production costs, revenue, and profit margin. However, due to the wide variety of existing ERP solution platforms, the lack of criteria and alternatives for their selection makes it difficult for business owners to make a decision about their implementation.

Summarizing the results of our review, subjective and objective factors that hinder the implementation of automation systems in the activities of small and medium-sized enterprises have been identified. These include specification of the business process that requires automation, financial capabilities and the level of technological readiness of a particular enterprise. In particular, the lack of selection criteria, conditions for the use of specific digital tools, and the lack of practical cases with specific platforms slow down the intensification of the implementation of digital tools by business entities.

Therefore, there are reasons to believe that it is advisable to conduct a study aimed at substantiating the selection and integration of specific digital tools for financial management of small and medium-sized enterprises. Based on the identification of features and providing characteristics of existing digital tools, the problem of determining the criteria and alternatives for choosing the most appropriate platform for automation must be solved. The feasibility and cost-effectiveness of using automation tools can be proven on the basis of demonstrating the advantages of the practice of using applied financial management platforms. The use of modern business process modeling tools is a prerequisite for their analysis, optimization, and further automation.

3. The aim and objectives of the study

The purpose of our study is to substantiate the use of automated cash flow management platforms for small and medium-sized businesses. This will provide an opportunity to form a comprehensive understanding of the role and potential of digital solutions for ensuring effective cash flow management for small and medium-sized businesses, as well as to offer tools for their practical application.

To achieve this aim, the following objectives were accomplished:

- to identify the features of existing platforms for automating business cash flow management processes;
- to characterize the advantages of automating cash flow management processes using an application platform that provides greater transparency of finances;
- to build a formalized model for automated cash flow management for small and medium-sized businesses.

4. Methods and materials

The object of our study is cash flow management processes at small and medium-sized businesses in the context of digitalization. The subject is a set of digital solutions (tools, platforms, technologies), mechanisms for their implementation, factors of influence and efficiency, which enable the optimization of cash flow management processes at small and medium-sized businesses.

The study hypothesized that the use of automated cash flow management platforms ensures increased transparency of

financial transactions, efficiency of management decisions and stability of financial results through the possibility of operational control and forecasting of cash flows. Before the study began, it was assumed that small and medium-sized businesses need to improve financial management, and automated platforms are technically and economically accessible to them. The adopted simplifications of the study are that the analysis was limited to the most common platforms without taking into account highly specialized solutions; the management model was built on the basis of typical business processes without industry detailing.

The study was conducted at the theoretical and empirical levels using the following methods and is based on the application of an integrated approach. The methods of system and descriptive analysis were used to identify the qualitative and quantitative advantages of implementing digital solutions, process modeling – for graphical representation of cash flow management processes, data visualization, logical and structural analysis. The methods of comparative analysis and SWOT analysis were used to identify innovative approaches in the development of digital solutions for managing corporate finances. The natural language processing algorithm was used to analyze information on the functional capabilities of existing platforms for automating business management processes. The research methodology is aimed at understanding and analyzing new technologies and methods of influencing key indicators of cash flow management (forecasting, operational and financial efficiency, avoiding cash gaps) and the overall competitiveness of the business.

To represent the advantages of automating cash flow management processes, an online management accounting tool designed for small and medium-sized businesses – Finmap (Ukraine) – was used. The functional features of the platform include automatic synchronization with the company's bank accounts. The system imports all revenue and expense transactions in real time, which ensures the generation of information reports and analytics with minimal manual data entry and risk of errors. Our paper demonstrates fragments of such reports using the example of a demo version of a functioning platform where cash flows of a demo company's activities are generated. The system represents integrated data in tabular or graphical form, which simplifies the perception of information and signals the presence of deviations in the indicators of excess of expenses over revenues. Absolute measurement of key indicators of cash flow analysis ensures the ease of determining their reliability by comparing current information on the company's bank account.

Modeling of the automated cash flow management business process in BPMN (Business Process Model and Notation) notation was implemented using Bizagi Modeler software (Great Britain, Columbia). The basis for constructing the BPMN model is the logic of reproducing the business rules of implementing the cash flow management process. Empirical experience of financial cash flow management of small businesses was used to conduct scenario modeling of resource utilization in the absence of automation processes and with their use.

5. Results of implementing and applying digital solutions in the cash flow management system of enterprises

5.1. Identifying features of existing platforms for automating business cash flow management processes

One of the reasons for the moderate pace of business digitalization is great diversity for individual business needs (market-

ing, analytics, communication). Choosing a unique set for the business owner, as well as its seamless integration, is a rather complicated and costly process. Often, in such cases, employees resist training and using various interfaces and functionality, so the owner faces a financial barrier to their implementation. Therefore, although the availability of a choice of digital tools is a positive criterion for implementation, an excess of platforms without a clear strategy for their use can slow down the digitalization of the business, making it more complex, expensive, and less effective. This issue is especially relevant when automating the processes of cash flow management of an enterprise.

Modern cash flow management goes beyond the accounting of past transactions [4]. Effective management requires accurate forecasting of future revenues and expenses. Marketing analysis (sales forecasts, advertising campaign effectiveness), results of communications with consumers and contractors (terms of agreements, payment confirmations), and analytical data (historical, trends) are critically important for compiling realistic budgets and financial models. Their fragmentation reduces the probability of payment forecasts and, as a result, maximizes financial risks. The results of the cash flow forecast are also negatively affected by subjective factors, namely errors or loss of data during their manual collection and processing. However, through the implementation of digital solutions in managing business cash flows, these risks are eliminated and their advantages in achieving objectivity and transparency of finances for owners and all stakeholders become obvious (Fig. 1).

Understanding the benefits of automated cash flow management processes, business owners increasingly consider the integration of the tool with others as the main criterion for deciding on digitalization, which forms an information flow for effective management. Tables 1, 2 demonstrate the identified features of the functioning of platforms for automating business cash flow management processes.

Based on the results of a comparative analysis of digital financial management tools for small and medium-sized businesses, owners can make decisions about choosing the one that best meets their needs and requirements. For small businesses, where the number of personnel is quite limited, and accounting and management accounting is most often conducted by specialists from outsourcing companies, the Quickbooks, Xero, and Finmap platforms will be more accessible. In this case, the criteria of fairly low cost of the product, moderate ease of mastering the skills of its use, and interpretation of the results of reports, accessible to owners without professional competence as a financier or accountant, will prevail. The Zoho books platform meets the criteria listed above. However, due to limited integration with other digital products, in addition to Zoho products, it makes it less attractive for business. Often, companies already have implemented digital solutions such as customer and sales management systems – CRM (Customer Relationship Management), warehouse accounting – WMS (Warehouse Management System), communication, etc. The Zoho books platform will be preferable for entrepreneurs who are just starting a business, then this platform will provide an opportunity to use a wider range of integrated digital services that are configured to each other, have a common interface and style of all applications.

The Oddo and Sage platforms require higher costs of both time and financial resources for their implementation and therefore are relevant for more complex business organizational structures and scales of activity. These costs are compensated by greater functionality of management systems.

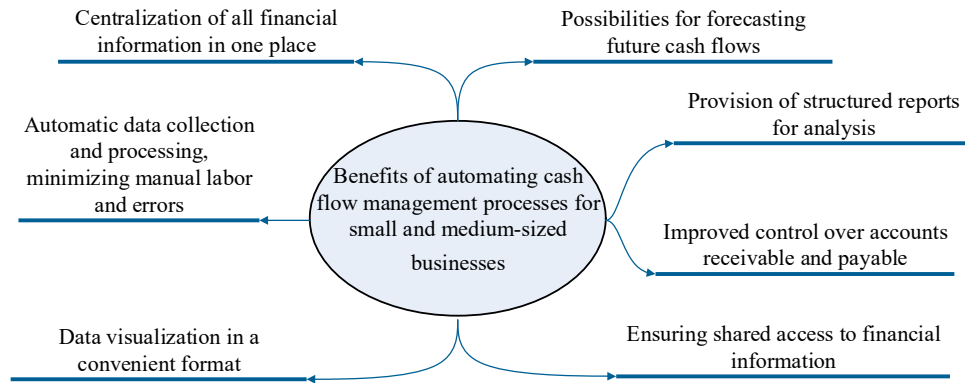


Fig. 1. Benefits of automating cash flow management processes for small and medium-sized businesses

Table 1

Comparative analysis of business cash flow management process automation platforms
ODOO, SAGE, QUICKBOOKS ONLINE [17–19]

Characteristics	Digital tool		
	ODOO	SAGE	QUICKBOOKS ONLINE
Solution type	ERP (module)	ERP (various products)	Cloud software
The main focus	Comprehensive business management (from sales to finance)	Financial accounting, ERP for SMEs	Online accounting for small businesses
Target audience	SMEs that require integration of multiple functions	SMEs and mid-sized enterprises	Small business, startups, freelancers
Key features	Accounting automation, bank accounts, invoices, reports, multicurrency, analytical accounting	Automated accounting, bank accounts, invoices, reports, tax calculations	Automated accounting, invoicing, bank reconciliation, reports, taxes, accounts payable management
Learning difficulty	Moderately high (depends on the number of modules)	Moderate-high (depends on product)	Low-moderate
Integration	Wide, proprietary modules and third-party ones	Broad, via Sage Marketplace	Wide, through the App Store
Cost per month	From USD 25 user/month	From USD 25 to USD 100+ thousand per year	From USD 30/month to USD 200/month
Advantages for SMEs	Complexity, scalability, flexibility	Reliable, full functionality for accounting	Ease of use
Disadvantages for SMEs	Difficult to use, requires IT specialists	Expensive for small businesses	Limited support

Table 2

Comparative analysis of business cash flow management process automation platforms XERO, ZOHO BOOKS, FINMAP [20–22]

Characteristics	Digital tool		
	XERO	ZOHO BOOKS	FINMAP
Solution type	Cloud software	Cloud software	Cloud software
The main focus	Financial management, cash flow control, accounting	Comprehensive accounting for growing companies	Cash flow management, financial analysis for non-financiers
Target audience	Small and medium business	Micro, small and growing business	Small and medium-sized businesses, entrepreneurs, without in-depth knowledge of accounting and finance
Key features	Accounting automation, bank accounts, invoices, reports, cash management, integrations	Accounting automation, online payments, expense tracking, reconciliation, project management, inventory control	Cash flow management, income/expense tracking, payment calendar, forecasting cash gaps, Debt control, reporting (Cash Flow, P&L), analytics by projects, customers, employees
Learning difficulty	Low-moderate	Low-moderate	Low
Integration	Wide, extensive ecosystem	Wide with other Zoho products	Direct integrations with banks, CRM systems, API for own integrations
Cost per month	From USD 2.90/month to USD 186.30/month	From USD 0 to USD 240/month	From USD 2.40/month to USD 716/month
Advantages for SMEs	Simplicity, cloud, banking integration, collaboration, mobile application	Availability, growing functionality, integration with the Zoho ecosystem, convenient interface	Specialization in cash flows, simplicity for non-financiers, direct integrations with banks, cash gap forecasting, debt management
Disadvantages for SMEs	Limited functions for complex business processes, less deep analytics	Limited opportunities for big business	Less complex accounting functionality, greater focus on management accounting

It was previously stated that the barrier to the implementation of digital solutions by small and medium-sized businesses is the lack of competence to use them, lack of resources [2–6]. However, if we analyze the information in Table 1, the implementation of financial management platforms is not expensive, the speed of learning and the low level of complexity of mastering the tool are insignificant. At the same time, the effect is many times greater than the costs.

When using digital tools for managing cash flows, owing to integration with an extensive system of payment instruments, every cent spent, every receipt is automatically recorded in the general balance of business income and expenses. Unlike the manual method of collecting and processing data, there is no loss of information. The analytical picture of business results is objective and transparent. Automatically generated data analysis daily provides the owner with a clear idea of the effectiveness of the activity, which contributes to the timely adjustment of management decisions to optimize income and expenses.

A summarized SWOT analysis of the benefits and risks of implementing digital cash flow management solutions for small and medium-sized businesses is shown in Fig. 2.

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • increased transparency and control • reduced manual operations and errors • faster decision-making • improved financial planning and forecasting • improved collaboration and communication • improved regulatory and security compliance • reduced operational costs 	<ul style="list-style-type: none"> • the need for initial investments in the initial cost of implementation • the need for staff training • the complexity of integration with existing systems • dependence on technology and internet connection • cybersecurity risks • resistance to change from staff • limited functionality of some budget solutions
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • increased competitiveness • access to new sources of financing • business expansion and scaling • opportunities to use cloud and AI technologies • improved relationships with suppliers and customers • focus on strategic tasks 	<ul style="list-style-type: none"> • wrong choice of software • insufficient qualification of personnel • dependence on external service providers • competition from large enterprises • costs of support and updates • potential data loss

Fig. 2. SWOT analysis of the benefits and risks of implementing digital cash flow management solutions for small and medium-sized businesses

Therefore, the choice of digital solutions for small and medium-sized businesses requires a careful individual approach and a detailed analysis of the company's internal processes. Each business has its own unique characteristics that must be taken into account when implementing technological solutions. It is not enough to simply purchase software – it is important to enable its effective integration into existing business processes, train personnel, and configure systems according to the specific needs of the enterprise.

To avoid mistakes and use resources as efficiently as possible, it is worth contacting proven software suppliers and integrators. They can provide expert support, help determine the most suitable solutions for specific tasks, and enable their smooth operation.

5.2. Advantages of automating cash flow management processes using an application platform

In order to demonstrate the advantages of implementing a digital cash flow management solution for small and medium-sized businesses, the results of using the Finmap online service [22] are reported. It is designed specifically to simplify financial and cash flow management for entrepreneurs. It makes it possible to track income and expenses, forecast future receipts and payments, as well as get a clear understanding of the financial status of the business. Its additional advantage is the simplicity of the interface, the ability to manage via a mobile application, and ease of use for users who are not finance specialists.

The platform makes it possible to connect bank accounts and payment systems, multi-currency, including cryptocurrency wallets. Transactions are automatically imported (the “Payments” section of the program) and can be automatically or manually sorted by expense and revenue categories (Fig. 3). Integrated artificial intelligence functions make it possible to process and automatically enter information represented in paper form or from other media. Finmap provides centralized and automatic display

of all financial transactions, giving an instant and complete picture of the flow of funds.

The platform generates and represents data in the form of understandable charts and reports (the “Analytics” section). The business owner sees current account balances, income and expense dynamics for different periods. Data visualization makes financial information easily accessible and understandable. One can quickly identify key trends, problem areas, and opportunities. The “Analytics” section contains automatically generated cash flow reports (Fig. 4), profit and loss statement (Fig. 5), accounts receivable and accounts payable, balance sheet, project report.

The fragments of the Finmap online service shown in Fig. 4, 5 reproduce automatically generated reports on the results of the enterprise's activities. For convenience, these reports can be displayed in both graphical and tabular format. By dis-

tributing payments by categories of expenses and income, the business owner sees their structure and dynamics and can quickly make decisions on their optimization. Using the auto-rules function, regular payments for income or expenses automatically fall into the category assigned by the user.

The “Calendar” section makes it possible to plan cash flow for future periods, which are reproduced in the same reports and visualize potential cash gaps or reserves for scaling and business development.

Studies have shown that automating cash flow tracking processes in real time contributes to an increase in income by 14.2% and a reduction in the risk of loss of solvency by 30% [23].

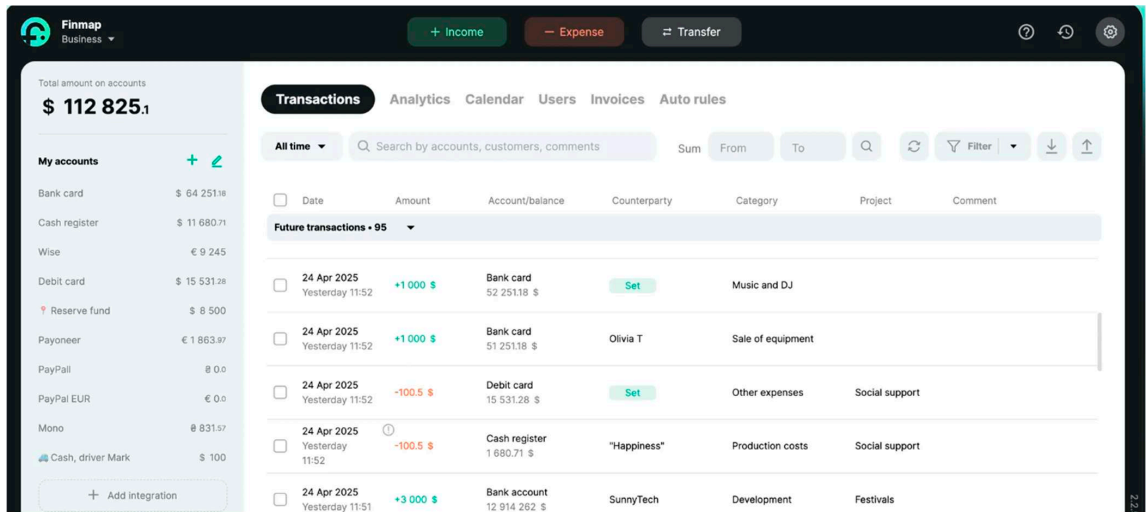


Fig. 3. Fragment of the “Payments” section at the Finmap platform

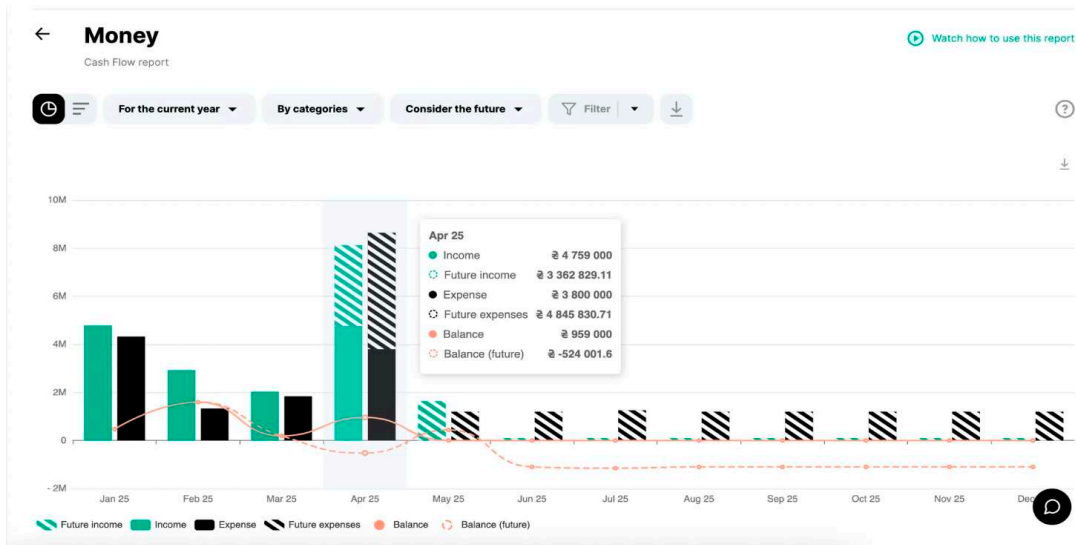


Fig. 4. Fragment of the “Analytics” section at the Finmap platform using the example of a cash flow report

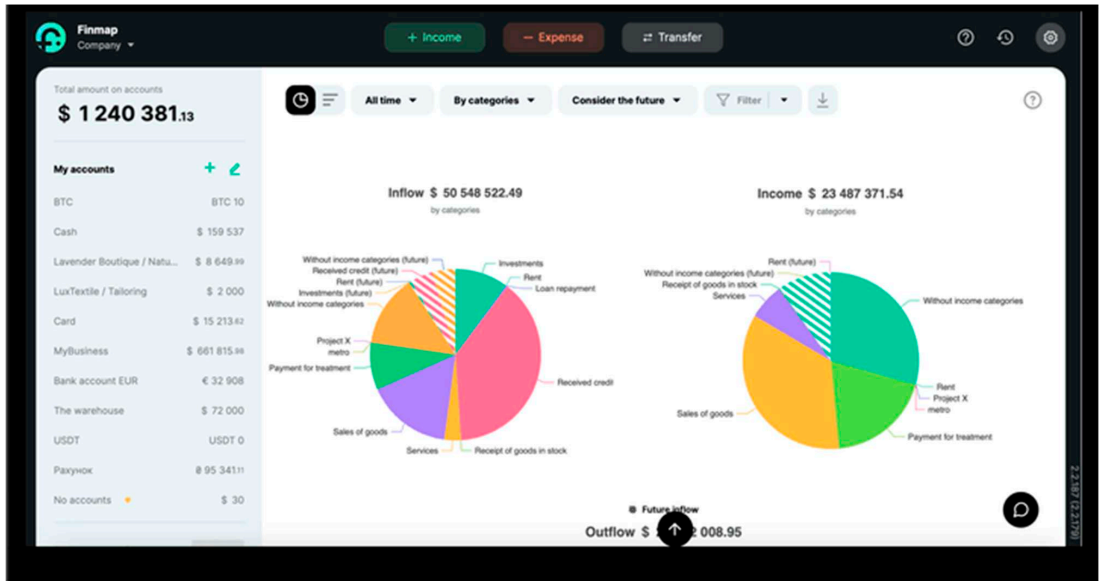


Fig. 5. Fragment of the “Analytics” section at the Finmap platform using the example of a profit and loss statement

5.3. Formalized model of automated cash flow management at small and medium-sized businesses

A standard way to represent a business model from start to finish is possible using BPMN notation. BPMN is a universal solution that uses standard modeling methods and standardized symbols to display complex processes. It makes it easy to share visual process models with anyone. BPMN technical and non-technical diagrams serve as a clear visual representation of process stages with enough detail to successfully implement them. They allow for improved communication and collaboration and are especially useful for increasing efficiency and identifying areas where improvements are needed. It is with the help of BPMN notation, built on the basis of the use of Bizagi Modeler software, that a formalized model of automated cash flow management of a business entity was constructed. Figure 6 shows a business process diagram of cash flow management by a business entity, which was built using standard BPMN notation.

The diagram consists of four cases that consistently reproduce the process of forming an analytical base of business revenues and expenses (invoicing, tracking payments and debts) through the work of the sales department. In the second case, the accountant reconciles bank transactions automatically imported into the cash flow management platform, and records other income and expenses, if available. Aggregated information is the basis for forecasting future revenues and expenses, performing simulation modeling and reproducing optimistic and pessimistic plans, and generating analytical reports. This case is performed by a financial analyst, and its results are the basis for making and implementing management decisions by the business owner.

The functionality of the Bizagi Modeler program allowed us not only to visualize the cash flow management process but also simulate the time and resource workload for its implementation. That made it possible to prove the practical effectiveness of implementing digital solutions in the financial management at small and medium-sized businesses while adhering to the “cost-benefit” criterion.

The first stage of the simulation analyzed resource utilization (Fig. 7) under “manual” cash flow management (AS-IS model). The total time for cash flow management in the absence of automated data collection and processing processes is 302 hours (Fig. 8).

The simulation results simultaneously demonstrate the parameters of labor and material resource costs in the implementation of the cash flow management process. We fix the total cost at USD 930.

A comparative analysis of the results of simulation of resource utilization and time spent when using a digital solution for implementing an automated cash flow management system for a business entity proves a positive effect. Namely, time savings of up to 266 hours (Fig. 9), reduction of the workload of the “manual” work of the financial analyst to 3.54% and the accountant to 6.52% against 14.17% and 19.17%, respectively (Fig. 10).

The results of our simulation of determining the level of resource utilization during automated management of cash flows of a business entity prove a threefold reduction in labor and material resource costs. This does not mean a reduction in wages, for example, of a financial analyst, it means the possibility of more productive work on strategic issues of enterprise development.

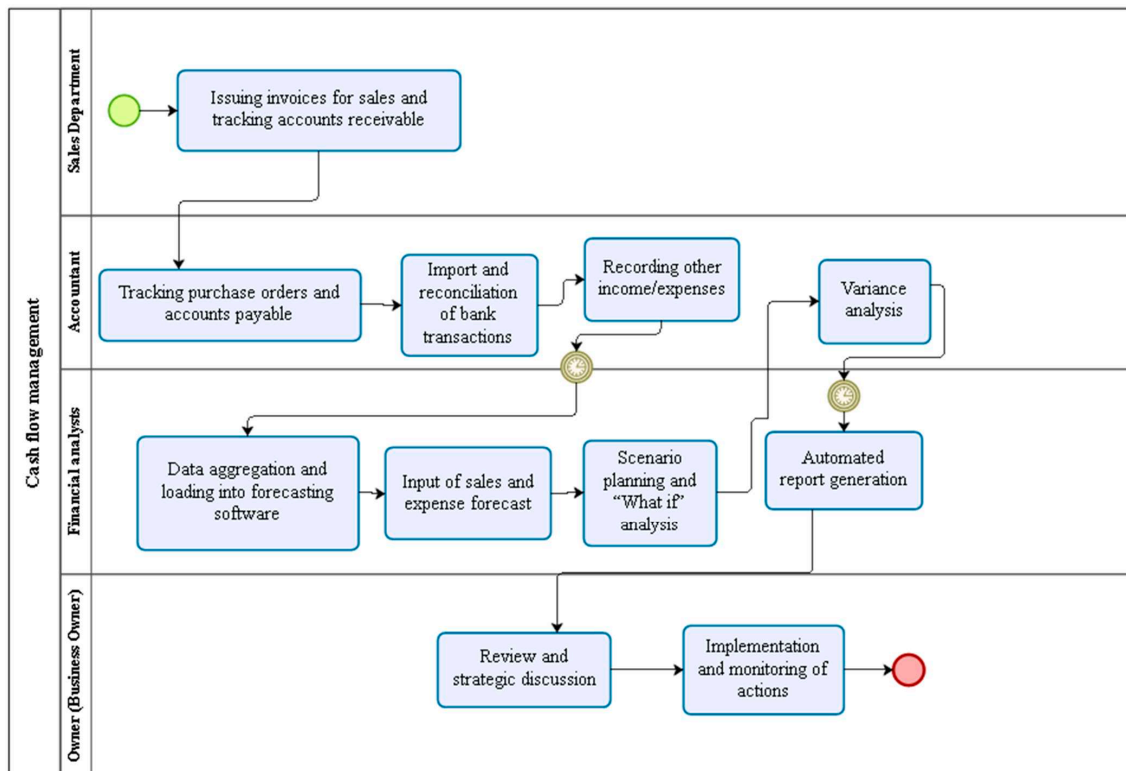


Fig. 6. Business process diagram of cash flow management by a business entity with the introduction of automated systems

Scenario information				
Title	Scenario 1			
Time unit	Hours			
Duration	020,00:00:00			
Resource	Utilization	Total fixed cost	Total unit cost	Total cost
Financial analyst	14,17 %	0	420,92	420,92
Accountant	19,17 %	0	316,48	316,48
Owner	1,67 %	0	0	0
Software	41,25 %	0	190,08	190,08
	Total	0	927,48	927,48

Fig. 7. Results of scenario modeling of resource utilization in cash flow management in the absence of automation processes (AS-IS model)

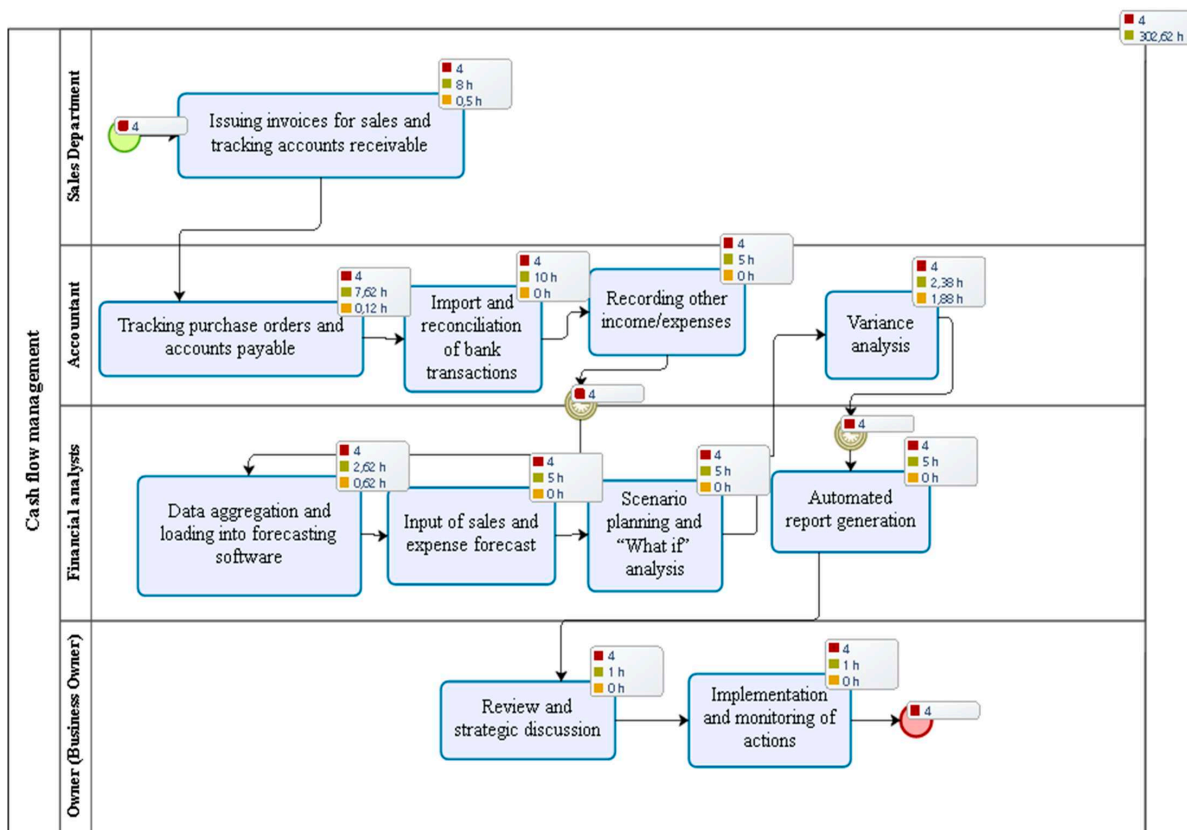


Fig. 8. Time allocation scenario for implementing four cash flow management cases in the absence of automation processes (AS-IS model)

So, with the help of another digital tool, it was possible to recreate a formalized model of the process of managing cash flows of a business entity. A visual representation of the sequence of management stages makes it possible to analyze and improve these processes, monitor implementation, time, and

expected results. By finding bottlenecks in business processes, the model makes it possible to eliminate them, optimize them, preventing problems from worsening. For novice business owners, this is an opportunity to build an effectively working financial management system built on the principles of automation.

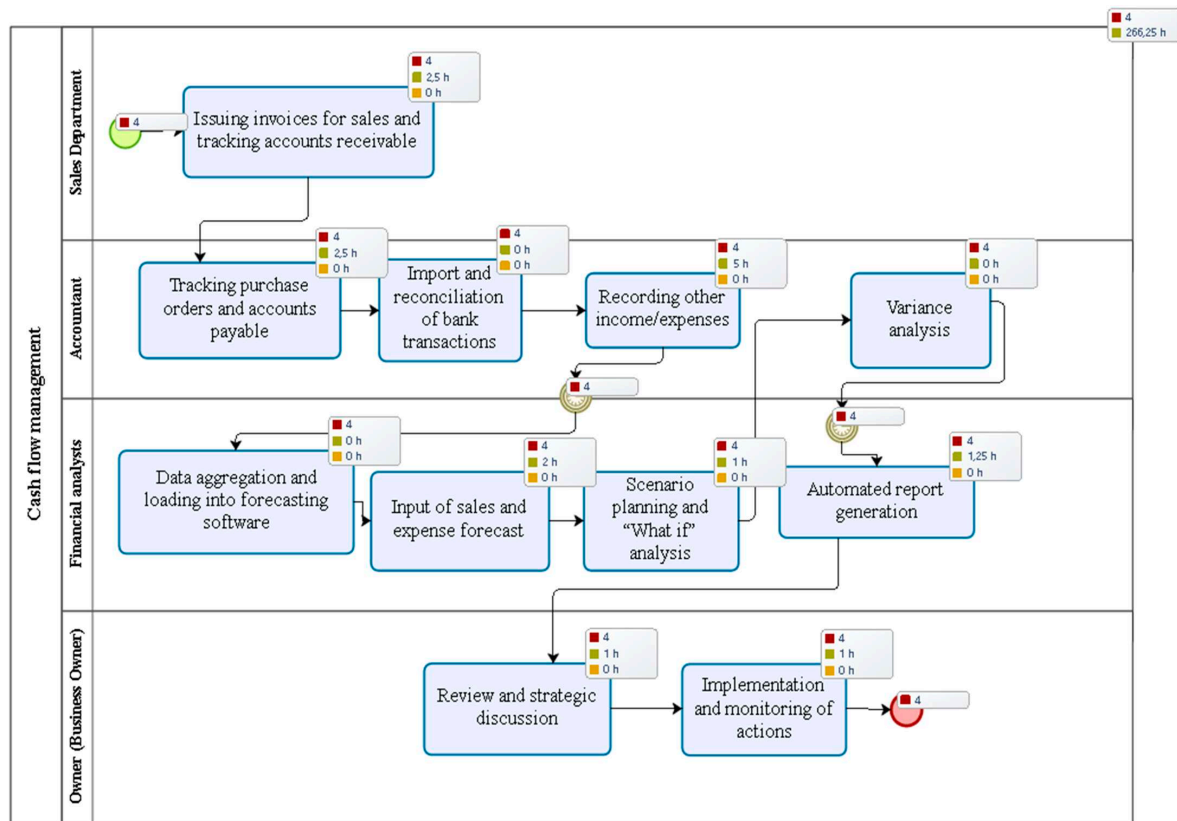


Fig. 9. Time allocation scenario for the implementation of four cases of automated cash flow management (TO-BE model)

Scenario information				
Title	Scenario 1			
Time unit	Hours			
Duration	020,00:00:00			
Resource	Utilization	Total fixed cost	Total unit cost	Total cost
Financial analyst	3,54 %	0	105,23	105,23
Accountant	6,25 %	0	103,2	103,2
Owner	1,67 %	0	0	0
Software (CRM, Vchasno, Trello, AI)	13,54 %	0	62,4	62,4
Software (Finmap)	13,54 %	0	14,63	14,63
Total		0	285,46	285,46

Fig. 10. Results of scenario modeling of resource utilization in automated cash flow management (TO-BE model)

6. Discussion of results based on the implementation and use of digital solutions in the cash flow management system of enterprises

The results of our research expand previous empirical studies, most of which prove the feasibility and effectiveness

of the implementation of digital technologies through surveys of business owners [2–6, 12, 13], specifying those that automate the financial management process. By conducting a comparative analysis of platforms for automating business cash flow management processes (Tables 1, 2), it was possible to break the barriers that small and medium-sized business

owners face in terms of the lack of professional competencies, their unpreparedness, and the high cost of digital solutions. As a result of our analysis of the characteristics of existing platforms for automating business cash flow management processes, those that are characterized by ease of implementation and low cost were identified. The incentives demonstrated by platforms for the digitalization of business cash flow management automation processes (Fig. 1, 2) are greater since they enable liquidity, solvency, and financial stability [23]. Practice shows that a significant part of small and medium-sized businesses face financial difficulties due to the risk of errors in routine operations and the lack of an objective picture of the financial situation.

The task of practical application of digital financial management tools for small and medium-sized businesses [13, 15] has been solved by highlighting the functionality and characteristics of a specific Finmap application platform [16, 22]. The platform's integration capabilities with various payment systems and bank accounts eliminate the need for manual entry and therefore minimize the risks of losing information and money (Fig. 3). Accessible online analytics (Fig. 4) for any period of time provide grounds for timely detection of cash flow imbalances and taking effective measures to prevent cash gaps, loss of liquidity and stability. Simple-to-represent and visually-friendly analytical reports (Fig. 5) are easily accessible for understanding by business owners who do not have a professional education in finance and are the basis for identifying reserves for scaling and development. Such reports will also be informative for third parties interested in the financial results of the business – investors, creditors, potential business buyers, etc.

In order to demonstrate the insignificant complexity of building an effective cash flow management system for small and medium-sized businesses in many industries and types of economic activity [14], our work simulated the business process of such automated management. The cash flow management model represented in BPMN notation using the Bizagi Modeler software visualizes the sequence of stages in the management process, identifies executors, and demonstrates the interaction between participants, as well as the logic of performing operations (Fig. 6). The built-in functions of the program allowed us to simulate changes in the cost and amount of resources spent on implementing the cash flow management process for small and medium-sized businesses under the conditions of making a digital decision (Fig. 9, 10) and its absence (Fig. 7, 8). The results of such a simulation demonstrated the economic effect of reducing the time for performing the processes of collecting, processing analytical information, and building reports based on it. Automatic reduction of labor costs affected the distribution of financial costs of payment for work performed, which allows specialists to devote more time to strategic planning of business development.

Our study is of practical interest to owners of small and medium-sized businesses who aim to enable the evolution of their own business through a clear understanding of the risks and opportunities of their financial capacity. The theoretical value of the study is of interest to researchers who devise methodological approaches to the analysis and assessment of the digital maturity of small and medium-sized businesses and are engaged in the implementation of digital tools in management accounting.

The research results are limited by their focus on certain types of platforms, namely, those responsible for the process of managing cash flows of small and medium-sized businesses. If it is necessary to implement, for example, operational or warehouse accounting, the proposed digital solutions will

not give the desired result. The use of one Finmap application platform to represent the advantages of automating the cash flow management process should be indicated as a disadvantage. In the context of specific cases, representing the results of using other platforms would expand the conclusions about the effectiveness and efficiency of digital solutions. Separately, it should be noted that the Finmap online platform is currently available for the following countries: Ukraine, Poland, the Czech Republic, Spain, and Turkey.

As areas of further research, it is advisable to consider the possibilities of deepening knowledge in the field of digitalization for more complex organizational structures and forms of business. The economic effect obtained from digitalization processes is practically important for enterprises of any scale, and the processes themselves for them, according to statistics, remain not high, especially in developing countries.

7. Conclusion

1. The results of determining the features of the functioning and implementation of existing platforms for automating cash flow management processes of enterprises allowed us to specify the criteria and alternatives for choosing a digital solution depending on the requirements and needs of their owners. The description of the platforms, based on the results of their systematization, resolves the issue of not only the feasibility of implementing digital tools but also the possibility of practical implementation of this process based on objective comparative data. This allows us to avoid the problems of choosing the wrong tool, which can lead to excessive spending of time and resources on making management decisions.

2. Based on the use of the Finmap application platform, the practical effectiveness of automating cash flow management processes has been substantiated. Due to automatic synchronization with bank accounts, errors from “manual” data entry are minimized, which ensures the relevance of financial indicators in real time. Reducing the time for collecting information and its automatic transformation into clear and understandable tables and charts for analysis contributes to a quick analysis of the financial condition of the enterprise. The use of such a platform allows for greater transparency of finances, ease, and efficiency of analysis of the current financial condition of business entities, reliability of forecasting and identification of opportunities for their strategic development. Compared to other, more universal and complex accounting systems, Finmap is a more accessible and adapted solution for small and medium-sized businesses. Its simplicity and specialization make it an effective tool for quickly obtaining transparency and control over financial flows. The use of such a platform overcomes the barriers of lack of competences to use them, lack of resources due to its ease of mastering even in the absence of professional competencies of a financier and affordability in terms of cost.

3. Our formalized model of the process of automated cash flow management at small and medium-sized businesses proves the effectiveness of automation processes through the prism of several criteria. The formalized model demonstrates how automation eliminates the “manual” stages of cash flow management, which makes it possible to reduce the workload of labor and financial resources. By simulating time and resource utilization, it became possible to quantify the results of implementing an automated cash flow management platform. Empirical experience has proven that a significant amount of time in the cash flow management process is taken up by the collection

and processing of primary information. Due to automation processes, these management stages are eliminated, which makes it possible to reduce the workload on a financial analyst by an average of 10% and on an accountant by 12%. The model reproduces how automation creates a single source of reliable financial data, relevant at the current point in time, which allows management to make quick and informed financial decisions.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study, as well as the results reported in this paper.

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Data availability

The manuscript has associated data in the data warehouse.

Use of artificial intelligence

The authors used artificial intelligence technologies within acceptable limits to provide their own verified data, which is described in the research methodology section.

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