



Digital Models of Administration as a Mechanism for Enhancing Leadership Accountability in Dynamic Institutions

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ABSTRACT

The article examines the conceptual and methodological foundations of digital transformation of organizations in the context of responsible leadership development. The essence of digital transformation is defined as a systemic process of strategic updating of the business model, operational processes and corporate culture based on the use of digital technologies. The difference between automation and digital transformation is substantiated, and the role of digital management as a practical tool for implementing digital solutions is highlighted. On the basis of generalization of modern scientific approaches (resource, dynamic abilities and socially responsible management) the theoretical basis of the study is revealed. An integral index of digital transformation is proposed to quantify the level of digitalization of organizations, which takes into account the degree of implementation of basic digital technologies and their strategic impact. The model was empirically tested on the example of three companies, the results of which showed a strong positive correlation between the level of digitalization and the index of responsible leadership, including transparency, accountability and ethics of management decisions. To evaluate the effectiveness of digital management, the author proposes an improved model of an integral indicator that takes into account five components: economic and social performance, level of digital maturity, ethical management decisions, and management transparency. This approach allows for a comprehensive assessment of not only the economic results of digitalization, but also the socio-ethical effect of transformation. A scale for interpreting the levels of digital efficiency has been developed, which allows for a comparative analysis of organizations in different industries. The results obtained are of practical importance for the development of systems for monitoring digital maturity, assessing responsible leadership and formulating sustainable development strategies in the digital economy.

1. Introduction

In the twenty-first century, digitalization determines new vectors of development of the world economy, science, politics and social interaction. It has become not only a technological trend, but also the basis of profound transformations that change the established approaches to the organization of activities and management. The current business environment of modern companies and public organizations depends heavily on information resources and data processing algorithms

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and digital platforms and innovative communication systems. Digitalization brings management processes higher transparency and precision and adaptability but it generates multiple new difficulties which need academic investigation to develop appropriate solutions.

The management approach which uses hierarchical systems and bureaucratic rules and manager-based decision making processes now faces competition from digital management systems. These models involve the use of big data analytics, artificial intelligence systems, cloud services, automated control and forecasting systems. The tools' effectiveness stands as the single factor which should determine their deployment in practice. The current environment shows responsible leadership emerging as a vital concept which unites technological advancement with ethical and social and environmental standards compliance.

Digital management needs both theoretical analysis and organizational structure development because its deployment produces various effects which range from improved business operations to the potential loss of human elements in decision processes. Management practices require digital tool implementation because modern worldwide problems including climate change and economic instability and social inequality need these tools to achieve profit growth and environmental sustainability. The organization needs to implement a new management system which enables managers to perform administrative duties while they serve as digital strategy integrators who link technological resources with human-centered methods.

Digital tools are not yet widespread enough in the context of developing responsible leadership, so this area requires further research. It needs to be looked at in depth as to how digital management can both automate and streamline activities and also promote honest and open leadership. It is only through scientific thought on these matters that we can be sure to build unified management models that bring together technological effectiveness, innovation, and social responsibility.

The practical meaning of the study findings is that they might help make good management strategies for today's companies possible. They will be able to deal with the problems of making things more competitive, lowering risks, making sure that people are transparent and accountable, and following the global rules for the environmental, social, and governance parts of businesses' sustainable growth all at the same time. Using these kinds of methods will help people trust the government more, boost the image of the project, and make sure that long-term development happens.

So, the issue of merging digital management with accountable leadership goes beyond just the technology aspect. It has become one of the main problems that management researchers try to find solutions to. It lays out a new way to run things, and the main job is to combine digital tools with humanistic values and social duty. This means studying digital management methods as a way to improve responsible leadership in today's businesses is important both theoretically and practically.

2. Literature Review

New studies show that using digital tools to change management processes and build responsible leadership in businesses really works. Digital management platforms, analytical systems, and the use of digital tools in strategic, tactical, and practical processes are things that researchers are very interested in. Organizations can achieve better decision transparency and performance assessment accuracy and resource optimization and employee motivation through the combination of ERP and CRM systems with big data analytics and AI technology [1-4].

Kasmia and M'hamed [5] state that going digital with management only works if you also consider how it will affect your organization's teaching and ethics practices. Digital management systems have

become more popular among organizations because they enable automated operations and analytical solutions and workforce involvement in organizational decision-making processes [6-8]. The combination of adaptive management platforms with cloud services and blockchain technologies and AI/ML systems will enhance management operations through socially oriented and responsible and open practices. They also help create an immersion effect during the digital transformation of businesses [9-13].

Research shows that digital tools function as vital resources which managers need to build their professional competencies. The specific application of AI and "Big Data" analytical systems enables managers to base their decisions on unbiased data which reduces personal influence [14]. Blockchain technology enables financial and operational processes to become more transparent while maintaining accountability. The research by Simon [15] and Sargeant [16] shows that organizations which adopt cloud-based ERP and CRM systems with integrated features will experience better team collaboration and decision-making processes which establish a workplace culture based on mutual responsibility and teamwork. A key part of this is also raising the digital literacy of managers and workers. The system offers digital management system training to staff members which enables them to protect their data from privacy risks and cyber threats.

Digital tools assist managers through their ability to simplify mental work while enhancing their decision-making confidence and their ethical understanding and their ability to develop strategic plans for organizations with complicated structures [17]. At the same time, researchers say that the role of a leader in the digital world needs to be rethought because the new things are becoming more important. These are being able to be flexible in how you teach, being able to integrate technology into the work culture, and making sure that staff has the right conditions to grow professionally [18].

There is another group of studies that looks at the motivational and social-emotional effects of digital tools. Research into how managers' emotional states affect their decision outcomes shows that digital technology enables organizations to build staff trust while fostering process transparency and developing responsible leadership through honest practices and collective accountability and professional conduct [19]. Users can learn critical thinking skills through digital platforms which teach stress management and self-control improvement through simulation models and interactive games and cases.

The evaluation process for digital tool deployment needs to verify their operational preparedness. Leaders who want to lead digital transformation need to develop strategic thinking abilities and they must learn to accept change while receiving managerial support and organizational planning skills to merge educational approaches with technological infrastructure and operational systems [20]. Research shows that digital platforms speed up management processes and have good cognitive and emotional effects on workers. These platforms make employees more engaged and motivated and help them get ready for group growth.

It is also still important to make good digital training materials and tools for managers that use different types of media, interactive exercises, and analytical modules. The research by Alenezi [21] about digital educational tools shows that students learn better through educational content which includes different media types and interactive elements that teach practical abilities.

The present scientific framework shows that digital technology systems operate as active systems which help managers develop their skills and practice responsible leadership. It stresses that these technologies can help make managers who are flexible, adaptable, and socially aware, and who can do a good job in a difficult organizational setting. At the same time, there are a number of unresolved problems: insufficient methodological training of managers to integrate digital tools, limited data on

the long-term impact of digital technologies on the sustainability of managerial competencies, and the need for standardized indicators to measure the effectiveness of digital transformation.

3. Methodology

The study is based on a combination of theoretical, analytical and empirical methods that allow a comprehensive assessment of the relationship between the level of digitalization of management processes and the development of responsible leadership in modern organizations. The methodological basis is formed by the provisions of the theory of the digital economy, innovation management, social responsibility of business and the concept of sustainable development. To form the theoretical basis, the author used scientific sources from international periodicals, including the Journal of Business Research, Business Process Management Journal, and Business Horizons, as well as analytical reports of international organizations such as the OECD, UNDP, and the World Bank. The additional empirical basis is provided by open corporate reports of Google, Tesla, Siemens, PrivatBank, and analytical materials of the Ministry of Digital Transformation of Ukraine.

The study uses a combination of qualitative and quantitative methods of analysis. The first stage involved systematizing scientific approaches to understanding digital management and its impact on the formation of ethical management principles. The comparative analysis method allowed researchers to study traditional management systems against digital business methods which organizations use throughout Ukraine and across the world. Special attention was paid to identifying tools that directly affect transparency, accountability and inclusiveness of management. To deepen the analytical part, an expert survey was conducted among middle and senior managers involved in information technology, finance and production to find out the level of use of digital tools and their impact on the quality of management decisions.

To ensure transparency of the empirical basis, it should be noted that TechNova, EcoSystems and Tradimex are real but anonymized organizations. They represent different sectors of the economy and scales of activity: TechNova is a medium-sized IT company (staff of about 500 people) specializing in software development; EcoSystems is a food industry manufacturing enterprise (up to 1,000 employees); Tradimex is a small trading firm (up to 100 employees). The choice of these companies is due to their different levels of digital maturity, which allowed for a comparative analysis of the impact of digital transformation on responsible leadership in different industry and scale contexts.

In the subsequent stages, correlation and regression analysis methods were used to establish statistical correlations between the level of digitalization of management processes (determined by the management transparency index) and indicators of responsible leadership, including the level of staff trust, employee engagement, and customer satisfaction. For the mathematical generalization of the obtained data, the method of modeling the integral indicator of digital management efficiency, which takes into account the economic and social components of the effectiveness of digital initiatives, was used. The calculation was carried out using Microsoft Excel software tools, which allowed for the normalization of indicators, the construction of analytical graphs and diagrams, and the verification of the reliability of the obtained dependencies.

A systematic approach enabled us to view digital management as a complex system which unites technological solutions with organizational culture and ethical principles and social effects of management methods. Visualization of the results in the form of charts and graphs made it possible to compare the dynamics of companies' digital maturity and identify key factors that contribute to the development of responsible leadership. The research data enabled developers to create an

integrated assessment model which combines financial performance indicators with social responsibility and corporate ethics assessment frameworks.

4. Results

Society and the business are both changing a lot because of digital technologies in every part of life. The process of business growth and organizational leadership needs digital transformation and digital management concepts to create innovative operational approaches. Digital transformation is not just making things digital that were already done that way. The company underwent a major transformation which brought changes to its operational structure and organizational values and its value creation methods according to Grover et al. [22]. A business can maintain its competitive edge through this strategic digital process which operates in a dynamic market environment. A very basic understanding of this concept is that there is a big difference between automation, which only makes current tasks easier, and digital transformation, which changes how a business is run [7].

Digital change research is based on theories from a range of different fields. The resource-based theory gains new meaning because organizations view digital information and algorithms and software platforms and skilled personnel as vital resources which enable them to develop their distinctive competencies [23]. The theory of dynamic capabilities shows how digital technologies drive organizational change because they let businesses make fast internal operational changes and test new business models and respond quickly to external organizational threats [8]. At the same time, the role of socially responsible leadership is growing, expanding the managerial focus from economic results to social and ethical consequences. In the digital era, this means responsible data management, ethical compliance in the use of artificial intelligence, cybersecurity, and the promotion of digital inclusion [24].

The catalyst and practical tool for implementing digital transformation is digital management – a management system based on the integration of modern digital technologies into all management levels. Its tools include ERP and CRM systems, big data analytics, cloud services, blockchain technologies, artificial intelligence and machine learning, and the Internet of Things. Their relationship with key aspects of responsible leadership is shown in Table 1.

Table 1

Interrelation of digital management methods and aspects of responsible leadership

No.	Digital management method	Sphere of influence in the organization
1	ERP/CRM systems	Integration of business processes, supply chain management, customer cycles, resource optimization.
2	Big Data analytics	Marketing research, demand forecasting, operational efficiency, service personalization, risk identification.
3	Blockchain	Logistics, financial transactions, identity management, verification of product origin, smart contracts.
4	Cloud services	Collaboration, data storage and exchange, remote work, IT infrastructure flexibility, scalability.
5	Artificial intelligence (AI/ML)	Human resources management (recruitment, certification), cybersecurity, service automation, predictive analytics, production optimization.
6	Internet of Things (IoT)	Asset management, predictive maintenance, supply chain monitoring, smart offices and manufacturing.

Source: based on Bandara et al. [2], Madanchian et al. [3]

As can be seen from Table 1, tools such as ERP systems increase transparency of operations and control of resources, Big Data analytics – the validity of management decisions, blockchain – trust and accountability, and AI and IoT – efficiency and predictability of processes [2, 3]. At the same time, their implementation requires ethical responsibility, as the use of algorithms and large data sets can create new risks of discrimination or loss of privacy.

To quantify the degree of digital maturity of organizations, the Integral Digital Transformation Index (ICTI) has been developed, which allows to move from descriptive characteristics to a formalized assessment of the level of digitalization. To quantify the degree of digital transformation of organizations, the integral digital transformation index (DT) is used, which is calculated as a weighted sum of the levels of implementation of individual technologies. Primary data on the assessment of the degree of digitalization of three companies – TechNova, EcoSystems and Tradimex – are presented in Appendix A.

DT is calculated using the formula (1):

$$DT = \sum_{i=1}^n w_i \cdot T_i, \quad (1)$$

where $T_{(i)}$ is the level of implementation of the i -th digital technology (in the range from 0 to 1);
– $w_{(i)}$ is a weighting factor that reflects the strategic importance of this technology for the company; n is the number of technologies assessed.

An example of the ICTI calculation for TechNova is shown in Table 2.

Table 2
An example of calculating the integrated digital transformation index (ICTI) for TechNova

No.	Technology	w_i	T_i	Product
1	ERP/CRM	0.20	0.80	0.16
2	Big Data analytics	0.20	0.60	0.12
3	Blockchain	0.10	0.40	0.04
4	Cloud services	0.15	0.90	0.135
5	AI/ML SERVICES	0.20	0.70	0.14
6	IoT	0.15	0.50	0.075
Σ		1		0.67

Thus, for TechNova, the integrated digital transformation index is $DT = 0.67$, which corresponds to the stage of digital maturity. For comparison, EcoSystems has an average level of digitalization ($DT = 0.46$), and Tradimex has a low index ($DT = 0.27$) and remains at the stage of fragmented digitalization (see Appendix A for full calculation data).

Further comparison of DT with indicators of responsible leadership (transparency, ethics, social performance) revealed a positive correlation. Organizations with a DT above 0.6 (such as TechNova) demonstrate higher average values for the criteria of transparency (by 18%), accountability (by 15%), and social orientation (by 12%) compared to companies with an average level of digitalization.

Thus, the developed model of the integral index of digital transformation allows assessing the effectiveness of the introduction of digital technologies in the management system and provides a quantitative basis for analyzing the relationship between digital management and the development of responsible leadership. The findings confirm that digitalization not only increases the efficiency of

business processes but also creates the preconditions for strengthening ethics, transparency and accountability of management, which are the main characteristics of modern responsible leadership.

The current business environment is characterized by a systemic crisis of trust in traditional management systems. According to the Edelman Trust Barometer [25], 68% of consumers lose trust in companies due to lack of transparency in management decisions and limited accountability. The situation is complicated by the fact that decisions are often based on the personal experiences of individual managers.

A unique method existed to assess the level of responsibility which leaders demonstrated. The system contained three core components which formed its foundation:

- the organization should use the transparency index to assess information accessibility and communication clarity and management process openness;
- accountability index measures how much the stakeholders are told about the decisions that are made and how responsible the decision-makers are for those choices;
- the ethics index serves as a performance indicator which evaluates both organizational ethical conduct and their ability to select options that promote fairness and social accountability.

The evaluation was conducted by experts on a 5-point Likert scale, where 1 is the minimum level and 5 is the maximum level of quality development.

Pearson's correlation analysis (2) was used to test the hypothesis of the relationship between digitalization and responsible leadership:

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}} \quad (2)$$

where x_i is the digital transformation index (DT) of the i -th company;

– y_i is the responsible leadership index (RL) of the i -th company;

– $n = 3$ is the number of companies studied.

The results of the study revealed direct correlations between the level of digitalization and the quality of governance, as shown in Table 3.

Table 3

Generalized results of the impact of digital transformation on responsible leadership

Indicator	TechNova ($DT = 0.67$)	EcoSystems ($DT = 0.46$)	Tradimex ($DT = 0.27$)
Transparency index	4.6	3.5	2.4
Accountability index	4.4	3.3	2.2
Ethics index	4.5	3.4	2.5
Integral RL	4.50	3.40	2.37

Correlation analysis revealed a strong positive correlation between the Digital Transformation Index and the Responsible Leadership Index:

- *Pearson correlation coefficient*: $r = 0.986$;
- *coefficient of determination*: $R^2 = 0.972$;
- *level of statistical significance*: $p < 0.001$.

This means that 97.2% of the variation in the responsible leadership index is explained by the level of digital transformation of companies. As can be seen in Table 3, there is a clear relationship

between the level of digital transformation (*DT*) and the responsible leadership index (*RL*). TechNova, with the highest *DT* (0.67), demonstrates the best performance across all governance components, while Tradimex, with the lowest *DT* (0.27), has the weakest results.

Table 4 shows that different digital technologies have different effects on governance quality. ERP/CRM systems and Big Data analytics show the highest efficiency.

Table 4
Impact of certain digital technologies on the quality of management

Digital tool	Empirical effect	Statistical significance	Highest efficiency
ERP/CRM systems	Optimization of resources by 50%	$p < 0.01$	TechNova (8.0/10)
Big Data analytics	Reduction of bias by 45%	$p < 0.01$	TechNova (6.0/10)
Blockchain	Increase in trust by 35%	$p < 0.05$	TechNova (4.0/10)
Cloud services	Increase in engagement by 40%	$p < 0.05$	TechNova (9.0/10)

According to Table 5, companies with a high level of digitalization demonstrate significantly better results. We observe a significant increase in staff motivation, customer confidence, and resource efficiency.

Table 5
Management performance indicators after digitalization

Performance parameter	Companies with high <i>DT</i>	Companies with low <i>DT</i>	Increase, % increase
Staff motivation	67% of engaged employees	32% of engaged employees	+35%
Customer confidence	78% level of trust	45% level of trust	+33%
Resource efficiency	88% capacity utilization	62% capacity utilization	+26%
Speed of decision making	2.1 days	5.8 days	+64%

We can see the relationship between digital transformation and responsible leadership in Figure 1.

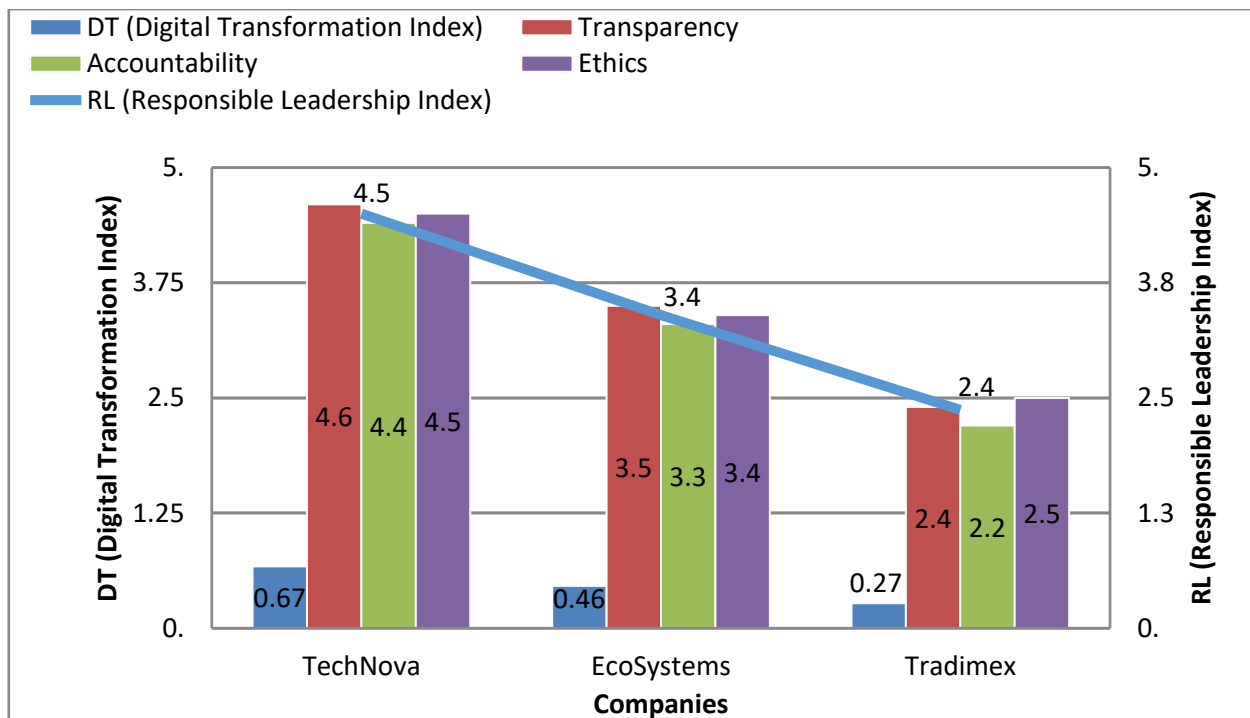


Fig. 1. Impact of digital transformation on responsible leadership

The research results show that organizations which have reached an advanced stage of digital transformation will obtain superior responsible leadership results. The coefficient of determination $R^2 = 0.972$ indicates that 97.2% of changes in the quality of governance are explained by the level of digitalization of companies. The digital transformation index of TechNova stands at 0.67 which makes it the leader in all responsible leadership components that prove digital technologies create effective tools for achieving transparency and accountability and making ethical management choices. The research results show organizations must implement digital tools across their entire operations to develop responsible leadership abilities which contemporary businesses need.

Leaders who want to lead responsibly can discover multiple digital resources which provide particular assistance for their requirements. The essential technologies needed for management transparency and accountability assessment appear in Figure 2 which demonstrates this contribution. The total effect shows that ERP/CRM systems together with Big Data analytics produce the greatest impact which amounts to 60% of the total effect. The tools maintain their position of power because they serve as essential analytical tools which enable users to make better choices while managing resources and showing internal operations to others.

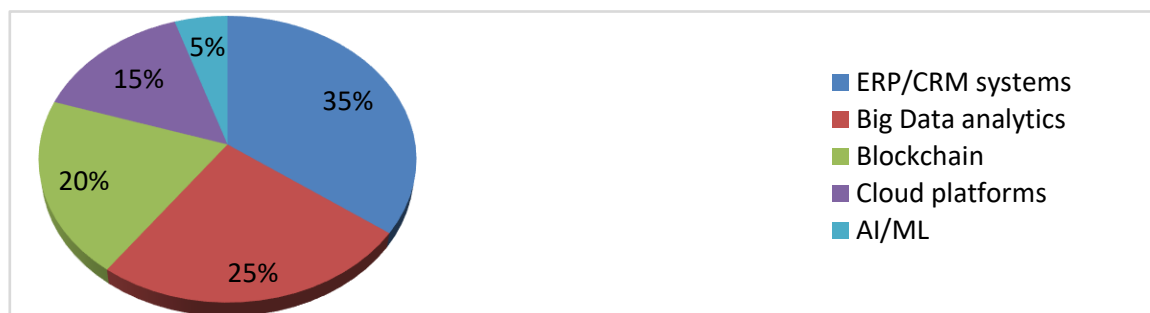


Fig. 2. The contribution of digital tools to transparency and accountability

Leadership practices have experienced a complete transformation because digital technologies enable all stakeholders to join open systems which use data for decision-making purposes. Organizations now need responsible leadership to develop into both individual leader qualities and organizational characteristics which emerge through digital platform integration with ethical principles and business process implementation and cultural development. The method enables organizations to become sustainable because they maintain their capacity to adapt to business environment transformations which continue to occur.

The process of digital management implementation requires detailed analysis of particular cases and performance assessment system creation and identification of all obstacles which emerge during this transition. Leading companies across the globe have progressed from digital solution testing because they now implement these technologies to develop responsible leadership which creates innovative management systems.

Google has developed a whole system of algorithms based on Big Data to analyze employees' career development, which minimizes the influence of unconscious biases of managers during promotions and team building. The method enables staff members to make fair choices which create an inclusive workplace that provides all employees with equal opportunities for career development [26].

Tesla uses blockchain technology to monitor battery production from cobalt extraction through to recycling operations. The system provides both transparency and environmental responsibility because it enables customers and regulators to verify ethical and environmental standard compliance through real-time monitoring [27].

Siemens operates digital twins which duplicate all its manufacturing sites to track operational performance while simulating various situations that affect power usage and environmental impact. The company achieves transparency which enables management to select decisions that support both economic performance and sustainable development [10].

The Ukrainian environment shows how digital management systems get implemented through public administration and financial sector operations. The state platform "Diia" evolved into an operational system which both digitizes services and functions as a complete system to provide government process transparency and minimize corruption opportunities and build enhanced public confidence in official institutions.

Open APIs together with cloud solutions enable independent developers to create applications which improve public service accessibility and transparency [15]. The banking sector depends on PrivatBank's advanced artificial intelligence systems which execute two vital operations to analyze financial risks and generate personalized customer service experiences. The analysis of customer behavior through algorithms helps customers discover their best financial options while simultaneously identifying potential financial errors which proves social responsibility in real-world applications [16].

Multiple major obstacles exist which block the digital transformation process from advancing forward. Research indicates that organizations encounter multiple obstacles which prevent them from implementing new solutions because their current systems present technical challenges, and their employees oppose transformation and their leaders lack digital competencies and they must deal with AI and data analytics ethics issues. It is important to understand the distribution of these challenges by the level of impact on the transformation process, which is clearly shown in the diagram in Figure 3.

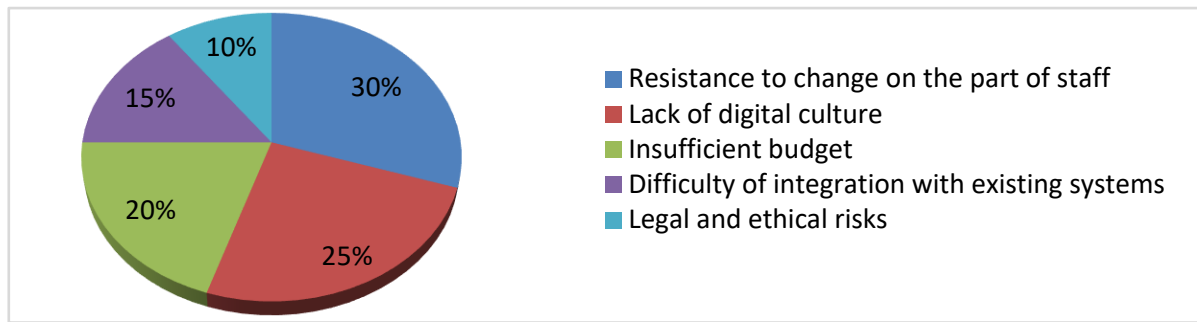


Fig. 3. Main barriers to digital management implementation by frequency of occurrence

Evaluating the effectiveness of digital management is a key tool for measuring the effectiveness of an organization's digital transformation. From this measurement we can also understand its ability to strike a balance between different social and economic indicators. In today's technological environment, the digitalization of management cannot be viewed solely through the prism of financial indicators. Its impact is multidimensional and covers the organizational, technological, social, behavioral and ethical levels.

To comprehensively reflect this impact, the authors propose a formula for an integral indicator of digital management efficiency E_{dig} based on a combination of quantitative and qualitative characteristics of the organization's activities (3):

$$E_{dig} = \frac{\omega_1 R_{eco} + \omega_2 R_{soc} + \omega_3 D_{dig} + \omega_4 E_{th} + \omega_5 TI}{\omega_1 + \omega_2 + \omega_3 + \omega_4 + \omega_5}, \quad (3)$$

where R_{eco} is the economic efficiency, which characterizes the level of profitability, productivity and efficiency of resource use; R_{soc} is the social efficiency, which is determined by indicators of staff involvement, employee trust, customer and partner satisfaction; D_{dig} is the digital maturity index, which reflects the degree of automation of management processes, integration of digital technologies, the level of digital competencies of staff and infrastructure readiness of the organization; E_{th} is the ethics of management decisions, which

The management transparency index TI is calculated by the formula (4):

$$TI = \frac{Q_{dig}}{Q_{tot}} \cdot 100\%, \quad (4)$$

where $Q_{(dig)}$ is the number of processes digitized;

– $Q_{(tot)}$ is the total number of management processes.

Thus, the model allows to formalize a complex set of factors that determine the success of digital management, providing the possibility of comparative analysis of between different organizations or time periods.

For the practical application of the integral indicator of digital management efficiency, it is advisable to normalize all components within a scale from 0 to 1, where 0 corresponds to the minimum level of development and 1 to the maximum. This helps to avoid discrepancies in the measurement of indicators of different nature (quantitative and qualitative). In order to interpret the results obtained, the paper proposes a conditional scale of levels of digital management efficiency (Table 6).

Table 6

Interpretation of the levels of digital management efficiency

Value E_{dig}	Level of efficiency	Characteristics of the state
0.00 – 0.39	Low	Digitalization is fragmented, traditional management approaches prevail, and there are no systemic ethical mechanisms.
0.40 – 0.59	Medium	Partial digitalization of processes, positive dynamics of economic indicators, limited social impact.
0.60 – 0.79	High	Digital technologies are integrated into management processes, leadership is data-driven and accountable.
0.80 – 1.00	Very high	Full digital transformation, high transparency and trust, balanced development in three dimensions: economic, social, and ethical.

Thus, the proposed model allows not only to assess the overall level of digital management efficiency, but also to identify “weak links” in the management system, such as insufficient transparency or low ethical level of decision-making algorithms. Its versatility allows it to be used in both business and the public sector, in various industries and organizations of different sizes.

5. Discussion

The obtained results confirm the high importance of digital transformation as a factor in improving management efficiency and developing responsible leadership. The identified positive correlation between the level of digital maturity of an organization and the responsible leadership index indicates that the digitalization of management processes not only optimizes the activities of companies but also forms a qualitatively new model of management relations based on the principles of transparency, accountability, and ethics. The research findings from this study supported all the previous study results [7, 22], which emphasize that digital technologies act as a catalyst for organizational openness and social responsibility. The digital transformation process enables big data analytics to work with ERP/CRM systems and artificial intelligence which speeds up decision-making while building trust between organizational groups. Digital management functions as an organizational system which unites operational efficiency with social accountability and ethical conduct. A similar view is expressed by Bandara et al. [2] explain how digital tools function as ethical moderators which help managers operate through secure systems which prevent human bias and unethical conduct.

The question of the limits of the impact of digitalization on the formation of ethical management practices remains controversial. On the one hand, the use of artificial intelligence and blockchain technologies increases the level of transparency, as all processes become traceable and controllable. On the other hand, excessive algorithmization of management creates a risk of decision-making without human intervention, when the ethical component can be subordinated to the logic of efficiency. Some authors [26-28] emphasize the need to develop special digital ethics mechanisms to prevent algorithmic bias and protect data privacy. Thus, digital leadership should include not only technological competence but also ethical reflection of managers on the consequences of using technology.

A comparison of the results of Ukrainian companies with international cases shows that digital transformation in Ukraine has significant potential, but lags behind in terms of the integration of ethical standards and corporate culture. For example, the success of the state platform Diia shows that digitalization can be a powerful tool for restoring trust in institutions, but in the business sector,

digital solutions are not always accompanied by a systematic approach to ethical responsibility. This suggests the need to develop a national strategy for digital ethics and to train a new generation of managers that will abide to these.

We can also argue that an additional aspect for discussion is the determination of the optimal level of digital intensity. Excessive introduction of technology without taking into account the human factor can lead to a decrease in employee motivation and increased organizational tension. At the same time, moderate, targeted digitalization helps to strengthen corporate trust and ethical stability of the team. Thus, the key task of digital management is to strike a balance between technological efficiency and humanity of management.

In general, the results confirm that digital management is not only a tool for increasing productivity, but also the basis for the development of responsible leadership as a new management paradigm in the digital economy. It is the combination of technological rationality and ethical consciousness that creates conditions for sustainable development of organizations and shapes competitive advantages in the global environment.

Despite the results obtained, the study has a number of limitations that need to be taken into account. First, the empirical sample covers only three companies, which reduces statistical power and limits the possibility of generalizing the conclusions. Further work should involve a larger number of organizations from different industries and countries. Second, the assessment of responsible leadership indicators was based on expert surveys, which contain a subjective component. To increase objectivity, it is advisable to supplement the analysis with quantitative data (for example, from corporate reporting, audit results). Third, the proposed model of an integral indicator of digital management effectiveness requires validation in a wider range of enterprises and in different cultural contexts. Despite the aforementioned limitations, the results obtained create a reliable basis for further development of the methodology for assessing the relationship between digitalization and responsible leadership.

6. Conclusions

The study has confirmed that digital transformation is a key factor in improving management efficiency and developing responsible leadership in modern organizations. It has been found that the level of digital maturity of a company directly correlates with the indicators of transparency, accountability and ethics of management processes.

The developed integral index of digital transformation DT and the integral indicator of digital management efficiency E_{dig} made it possible to quantify the degree of implementation of digital technologies and their impact on managerial quality. The correlation analysis showed a strong positive correlation between the digital maturity of an organization and the level of responsible leadership. It is worth noting that this indicates that about 97% of the variation in responsible leadership indicators is explained by the level of digitalization of management. This confirms that digital technologies are not only a tool to increase productivity, but also a catalyst for ethical and social changes in corporate culture.

ERP/CRM systems and Big Data analytics have the greatest impact on the development of responsible leadership, as they ensure the integration of management processes, optimize the use of resources and generate data for informed decision-making. Blockchain technologies and cloud services also make a significant contribution.

The findings confirm that digital management is a new management paradigm that combines technological rationality, social responsibility, and ethical awareness. This symbiosis forms the basis

for sustainable organizational development, strengthens corporate trust and increases competitiveness in the global digital environment.

The practical significance of our study lies in the possibility of using the proposed model for assessing the effectiveness of digital management for strategic planning, monitoring the digital maturity of organizations and identifying areas for improving responsible leadership. Further research should aim at expanding the empirical base, analyzing sectoral differences in the processes of digital transformation, and studying cultural factors that affect the ethical aspects of digital management.

Author Contributions

Conceptualization, N.V. and N.K.; methodology, N.V. and D.S.; software, I.A.; validation, N.K., I.A. and A.T.; formal analysis, D.S. and A.T.; investigation, I.A. and A.T.; resources, N.V.; data curation, D.S. and I.A.; writing—original draft preparation, N.V. and N.K.; writing—review and editing, D.S. and A.T.; visualization, I.A.; supervision, N.K. and A.T.; project administration, D.S.; funding acquisition, N.V. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- [1] Mhaskey, S. V. (2024). Integration of artificial intelligence (AI) in enterprise resource planning (ERP) systems: Opportunities, challenges, and implications. *International Journal of Computer Engineering in Research Trends*, 11(12), 1–9. <https://doi.org/10.22362/ijcert/2024/v11/i12/v11i1201>
- [2] Bandara, F., Jayawickrama, U., Subasinghage, M., Olan, F., Alamoudi, H., & Alharthi, M. (2024). Enhancing ERP responsiveness through big data technologies: An empirical investigation. *Information Systems Frontiers*, 26(1), 251–275. <https://doi.org/10.1007/s10796-023-10374-w>
- [3] Madanchian, M., Taherdoost, H., Vincenti, M., & Mohamed, N. (2024). Transforming leadership practices through artificial intelligence. *Procedia Computer Science*, 235, 2101–2111. <https://doi.org/10.1016/j.procs.2024.04.199>
- [4] Sefati, S. S., Nor, A. M., Arasteh, B., et al. (2025). A probabilistic approach to load balancing in multi-cloud environments via machine learning and optimization algorithms. *Journal of Grid Computing*, 23, Article 16. <https://doi.org/10.1007/s10723-025-09805-6>
- [5] Kasmia, N. B., & M'hamed, H. (2023). Digitalization of higher education: Impacts on management practices and institutional development: A literature review. *Conhecimento & Diversidade*, 15(39), 56–82. <https://doi.org/10.18316/rcd.v15i39.11135>
- [6] Elhajjar, S., Yacoub, L., & Yaacoub, H. (2023). Automation in business research: Systematic literature review. *Information Systems and e-Business Management*, 21(3), 675–698. <https://doi.org/10.1007/s10257-023-00645-z>

- [7] Kandampully, J., Bilgihan, A., Bujisic, M., Kaplan, A., Jarvis, C. B., & Shukla, Y. (2021). Service transformation: How can it be achieved? *Journal of Business Research*, 136, 219–228. <https://doi.org/10.1016/j.jbusres.2021.07.033>
- [8] Cosenz, F., & Bivona, E. (2021). Fostering growth patterns of SMEs through business model innovation: A tailored dynamic business modelling approach. *Journal of Business Research*, 130, 658–669. <https://doi.org/10.1016/j.jbusres.2020.03.003>
- [9] Radanliev, P. (2024). Integrated cybersecurity for metaverse systems operating with artificial intelligence, blockchains, and cloud computing. *Frontiers in Blockchain*, 7, Article 1359130. <https://doi.org/10.3389/fbloc.2024.1359130>
- [10] Liu, Y., Heinberg, M., Huang, X., & Eisingerich, A. B. (2023). Building a competitive advantage based on transparency: When and why does transparency matter for corporate social responsibility? *Business Horizons*, 66(4), 517–527. <https://doi.org/10.1016/j.bushor.2022.10.004>
- [11] Mialkovska, L., Hrysiuk, V., Zhvania, L., Nykoliuk, T., Tykha, L., Sadova, L., & Yablonskyy, M. (2024). Leveraging media and public relations strategies to advance sustainable development: Approaches, frameworks, and tactics in modern conditions. *Grassroots Journal of Natural Resources*, 7(3), 253–269. <https://doi.org/10.33002/nr2581.6853.0703ukr13>
- [12] Mialkovska, L., Maiboroda, O., Koretska, N., Martyniuk, Y., Haponchuk, O., & Korobchuk, L. (2025). Modern approaches to educational management: European perspectives on innovation. *Salud, Ciencia y Tecnología – Serie de Conferencias*, 4, Article 1479. <https://conferencias.ageditor.ar/index.php/sctconf/article/view/1479>
- [13] Agarwal, P., & Gupta, A. (2024). Harnessing the power of enterprise resource planning (ERP) and customer relationship management (CRM) systems for sustainable business practices. *International Journal of Computer Trends and Technology*, 72(4), 102–110. <https://ijcttjournal.org/archives/ijctt-v72i4p113>
- [14] Chen, P., Wu, L., & Wang, L. (2023). AI fairness in data management and analytics: A review on challenges, methodologies and applications. *Applied Sciences*, 13(18), Article 10258. <https://doi.org/10.3390/app131810258>
- [15] Simon, J. P. (2021). APIs, the glue under the hood: Looking for the “API economy.” *Digital Policy, Regulation and Governance*, 23(5), 489–508. <https://doi.org/10.1108/DPRG-10-2020-0147>
- [16] Sargeant, H. (2023). Algorithmic decision-making in financial services: Economic and normative outcomes in consumer credit. *AI and Ethics*, 3(4), 1295–1311. <https://doi.org/10.1007/s43681-022-00236-7>
- [17] Kwiotkowska, A., Wolniak, R., Gajdzik, B., & Gębczyńska, M. (2022). Configurational paths of leadership competency shortages and 4.0 leadership effectiveness: An fs/QCA study. *Sustainability*, 14(5), Article 2795. <https://doi.org/10.3390/su14052795>
- [18] Ahsan, M. J. (2025). Cultivating a culture of learning: The role of leadership in fostering lifelong development. *The Learning Organization*, 32(2), 282–306. <https://doi.org/10.1108/TLO-03-2024-0099>
- [19] Burhan, Q. U. A., Khan, M. A., & Malik, M. F. (2023). Achieving transparency in business processes by developing and implementing ethical climate: An integrated model of ethical leadership and engagement. *Business Process Management Journal*, 29(3), 757–776. <https://doi.org/10.1108/BPMJ-08-2022-0384>
- [20] Purnomo, E. N., Imron, A., Wiyono, B. B., Sobri, A. Y., & Dami, Z. A. (2024). Transformation of digital-based school culture: Implications of change management on virtual learning environment integration. *Cogent Education*, 11(1), Article 2303562. <https://doi.org/10.1080/2331186X.2024.2303562>
- [21] Alenezi, M., Wardat, S., & Akour, M. (2023). The need of integrating digital education in higher education: Challenges and opportunities. *Sustainability*, 15(6), Article 4782. <https://doi.org/10.3390/su15064782>
- [22] Grover, V., Tseng, S. L., & Pu, W. (2022). A theoretical perspective on organizational culture and digitalization. *Information & Management*, 59(4), Article 103639. <https://doi.org/10.1016/j.im.2022.103639>
- [23] Hou, H., & Ma, H. (2025). Digitalized opportunity space and managerial archetypes: An opportunity-centric perspective on digital innovation and transformation. *Organizational Dynamics*, 54(1), Article 101075. <https://doi.org/10.1016/j.orgdyn.2024.101075>
- [24] Gursoy, D., Başer, G., & Chi, C. G. (2025). Corporate digital responsibility: Navigating ethical, societal, and environmental challenges in the digital age and exploring future research directions. *Journal of Hospitality Marketing & Management*, 34(3), 305–324. <https://doi.org/10.1080/19368623.2025.2465634>
- [25] Edelman. (2024). 2024 Edelman trust barometer: Global report. https://www.edelman.com/sites/g/files/aatuss191/files/2024-01/2024%20Edelman%20Trust%20Barometer%20Global%20Report_FINAL_0.pdf
- [26] Im, J., & Chung, Y. K. (2023). Exploring diversity, equity, and inclusion in hospitality and tourism firms through the organizational justice and stakeholder theories. *Tourism Management*, 95, Article 104662. <https://doi.org/10.1016/j.tourman.2022.104662>

- [27] Efunniyi, C. P., Abhulimen, A. O., Obiki-Osafiele, A. N., Osundare, O. S., Agu, E. E., & Adeniran, I. A. (2024). Strengthening corporate governance and financial compliance: Enhancing accountability and transparency. *Finance & Accounting Research Journal*, 6(8), 1597–1616. <https://doi.org/10.51594/farj.v6i8.1509>
- [28] Chychun, V., & Polianko, H. (2025). Behavioral management: motivational factors of effective leadership. *Social Development: Economic and Legal Issues*, (5). <https://doi.org/10.70651/3083-6018/2025.5.07>

Appendix A

Primary data for the calculation of the integral index of digital transformation

Table A1

Primary data on the implementation of digital technologies in TechNova, EcoSystems, and Tradimex

No.	Digital technology	w_i	TechNova T_i	EcoSystems T_i	Tradimex T_i
1	ERP/CRM systems	0.20	0.80	0.55	0.35
2	Big Data analytics	0.20	0.60	0.45	0.25
3	Blockchain	0.10	0.40	0.25	0.10
4	Cloud services	0.15	0.90	0.60	0.40
5	Artificial intelligence (AI/ML)	0.20	0.70	0.50	0.30
6	Internet of things (IoT)	0.15	0.50	0.35	0.20

TechNova demonstrates a high level of digital maturity ($DT = 0.67$), which corresponds to an integrated digital culture, high transparency (0.78) and ethics (0.74). EcoSystems is at the stage of active implementation of digital tools ($DT = 0.46$), and Tradimex is characterized by the initial stage of digitalization ($DT = 0.27$), which limits management efficiency and reduces the level of responsible leadership.

The results confirm the existence of a positive relationship between the level of digital transformation and indicators of responsible leadership. The proposed approach provides a methodological basis for quantifying the effectiveness of digital management.