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IMPROVING THE ACCOUNTING AND ANALYTICAL SUPPORT MODEL FOR THE FORMATION AND DIGITALIZATION OF ENTERPRISE REPORTING

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ABSTRACT

The digitization of reporting and the increase in requirements for the quality of accounting information create a need for a system model that combines regulatory rules, data management, automation, control, security, and stability of processes. In the practice of modern enterprises, fragmentation is often observed when individual digital tools are implemented without coordinating them with the control loop, compliance, data protection, and recovery scenarios. The aim of the work is to improve an adaptive model for accounting and analytical support of digital reporting, which ensures a stable cycle of indicator formation from input data to output digital reporting, consistent with the requirements of control, compliance, and information protection. The methodological basis is a combination of DEMATEL and DANP, which allows for simultaneously determining the causality structure in the system and obtaining quantitative weights of the priority of the components of the model. To build a matrix of direct impacts, an expert survey of specialists in the field of accounting and analytical support, as well as digitalization from Ukraine and Poland, was used. According to the results of DEMATEL, elements with the greatest systemic importance were identified through the D+R indicator, and causal elements that form the drivers of the model were also determined through the D−R indicator. The highest global weights belong to the components of information protection, business continuity, and cybersecurity. The practical result is an improved three-level structural model, which includes a regulatory and methodological basis, a security and stability contour, input data management, integration and processing, a control and compliance contour, analytics, and output digital reporting with feedback. The proposed improved model can be used as a basis for the development or modernization of digital reporting with a clear order of implementation of components, formalized interrelationships between them, and tools to ensure stability, manageability, and demonstration of results.

Keywords: accounting and analytical support, reporting formation model, digitalization of reporting, financial reporting, reporting quality, data management, data standardization, information systems integration, internal control, enterprises

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INTRODUCTION

The relevance of improving the accounting and analytical support model for the formation and digitalization of reporting is due to the fact that reporting has long ceased to be just a summary document for external users. It has become a central node of information trust between the enterprise, the state, investors, creditors, partners, and management. At the same time, in the modern economy, decisions are made quickly, and an error in the data costs more than the costs of setting up a high-quality accounting and analytics process. That is why it is critically important to ensure the integrity of data from the primary document to the final indicator in the report, the traceability of each calculation, consistency between management, financial, and tax logic, as well as the timeliness of the preparation of information for assessing results and risks. Additional pressure is created by the complexity of the regulatory environment, increasing requirements for transparency, accountability, and evidence. There is also heightened attention to internal control, audit trail, and responsibility for distortion of indicators. When an organization works with a large number of operations, counterparties, sales channels, and logistics, manual procedures not only slow down the preparation of reporting but also increase the likelihood of errors and manipulations. Therefore, the accounting and analytical support model should be described as a system of interconnected rules, procedures, responsibilities, control points, and tools that guarantee the quality of data, their interpretability, and comparability over time.

The importance of digitalization of reporting lies in the transition from periodic, delayed display of results to a more operational formation of indicators that support management decisions in almost real time, but such a transition is impossible without a scientifically based accounting and analytical support model. The digital format changes the very nature of the report, as the emphasis is shifted from document design to data management, their standardization, coordination of directories, integration with planning, budgeting, controlling, treasury, production, and logistics modules, as well as automated correctness checks.

LITERATURE REVIEW

In the current scientific and practical literature on the digitalization of reporting and the restructuring of accounting and analytical support, a strong block of research is noticeable, devoted to blockchain technology and the associated logic of increasing data trust. For example, Schmitz and Leoni (2019) shape the research agenda for accounting and auditing in the context of the spread of blockchain, emphasizing that the key value lies not only in the new technological infrastructure but in the transformation of the evidentiary nature of transactions, the audit trail, and confirmation procedures. In a similar vein, Bonsón and Bednárová (2019) analyze the implications of blockchain for accounting and auditing, focusing on the potential for record immutability, automated checks, and new approaches to ensuring reliability. They also emphasize the methodological and organizational challenges associated with the integration of distributed ledgers into traditional systems.

Grigg (2024) develops the idea of triple entry, showing how the concept can enhance control and trust through cryptographically verified records, which is relevant to the topic of the model for generating and digitizing reporting, as it shifts the focus from post-facto reconciliation of indicators to built-in verifiability.

At the same time, Akter et al. (2024) convincingly demonstrate the need to go beyond technological optimism and record the barriers to implementing blockchain in accounting, including the complexity of process changes, lack of competencies, interoperability issues, uncertainty of standards, and transformation costs.

For example, Premuroso and Bhattacharya (2008) study early and voluntary submitters of reporting data in the Extensible Business Reporting Language (XBRL) format and interpret such behavior as a possible signal of higher levels of corporate governance and operational performance, which strengthens the argument for the strategic, rather than purely technical, nature of digitizing reporting.

Callaghan and Nehmer (2009) complement this line by showing the connection of voluntary implementation of XBRL with certain characteristics of companies, thereby emphasizing that digitalization is not universally automatic; its pace is determined by resources, structure, motivation for transparency, and the ability to restructure internal processes.

From the perspective of reporting quality and digital transformation, Phornlaphatrachakorn and Na Kalasindhu (2021) demonstrate on the material of public companies that digital accounting and broader digital transformation processes can be associated with an increase in the quality of financial reporting, but this effect depends on the maturity of data management, the consistency of procedures, and whether control and discipline of input of primary information are ensured.

Tiwari (2024) examines visual reporting and continuous monitoring, showing that modern audit approaches increasingly rely on analytical dashboards, automated risk alerts, and continuous monitoring of transaction flows, which changes the requirements for data structure and speed of their update.

Ditkaew and Suttipun (2023) empirically link audit data analytics to audit quality and audit review continuity. Their findings reinforce the thesis of the need for standardized, complete, and logically consistent data suitable for automated review procedures. Roszkowska (2021) focuses on the role of financial technology in financial reporting and auditing to prevent fraud and protect investments, emphasizing that the digital environment simultaneously creates new controls and new risks that require strengthening internal rules, access segregation, change logging, and data governance.

Muravskyi, Farion, and Hrytsyshyn (2021) focus on the principles of cyber protection as a prerequisite for accounting information quality, including access segregation, change logging, confidentiality boundaries, and stakeholder-oriented protection priorities. Taken together, these works reinforce the need to embed cybersecurity and business continuity not as auxiliary measures, but as core elements that shape the stability of digital reporting and the credibility of analytical outputs.

AIMS AND OBJECTIVES

The purpose of the study is to improve an adaptive accounting and analytical model for the formation and digitalization of reporting, which ensures the stability of processes, data controllability, and provability of the initial digital reporting based on cause-and-effect modeling, DEMATEL, and prioritization of components using the DANP method. To achieve the goal, the following tasks were performed:

1. Systematization of components for improving the accounting and analytical model for the digitalization of enterprise reporting and grouping them into clusters that reflect the logic of movement from the regulatory framework and data to control, security, and initial digital reporting.
2. Organization of an expert assessment of direct impacts between the components of the model, with the involvement of specialists from Ukraine and Poland, to form an agreed scale of impacts and a matrix of direct impacts.
3. Implementation of DEMATEL to obtain a matrix of cumulative impacts, to determine the systemic importance of elements through D+R indicators and their causal role through D−R indicators, and to build a causal map of the model.
4. Improvement of the accounting and analytical support model, including input data, processing, control, security, and output digital reporting circuits.

METHODS

The model of accounting and analytical support for the formation and digitalization of reporting is essentially an extremely complex system in which individual components mutually reinforce or weaken each other. In conditions of martial law, this interdependence becomes even more evident, since the risk of disruptions in access to data increases, cybersecurity requirements increase, regulatory emphases change, and managerial decisions must be taken more quickly. That is why, to improve an adaptive model, it is advisable to apply an approach that simultaneously allows for establishing the cause-and-effect structure of the system and determining the priority of its components, taking into account mutual influences. For this, a combination of DEMATEL and ANP is used, namely, DEMATEL forms a causality map, and ANP provides the calculation of weights and ranking of components in conditions of network dependencies.

Therefore, DEMATEL, namely Decision-Making Trial and Evaluation Laboratory, is used to build cause-and-effect relationships between system elements. The method is based on an expert assessment of the strength of the direct influence of one element on another, after which it converts these assessments into a matrix of cumulative influences, which reflects both direct and indirect dependencies. As a rule, a discrete scale is used, for example:

- 0, no influence;
- 1, weak influence;
- 2, medium influence;
- 3, significant influence;
- 4, very strong influence.

Experts assess how much component i influences component j; the result forms a matrix of direct influences. In this case, the calculation of the importance and causality indicators is as follows (1):

$$D_i=\sum_{j=1}^{n} t_{ij} \quad R_i=\sum_{j=1}^{n} t_{ij} \tag{1}$$

where: Di+Ri reflects the overall involvement of the element in the system, that is, its systemic importance; Di−Ri shows the role of the element. If the value is positive, then the element is a cause; if negative, then the element is a consequence.

ANP, namely Analytic Network Process, is a development of the AHP method, but unlike hierarchical structures, it works with network dependencies. ANP allows us to determine the weights of criteria and components in a system where there are mutual influences and feedback. Classical ANP uses pairwise comparisons; however, for complex models with a large number of elements, it is advisable to apply an integrated approach in which DEMATEL forms a dependency structure, and

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ANP performs weighted generalization based on this structure. This approach is often described as DEMATEL-based ANP, or DANP. At the same time, in order to avoid excessive burden on experts and ensure systematicity, we form ANP weights based on the DEMATEL cumulative influence matrix.

The application of DEMATEL and DANP requires high-quality expert assessments of the interactions between the components of the model. In our study, 12 experts were involved, which provides a balance between the reliability of generalization and the manageability of the procedure. The composition of the formula group was such that it reflected different views on the model, in particular:

- 4 specialists in accounting and financial reporting, including corporate-level practices;
- 3 specialists in internal control, internal audit, and compliance;
- 3 specialists in digitalization of accounting, information systems, and data integration;
- 2 specialists in cybersecurity and data protection.

The survey was conducted in two rounds. In the first round, experts assess direct impacts on a scale of 0–4. After generalizing the results, an intermediate matrix is formed, experts receive a consolidated profile and, if necessary, refine the assessments in the second round. This approach increases consistency and reduces the risk of random assessments. After finalization, an averaged matrix is formed, on the basis of which DEMATEL and DANP calculations are performed.

RESULTS

In our view, the model should be designed as a system of interconnected blocks comprising input data, data-processing rules, digital infrastructure, quality control, and outputs in the form of digital reporting and analytics. For DEMATEL, it is important that the elements are specific enough so that experts are able to assess the impacts more consistently. Therefore, the grouping is carried out into clusters by function, namely the regulatory block, data block, digital infrastructure, control and analytics, security and continuity, and the output reporting block. This structure corresponds to the reporting cycle and allows us to identify which elements are drivers and which are results. To begin with, let's distinguish the clusters themselves and the components of the model:

Cluster A. Regulatory, methodological, and organizational support:

- A1. Regulation of accounting policy and methods for forming indicators.
- A2. Digital reporting regulations, closing calendar, responsibility, and roles.
- A3. Internal data and reference standards, rules for a uniform interpretation of indicators.

Cluster B. Data and primary documents:

B1. Primary accounting and digital document flow, including electronic signatures.

B2. Data quality at input, validation, completeness, and timeliness control.

B3. Data source integration, single repository, or single data model.

Cluster C. Digital infrastructure and automation:

- C1. Accounting system, such as ERP, and its settings for reporting.
- C2. Automation of period-end closing, consolidation, and transformations.
- C3. Business intelligence, visualization, and dashboard tools.

Cluster D. Control, compliance, and analytical support:

- D1. Internal control and reporting quality control procedures.
- D2. Internal audit and compliance, preparation for inspections, and evidence-based.
- D3. Analytical procedures, interpretation, explanatory notes, and management conclusions.

Cluster E. Security and continuity:

- E1. Cybersecurity, access control, and incident monitoring.
- E2. Protection of personal and sensitive data, rules for exchange and storage.
- E3. Continuity of processes, backup, recovery, and alternative channels.

Cluster F. Output, digital reporting, and feedback:

- F1. Formation of digital financial and management reporting, versioning, and reconciliation.
- F2. Publication, communication with users, feedback, and refinement of indicators.

A scale of 0–4 is proposed to assess direct effects between elements.

- 0, no effect. Changing component *iii* does not change component *j*, or the effect is random.
- 1, weak effect. There is a connection, but it manifests itself only under certain conditions or has a low intensity.
- 2, medium effect. Changing component *iii* significantly affects component *j*, but is not decisive.
- 3, strong effect. Component *iii* significantly determines the state of component *j*. Without it, the effect is significantly weakened.
- 4, very strong effect. Component *i* is a critical condition for component *j*; changes are almost directly translated into the result.

The five-level scale is detailed enough to capture the difference between the effects, and at the same time, does not overload experts. This is important because with a large number of elements, excessive detailing of the scale reduces the consistency of assessments. In wartime, the scale also makes it possible to isolate critical dependencies where security or continuity constraints directly impede the ability to generate reports.

The direct impact matrix is the starting point of DEMATEL. It captures causal relationships in a format that experts can realistically assess. Values are given on a scale from 0 to 4, where 0 means no impact, and 4 means a very strong direct impact. The diagonal is always zero because the element does not assess itself (Table 1).

Table 1. Direct Impact Matrix (MD).

	A1	A2	A3	B1	B2	B3	C1	C2	D1	D2	D3	E1	E2	E3	F1	F2
A1	0	2	2	3	3	2	2	2	3	2	0	0	0	0	3	2
A2	2	0	2	2	2	2	0	3	3	3	0	0	0	0	3	2
A3	1	2	0	2	3	3	3	2	2	0	0	0	0	0	2	0
B1	0	0	0	0	3	2	3	2	3	0	0	0	0	0	3	0
B2	0	0	0	2	0	3	3	3	4	2	0	0	0	0	3	0
B3	0	0	0	1	2	0	4	4	3	0	2	0	0	0	3	0
C1	0	0	0	0	0	0	0	3	3	2	0	0	0	0	3	1
C2	0	0	0	0	0	0	2	0	3	2	2	0	0	0	4	2
C3	0	0	0	0	0	0	1	2	2	0	3	0	0	0	2	3
D1	0	2	2	0	3	0	0	2	0	2	2	0	0	0	3	2
D2	2	2	0	2	2	0	0	0	2	0	2	0	2	0	2	2
D3	1	2	0	0	0	0	0	0	2	1	0	0	0	0	2	3
E1	0	0	0	0	0	2	3	3	0	2	0	0	2	2	3	0
E2	0	0	0	2	2	2	2	2	0	3	0	2	0	2	2	0
E3	0	0	0	0	0	3	3	4	0	0	0	2	2	0	1	2
F1	0	1	0	0	0	0	0	1	3	2	2	3	2	1	0	2
F2	0	2	2	0	0	0	0	0	2	2	3	0	0	2	2	0

The matrix of direct injections shows which components create the greatest multiplicative effect in the forming of displays, so that investments in standards, data availability, automation, and control give the greatest reduction in manual labor, Vitrat, and the risk of allowances in the world. At the same time, even before calculating cumulative impacts, it is useful to identify which elements have the greatest total impact on others, and which elements depend most on the system. Therefore, this allows us to logically check whether the matrix does not contradict common sense. For a digital reporting model, it is normal for a reporting element to have a high input impact because it accumulates the result of all previous components (Table 2).

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Table 2. Sums of direct impacts, external, and on the element.

Code	Sum of direct external influences	Sum of direct influences on the element
A1	26	6
A2	24	13
A3	22	8
B1	16	13
B2	22	20
B3	22	19
C1	14	26
C2	18	33
C3	13	18
D1	18	34
D2	18	21
D3	13	15
E1	19	4
E2	19	6
E3	24	4
F1	9	44
F2	10	22

The amount of infusions gives a financially sound allocation to the drivers and the largest remaining elements, in order to show how spending on investments creates the greatest effect for the entire system, and where there is something to be stored before the previous efforts have already been made contours.

Thus, the strongest drivers in terms of direct impacts are A1, A2, and E3; they set the rules of the process and ensure continuity, and therefore affect many other elements. The most dependent element is expected to be F1, the formation of digital reporting, as it integrates the outputs of data, infrastructure, control, and security components. D1 and C2 also have a high dependence, because quality control and automation of closure concentrate the impacts from many blocks.

It should be noted that the full direct impact matrix (MD) is 17×17 and large, so for ease of analysis, we include a compact clustered version (which is why we emphasized clustered at the beginning) that shows where the direct interactions are concentrated. This makes it immediately apparent that digital reporting is most powered by the regulatory block, the data block, the infrastructure, and the control (Table 3).

Table 3. Average direct influence between clusters based on the MD matrix.

Clusters	A	B	C	D	E	F
A	1.833	2.444	1.556	1.444	0	2
B	0	2.167	2.667	1.556	0	1.5
C	0	0	2.167	1.889	0	2.5
D	1.222	0.778	0.444	1.833	0.222	2.333
E	0	1.222	2.111	1	2	1.833
F	0.833	0	0.5	1	0	2.5

The middle clusters will show which blocks require the greatest expenditures on integration, due to vendors and regulations, since transactional expenditures themselves are formed, their Digitalization requires coordination, direction, and control.

In this case, Table 4 is of key importance. Thus, it shows that F1 and D1 have the greatest systemic importance, but they are consequences, since many other elements pressure them. Instead, the block E and A forms the basis of causality, which is logical for martial law conditions, because without security, data protection, and continuity, digital reporting cannot be sustainable (Table 4).

Table 4. DEMATEL results for elements.

Element	D	R	D+R	D-R	Role	Rank D+R
D1	1.871	3.672	5.542	-1.802	Consequence	1
F1	0.867	4.464	5.331	-3.597	Consequence	2
C2	1.602	3.050	4.652	-1.448	Consequence	3
A2	2.567	1.613	4.180	0.953	Cause	4
B2	2.171	1.938	4.109	0.234	Cause	5
A1	2.714	0.607	3.321	2.108	Cause	6
A3	2.337	0.977	3.314	1.362	Cause	7
B3	2.087	1.421	3.507	0.667	Cause	8
C1	1.264	1.547	2.812	-0.283	Consequence	9
C3	1.282	2.122	3.404	-0.841	Consequence	10
D2	1.693	1.776	3.469	-0.083	Consequence	11
D3	1.340	2.188	3.528	-0.848	Cause	12
E1	1.094	0	1.094	1.094	Cause	17
E2	0.938	0	0.938	0.938	Cause	16
E3	1.124	0	1.124	1.124	Cause	15
B1	1.061	0.643	1.704	0.418	Consequence	14
F2	1.056	2.832	3.888	-1.776	Consequence	13

The D+R and D−R indicators allow us to interpret the results as a financial map of priority management, where elements with high D+R are the most critical for the intensity and intensity of the brightness, and a positive D−R indicates points of application of resources that trigger system changes.

Next, the roles of each component in the system should be visualized, specifically identifying which elements are drivers of change and which are the results of the influences of other elements. Therefore, in DEMATEL, it is important not only to count the numbers but also to explain the logic of causality, which is why the causal diagram provides an intuitive reading of the model. It shows two things at the same time. The D+R axis shows the systemic importance, that is, how much the element is involved in interaction with others. The D−R axis shows causality, that is, whether the element affects the system more or depends on it more. In our case, the figure demonstrates that the elements of security and stability, as well as regulatory and methodological elements, form a causal vector, while the formation of digital reporting is the final result that accumulates influences from the entire system (Figure 1).

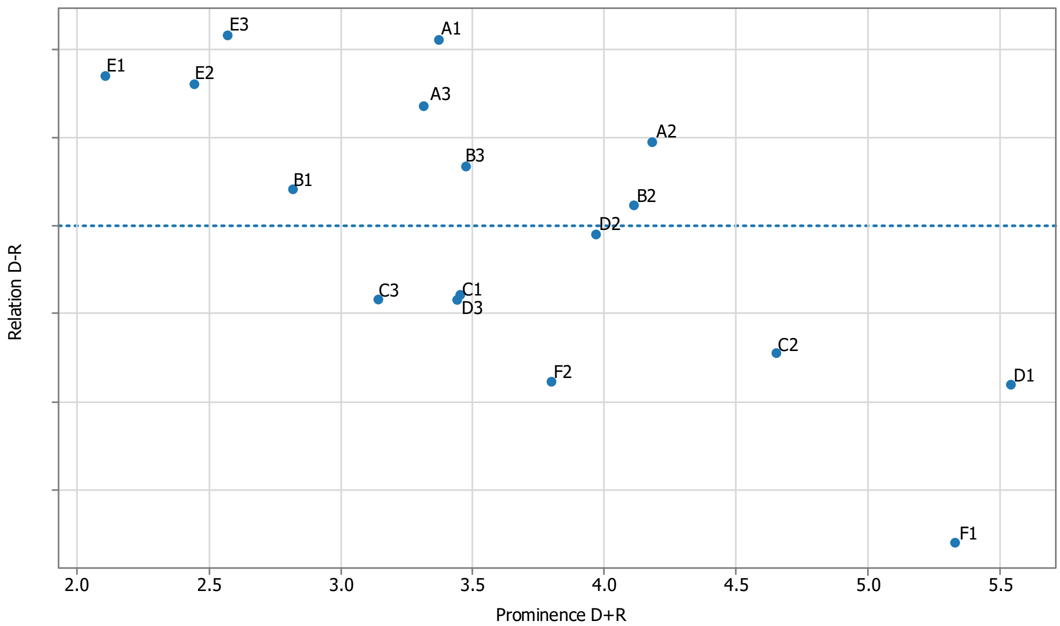

Figure 1. DEMATEL causal diagram for model components.

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The highest weight was given to security cluster E, and this is consistent with the logic of adaptability, as digital reporting in martial law requires data protection and process recoverability (Table 5).

Table 5. DANP weights, global priorities of model elements.

Element	DANP	Rank
E2	0.1642	1
E3	0.1429	2
E1	0.1366	3
D2	0.0837	4
A2	0.0639	5
A1	0.0609	6
A3	0.0485	7
D1	0.0462	8
B2	0.0447	9
B3	0.041	10
C2	0.0315	11
D3	0.0295	12
F1	0.0287	13
C1	0.0267	14
C3	0.0194	15
B1	0.0177	16
F2	0.011	17

Globally, we want to show which components are likely to be most profitable in terms of the financial strength of the mechanism, while minimizing the impact of waste from incidents, data losses, downtime, fines for damage, and expenses for renewing the cycle.

Cluster E has the highest weight, so the core of adaptability is security and resilience. Regulatory block A is the second, because without the unification of requirements, digitalization becomes fragmented. The DEMATEL result showed a causality structure, where E and A are key drivers, and D1 and F1 are the main system outcomes on which the impacts converge. The DANP result translated this into priority weights, where the first three positions belong to E2, E3, and E1, so the protection of sensitive information, continuity, and cybersecurity should be funded and implemented first (Table 6).

Table 6. DANP cluster weights.

Clusters	Weight	Rank
E	0.4437	1
A	0.1733	2
D	0.1584	3
B	0.1073	4
C	0.0776	5
F	0.0397	6

The types of clusters show what part of the resources can be directed to security and continuity, regulatory framework, control and compliance, data management, and infrastructure to achieve a stable result in the form of digital visibility.

At the end of our study, we will present the author's vision of improving the adaptive model for accounting and analytical support for the formation and digitalization of reporting (Figure 2).

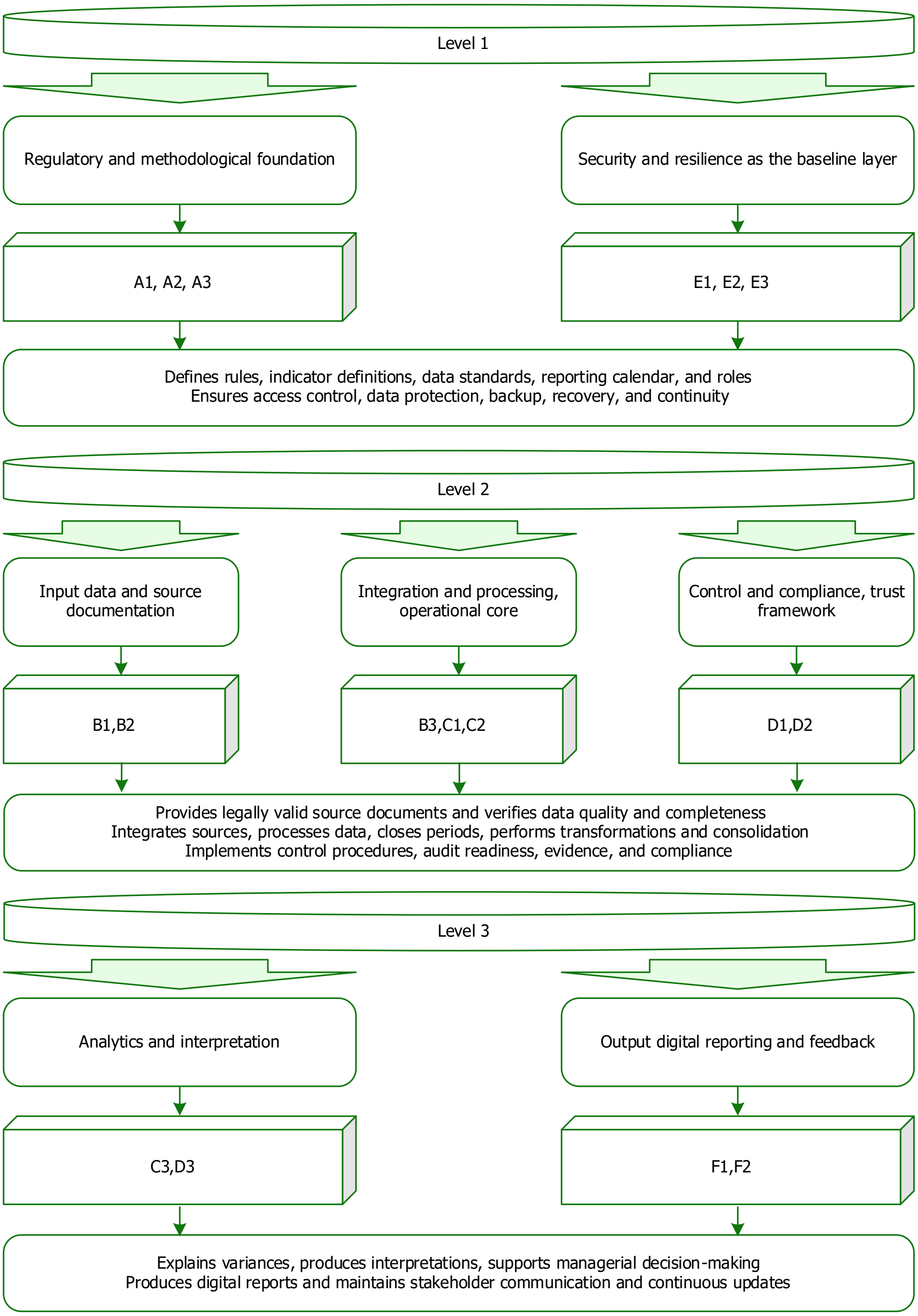

Figure 2. The improved adaptive model for accounting and analytical support for the formation and digitalization of enterprise reporting.

In essence, we have an improved three-tier model that transforms the digitalization of reporting into a managed process, where security and resilience have the highest priority, control and compliance provide trust and evidence, and data and automation reduce manual labor and errors.

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DISCUSSION

The results showed that the practice of digitalization of reporting often prevails in a fragmented approach, when the emphasis is on the implementation of individual tools, for example, reporting tagging, process robotization, analytical panels, blockchain solutions, or models for assessing the quality of reporting. At the same time, scientific works show that each such technology is effective only in the presence of a consistent data structure, controlled procedures, and proper risk management. In particular, report tagging substantially reduces errors but requires strong data discipline, standardization, and embedded validation checks (Perdana et al., 2023). Robotization of processes changes the preparation of financial reporting, but without a control loop, it can transfer errors faster, rather than eliminate them (Teixeira et al., 2025). Research on business intelligence emphasizes that analytical solutions are valuable when integrated with accounting processes and management logic (Rikhardsson and Yigitbasioglu, 2018). Therefore, it is debatable whether it is enough for enterprises and institutions to simply digitize operations or whether they need to first build a holistic model that ensures the reproducibility, provability, and sustainability of digital reporting.

In contrast to the majority of studies assessing the impact of individual technologies on indicators of quality, value relevance, or trust in reporting, our study focuses on the construction of the model as a system of causal relationships. Thus, the results on the value relevance of digital reporting confirm the importance of digital formats for information users, but do not explain which components of the model need to be built first for this effect to be sustainable (Shan and Troshani, 2020).

Studies on the application of blockchain technologies in financial reporting demonstrate the potential for improving quality, but at the same time emphasize barriers to implementation, compliance, and organizational readiness, which reinforces the need for a model, not just technology (Oladejo et al., 2024; Liao et al., 2025).

Studies using machine learning in assessing the quality of reporting also show the promise of the approach, but leave open the issues of interpretability, reliability, and dependence on the quality of input data (Al-Okaily et al., 2024). That is why the contribution of our work is not just a list of digitalization components, but their systematic ordering through DEMATEL and DANP, which provides a reasoned course of action and allows us to avoid a situation where the implementation of advanced technology does not produce the expected result due to weaknesses in data, control, or security.

A key difference and novelty of our approach is that the DANP results show that the highest priorities are given to security and resilience components, namely, protection of sensitive information, business continuity, and cybersecurity. This finding is consistent with current research, which shows that in conditions of high environmental uncertainty, digital transformation and the quality of accounting information significantly depend on risks and the ability of the system to adapt to change (Li et al., 2025). Additionally, work on the behavioral effects of big data in auditing highlights that the technological environment can complicate professional judgments and increase risks if control loops and data rules are not clear (Brown-Liburd et al., 2015). Therefore, our results clarify the focus of the discussion: the digitalization of reporting should start with building a secure and controlled environment, and only then scale automation, analytics, public disclosure, and additional technological solutions, including the Internet of Things, which expands data sources and requirements for their management (Valentitti and Flores Muñoz, 2021).

However, the results should be interpreted with due consideration of their limitations. Therefore, the DEMATEL and DANP models rely on expert assessments, so generalization requires further testing on samples of organizations with different accounting system architectures and different regulatory regimes. Second, technological solutions, such as process robotization, blockchain, analytics, can have different effects depending on the industry, digital maturity and control culture, so the next step is to combine our model with applied metrics of reporting quality, in particular with indicators of tagging errors and the results of control procedures (Perdana et al., 2023; Teixeira et al., 2025). At the same time, it is the causal model and three-stage roadmap we have proposed that create the basis for practical solutions, as they allow us to align digitalization with compliance and security requirements, as well as ensure the stable formation of output digital reporting as the final product of the system.

CONCLUSIONS

In general, we can say that the improved accounting and analytical support model for the formation and digitalization of reporting is a systemic approach that combines regulatory and methodological requirements, data management, digital infrastructure, control, as well as a security and resilience contour. Therefore, the use of the DEMATEL and DANP connection made it possible not only to describe the components of the model, but also to quantitatively establish their interdependence and implementation priorities, which is critically important for the conditions of high environmental variability and the need to ensure the continuity of digital reporting processes. The results of expert assessment and cause-and-effect modeling showed that the key driver of the model's adaptability is the security and resilience cluster. The highest DANP weights were given to the protection of personal data and sensitive information, business continuity, and cybersecurity. Thus, this means that the digitalization of reporting cannot be effective if it is not based on formalized access rules, recovery scenarios, backup, and secure data exchange channels. Within the model, these components establish the framework of trust and ensure the reproducibility of results, since without them, any automation of processing or reporting becomes vulnerable to failures and loss of controllability. At the same time, the DEMATEL causal map confirmed that the formation of initial digital reporting and internal control is of the highest systemic importance, but is a consequential element that accumulate the effects of all other components. This precisely indicates that improving the quality of digital reporting is achieved not by isolated changes in the initial circuit, but by consistently strengthening the regulatory and methodological framework, data standardization, source integration, automation of closure, and compliance. That is why the improved three-level model was built in such a way that the rules and the stability circuit were fixed at the first level, the input data and processing with control were provided at the second level, and digital reporting with analytical explanations and feedback was formed at the third level.

The practical significance of the study lies in the fact that the improved model and the obtained priorities can be used as a basis for designing or modernizing digital reporting systems, both at the level of individual organizations and at the level of industry approaches. The key advantage is that it combines standardization with flexibility, since changes in requirements are reflected through a regulated versioning loop, and environmental risks are compensated by a stability and control loop. Therefore, the implementation of an adaptive model for accounting and analytical support for digital reporting should be carried out primarily by strengthening the security and continuity components, while simultaneously unifying data standards and control procedures, which ultimately increases the reliability, timeliness, and manageability of digital reporting and creates conditions for its sustainable development.

Future research should validate the proposed causal structure and priority weights on broader samples of enterprises and sectors, using larger expert panels and multi-country comparisons to test the stability of the DANP ranking under different regulatory regimes and digital maturity levels.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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УДОСКОНАЛЕННЯ МОДЕЛІ ОБЛІКОВО-АНАЛІТИЧНОГО ЗАБЕЗПЕЧЕННЯ ФОРМУВАННЯ ТА ЦИФРОВІЗАЦІЇ ЗВІТНОСТІ ПІДПРИЄМСТВ

Цифровізація звітності та підвищення вимог до якості облікової інформації формують потребу в моделі, яка поєднує нормативні правила, управління даними, автоматизацію, контроль, безпеку й стійкість процесів. У практиці сучасних підприємств можна досить часто спостерігати фрагментарність, коли впроваджують окремі цифрові інструменти без узгодження їх із контуром контролю, комплаєнсу, захистом даних і сценаріями відновлення. Метою роботи є вдосконалення адаптивної моделі обліково-аналітичного забезпечення цифрової звітності, яка забезпечує стабільний цикл формування показників від вхідних даних до вихідної цифрової звітності, узгоджений із вимогами контролю, комплаєнсу та захисту інформації. Методологічну основу становить поєднання DEMATEL і DANP, яке дозволяє одночасно визначити структуру причиновості в системі та отримати кількісні ваги пріоритетності складових моделі. Для побудови матриці прямих впливів використано експертне опитування фахівців у галузі обліково-аналітичного забезпечення та цифровізації з України та Польщі. За результатами DEMATEL ідентифіковано елементи з найбільшою системною важливістю через показник D+R, а також визначено причинові елементи, які формують драйвери моделі, через показник D−R. Найвищі глобальні ваги належать компонентам захисту інформації, безперервності діяльності та кібербезпеки. Практичним результатом є вдосконалена трирівнева структурна модель адаптивної моделі, що включає нормативно-методичну основу, контур безпеки та стійкості, управління вхідними даними, інтеграцію та обробку, контур контролю й комплаєнсу, аналітику та вихідну цифрову звітність зі зворотним зв'язком. Запропонована вдосконалена модель може слугувати основою для розробки або модернізації цифрової звітності з чітким порядком упровадження компонентів, формалізацією взаємозв'язків між ними та інструментами для забезпечення стабільності, керованості й демонстрації результатів.

Ключові слова: обліково-аналітичне забезпечення, модель формування звітності, цифровізація звітності, фінансова звітність, якість звітності, управління даними, стандартизація даних, інтеграція інформаційних систем, внутрішній контроль підприємств

JEL Класифікація: M41, M42, M15

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