European Research Studies Journal
Volume XXIX, Issue 1, 2026

pp. 421-431

Financial Management in the Age of Artificial Intelligence: Challenges and Risks for Small and Medium-Sized Enterprises in Poland

Submitted 13/12/25, 1st revision 05/01/26, 2nd revision 20/01/26, accepted 20/02/26

Maciej Sikorski[1], Iwona Przychocka[2]

Abstract:

Purpose: *This article attempts to analyse the impact of artificial intelligence (AI) solutions on the financial management of small and medium-sized enterprises (SMEs) in Poland.*
Design/Methodology/Approach: *The research context is set in the reality of advancing digitalisation, automation of economic processes and the evolution of decision-making models. Although AI is not a panacea, it is increasingly playing a key role in streamlining financial processes, offering, among other things, predictive analytics, automation of operations and support in risk management.*
Findings: *The article highlights both the potential of these tools and the risks associated with their implementation without adequate organisational preparation. It also points out that artificial intelligence does not eliminate risk - it only changes its nature, shifting responsibility to other levels of analysis and decision-making.*
Practical implications: *For SMEs, this means the need for deeper reflection on digital strategy, management competencies and the ethical dimension of technology.*
Originality/Value: *For the SME sector in Poland, this is an opportunity to increase efficiency, improve risk management and respond more quickly to changes in the environment.*

Keywords: *Artificial intelligence, finance, SMEs, risk management, digital transformation.*

JEL Codes: *G30, O33, L26, G32, M15.*

Paper type: *Research article.*

[1]*University of Economics and Technology, Warsaw, Poland, maciej.sikorski@uth.edu.pl;*
[2]*Prof. University, Ph.D., Warsaw Military University of Technology Safety Logistics and Management Department, Poland, ORCID: 0000-0002-6328-9193, iwona.przychocka@wat.edu.pl;*

1. Introduction

Digital transformation is no longer a phenomenon of the future - it has become part of everyday life for Polish small and medium-sized enterprises. In recent years, we have seen growing interest in new technologies in the area of management, particularly in finance, which has traditionally been considered a domain based on predictable data and proven procedures. Today, it is increasingly giving way to automated solutions based on algorithms, and the role of the financial manager is being redefined.

Artificial intelligence is no longer the domain of large corporations - solutions using machine learning, predictive systems and robotic process automation are also appearing in the SME sector. Companies use AI to analyse cash flows, assess credit risk and optimise operating costs. The benefits seem obvious: greater efficiency, faster decisions, the ability to respond in real time. However, there are also specific risks behind this promise.

The implementation of AI, especially in smaller organisations with limited resources, poses many challenges: from the mismatch between technology and the scale of operations, through low levels of digital competence, to difficulties in interpreting the results generated by algorithms. In practice, tools sometimes hinder decision-making processes, reinforce information asymmetry, or introduce a false sense of control, rather than supporting them.

The aim of this article is to provide an in-depth analysis of the impact of AI on financial management in Polish SMEs, both from the perspective of potential benefits and systemic risks. The authors draw on the literature on the subject, the latest research on digitalisation in the small business sector, and observations on the barriers and conditions for implementing innovation in a resource-constrained environment. Particular attention is paid to algorithmic risk, technology ethics and strategic decisions regarding competence and organisational culture.

2. AI and Management - A Paradigm Shift in Business

The development of artificial intelligence is increasingly influencing the way modern organisations, including those in the SME sector, design and manage decision-making processes. Traditional models based on linear planning, managerial expertise and manual data analysis are giving way to approaches supported by predictive algorithms and machine learning systems. This shift is not limited to technology - its consequences are deeply organisational and cultural.

Agrawal, Gans and Goldfarb (2018) point to one of the key assumptions of this change: artificial intelligence radically reduces the cost of forecasting. In the past, the limitation was the availability of information and the ability to process it. Today, the problem is rather an excess of data and the need for its accurate interpretation.

As a result, it is not the prediction itself, but reflection on its meaning that takes on strategic importance.

Management literature increasingly argues that AI does not replace managers, but changes the scope of their responsibilities. Iansiti and Lakhani (2020) point out that management in the digital economy requires constant monitoring, real-time action and adaptive response capabilities. This shift away from the concept of ex post control and static budgets is towards dynamic, data-driven management.

For SMEs, this means having to face a new paradigm, often in conditions of limited resources, a lack of dedicated analytical teams and a high level of operational workload for management (Tyagi *et al.,* 2023).

Przychocka and Sikorski (2024) note that in many Polish companies, digital transformation is isolated - individual tools are implemented, but there is no broader vision. The result can be paradoxical: instead of supporting decisions, AI highlights their weakness and fragmentation.

This is accompanied by a phenomenon of excessive trust in technology, known as "automatic obedience" to the algorithm (Shane, 2019). Managers, lacking technical expertise, accept the system's recommendations without verifying their validity. In SMEs, where decision-making is often concentrated in the hands of one person, this risk becomes particularly dangerous as misinterpretation of results can result in real financial losses.

The cognitive aspect is also important. Kahneman (2011) argues that decision-making errors stem from simplified thinking patterns and the illusion of control. Artificial intelligence, trained on data containing the same biases, can not only reproduce them, but also reinforce them. Paradoxically, instead of neutralising human cognitive limitations, AI can be a vehicle for them, only on a larger scale and with apparent objectivity.

Technology management, especially in the SME sector, cannot therefore rely solely on the purchase of software. Rumelt (2011) warns against superficial modernisation, i.e. implementing tools without linking them to the strategic goals and real needs of the organisation. AI does not solve structural problems, but it can reveal and exacerbate them if it is not accompanied by conscious leadership and planned change management.

In summary, artificial intelligence does not replace managerial thinking; on the contrary, it presents organisational leaders with new, more complex challenges. For SMEs, the effective use of AI requires not only openness to technology, but above all, developed reflective skills: the ability to interpret, make decisions under data pressure, and remain responsible in an environment dominated by algorithms.

3. Financial Applications of Artificial Intelligence - Promises and Reality

In recent years, artificial intelligence has come to be seen as one of the most promising tools for improving financial management. Its role is no longer limited to the automation of routine operations; we are increasingly talking about real support in making complex investment decisions, risk management and profitability analysis. In theory, the possibilities are vast. In practice, especially in the reality of SMEs, the situation is more nuanced.

One of the undoubted advantages of AI is its ability to instantly analyse huge data sets and detect subtle relationships that even an experienced analyst might miss. Predictive systems, based on historical data, can identify risks, forecast cash flows and indicate the most effective capital allocations.

However, as Berman and Knight (2013) point out, data without context is just numbers. Even the most accurate forecast becomes useless if the manager does not understand its sources, limitations or significance for the company's current situation.

From the perspective of classical financial management theories, capital decisions such as the choice of financing structure or the assessment of investment profitability always require not only quantitative analysis but also an assessment of qualitative factors: the market environment, competitive position and strategic objectives. AI can support the decision-making process, but it does not make decisions for humans. The correct interpretation of the results remains the responsibility of managers.

The quality of input data remains a key limitation to the effectiveness of AI. As Provost and Fawcett (2013) point out, even the most advanced analytical models are useless if they are based on incomplete, outdated or distorted data. This is particularly important for SMEs - many companies do not have uniform data recording systems, and information gathering processes are often scattered and inconsistent. In such conditions, AI systems can generate erroneous or misleading recommendations.

There is also a risk of so-called over-automation. More and more companies are turning to ready-made, off-the-shelf solutions, hoping for quick results without the need to deepen their knowledge of how they work. Przychocka and Sikorski (2024) point out that in such cases, the tools implemented often operate in isolation, without consistent integration with the financial management system. Instead of organising data and decisions, they can lead to information chaos and fragmentation of knowledge within the organisation.

For small and medium-sized enterprises, it may prove particularly difficult to adapt AI tools to the actual needs of the company. As Harnish (2014) notes, the

development of an organisation requires the gradual building of management systems appropriate to its size and stage of development. Implementing advanced tools too quickly without proper preparation of staff and processes can lead to so-called information overload. Instead of making better decisions, managers get lost in an excess of data, alerts and interpretations.

In summary, although financial applications of AI offer real potential for efficiency gains, their implementation in SMEs requires much more than just technological investment. The key factors are: a coherent strategy, structured data, appropriate skills and awareness of the limitations of the technology. Otherwise, the promises of artificial intelligence may remain unfulfilled and, instead of profits, new decision-making and organisational risks will emerge.

4. Risk, Decision-Making Errors and Uncertainty in AI-Supported Finance

One of the most frequently repeated arguments in favour of implementing artificial intelligence in financial management is the belief that algorithms can reduce the impact of subjective cognitive errors on decision-making processes. In theory, this seems correct - AI operates on the basis of data, analyses objective indicators, excludes emotionality and speeds up information processing. However, practice shows that the situation is much more complex.

From the perspective of behavioural finance, it is well known that economic decisions, even those made by experienced managers, are burdened with a number of cognitive biases. Kahneman (2011) described how we often succumb to excessive optimism, ignore rare but significant threats, or act on the basis of simplified heuristics. What is more, if AI models learn from historical data containing the same errors, they may not only reproduce them, but even reinforce them, generating erroneous recommendations with the appearance of precision.

One of the biggest limitations of artificial intelligence in the context of risk management is its inability to predict so-called "black swans" - events with a low probability but a huge impact (Taleb, 2007). AI models are based on past patterns, which makes them vulnerable to surprises when the environment changes rapidly.

The COVID-19 pandemic, geopolitical conflicts and energy crises have shown that even the most advanced algorithms fail when market mechanisms cease to operate according to previous rules. For SMEs, which often operate without collateral and with limited liquidity, this can have disastrous consequences.

In this context, it is worth recalling Taleb's (2012) concept of "antifragility", according to which organisations should not only survive disruptions, but also be able to profit from them. AI, if properly implemented and integrated into the management system, can support this ability, e.g., through crisis scenario modelling,

diversification of revenue sources or flexible cost management. However, if not, it can also reinforce organisational fragility, especially if algorithms are implemented without reflection and supervision.

There is also increasing talk of the phenomenon of blurred responsibility in AI-supported decisions. O'Neil (2016) points out that systems operating as "black boxes" that generate recommendations without a clear explanation of how they work can lead to situations where managers do not understand why a particular decision has been proposed. As a result, responsibility for the outcome becomes diffuse: neither humans nor machines are directly accountable. In SMEs, where there are no specialised data modelling teams, this risk becomes particularly real.

Research by Przychocka and Sikorski (2024) shows that many Polish SMEs do not take algorithmic risk into account in their management strategies. The implementation of AI is mainly motivated by the desire to streamline operations or reduce costs, while issues of financial security or responsibility for technological recommendations remain outside the mainstream of strategic thinking. The result may be an apparent modernisation that actually increases vulnerability to unpredictable shocks.

In summary, artificial intelligence does not eliminate financial risk, but rather transforms it. It shifts the focus from emotional decisions to issues related to data quality, model structure and lack of transparency in system operation. For SMEs, this means the need to develop new competencies: the ability to critically analyse AI results, the ability to verify and, above all, to maintain managerial vigilance. Because even though machines can analyse faster, the responsibility still lies with humans.

5. SMEs in Poland - Implementation Barriers and Strategic Conditions for the Use of AI

Small and medium-sized enterprises are the foundation of the Polish economy, accounting for a significant proportion of employment, generating a significant share of GDP and creating conditions for the development of local markets.

However, in the context of implementing modern technologies, including solutions based on artificial intelligence, the SME sector faces a number of barriers that significantly hinder the full exploitation of their potential. These limitations are not only technological, but also organisational, financial and cultural.

The first and most obvious barrier is limited financial resources. Although the cost of AI solutions is falling year on year, implementing them effectively still requires investment - both in technical infrastructure and in team skills. SMEs often do not have the reserves that would allow them to experiment with technology in a test-and-learn model.

As Ries (2011) points out, implementing innovation requires iteration, tolerance for error, and the ability to learn from failure, all of which are difficult to achieve when struggling for current liquidity.

Another problem is the low level of digital competence among management. AI is not just a set of algorithms - it is a tool that requires an understanding of how it works, its limitations, capabilities and risks.

Przychocka and Sikorski (2024) point out that in many SMEs, financial decisions are still made intuitively, often by owners who do not treat technology as an integral part of the management model. In this context, even advanced tools do not improve the quality of decisions - they may even introduce additional misunderstandings.

Equally important is the fragmented approach to digitisation. Instead of strategic implementations tailored to the specific nature of the business, we are seeing the purchase of individual tools, most often accounting or analytical systems with AI elements.

Such solutions operate independently and are not integrated with either decision-making processes or reporting systems. As a result, instead of facilitating management, they introduce information chaos and hinder financial control. Harnish (2014) notes that the development of a company must go hand in hand with the maturity of management systems - otherwise, technology exacerbates problems instead of solving them.

It is also worth paying attention to cultural and institutional factors. For many business owners, technology is still treated as a temporary trend, an image-building element, rather than a permanent component of strategy.

Rumelt (2011) warns against so-called apparent strategy - the implementation of solutions that look modern but do not stem from real needs or fit in with the long-term goals of the organisation. For SMEs, this can result in increased operating costs, loss of flexibility and disappointment with the effectiveness of the tools implemented.

An additional barrier is the insufficient use of available support instruments. Although there are numerous national and EU programmes supporting digitisation, many SMEs do not take full advantage of them.

The reasons for this include complicated application procedures, programmes that are not tailored to the actual needs of entrepreneurs, and a lack of strategic advice. As Przychocka and Sikorski (2024) note, assistance often focuses on the purchase of technology rather than on building competencies, planning transformation or integrating technology into the organisational culture.

In summary, the implementation of artificial intelligence in the SME sector does not encounter technological resistance, but systemic resistance. The key challenge is not a lack of tools, but a lack of strategy, awareness and organisational structure that would enable their effective and responsible use. AI cannot be treated as a point solution - its implementation must be part of a broader management change, encompassing people, processes and the culture of thinking about the future of the organisation.

6. Ethics, Responsibility and Regulations in AI-Based Finance

As artificial intelligence penetrates deeper into the areas of financial management, questions that go beyond operational effectiveness and analytical efficiency are becoming increasingly important. Issues related to ethics, responsibility and regulatory frameworks are coming to the fore. The implementation of algorithms supporting financial decisions means not only a technological transformation, but also an axiological change affecting the fundamental principles of transparency, fairness and trust.

One of the key threats is the phenomenon of so-called apparent objectivity. O'Neil (2016) warns that although algorithms appear to operate impartially, in reality they can reproduce the biases and errors contained in the data on which they were trained. This also applies to financial decisions, such as creditworthiness assessments or investment profitability. If historical data contains systemic inequalities, algorithms not only reproduce them, but often perpetuate them.

In the case of SMEs, this problem is exacerbated by limited auditing capabilities. Small and medium-sized enterprises generally do not have teams capable of verifying the operation of algorithms. They lack technical expertise, but also the tools to understand the system's decision-making mechanisms. As a result, companies may make decisions based on recommendations whose logic remains unclear to them, which creates significant organisational and legal risks.

This raises the question: who is responsible for decisions made with the support of AI? In the classic model, responsibility for the consequences of financial decisions rests with human managers, analysts and management boards. In algorithm-supported systems, this boundary becomes blurred. Kearns and Roth (2019) emphasise that algorithm design must take into account not only efficiency goals, but also social and ethical values. From a management perspective, this means that clear accountability procedures must be established not only for final decisions, but also for the selection and configuration of the algorithm itself.

In response to these challenges, increasing attention is being paid to regulatory aspects. The European Union is working on the so-called AI Act, a legal act that introduces the categorisation of artificial intelligence systems according to their level of risk.

In the case of AI used in finance, i.e., in a high-risk area, the planned regulations provide for obligations related to transparency, documentation, supervision and the possibility of explaining the algorithm's decisions. Although this may mean additional administrative burdens for SMEs, it also provides an opportunity to standardise standards and increase confidence in the solutions implemented.

However, there are concerns that the regulations will be perceived by entrepreneurs as yet another bureaucratic barrier. Przychocka and Sikorski (2024) note that many SMEs in Poland take a minimalist approach to formal compliance requirements, treating them as an obligation to be fulfilled rather than an opportunity to enhance transparency and organisational security. Meanwhile, transparency can be not only a legal requirement, but also a competitive advantage, especially in a sector where the trust of customers and business partners is of strategic value.

An additional challenge is the problem of so-called "black boxes", i.e., systems whose operation is difficult to understand even for their creators. When models become too complex, it becomes impossible to audit them or interpret their results in a meaningful way. In the context of finance, where many decisions require not only economic justification, but also legal and ethical justification, the lack of explainability becomes a serious limitation.

In summary, the responsible use of AI in financial management cannot be limited to technical issues. It is essential to think in terms of system ethics, organisational culture and compliance with legal standards. In particular, SMEs wishing to build lasting value based on new technologies must not only implement AI, but also be able to control, understand and embed it in the context of the principles that define the boundaries of responsible management.

7. Conclusion

The analysis presented in this article clearly shows that artificial intelligence is no longer just a technological novelty or an addition to management tools - it is becoming an integral part of modern financial management. It is not only changing the way data is processed, but above all, it is redefining the logic of decision-making, the structure of risk, and expectations regarding management competencies.

For the SME sector in Poland, this is, on the one hand, an opportunity to increase efficiency, improve risk management and respond more quickly to changes in the environment.

On the other hand, however, this technology carries specific risks that can be particularly acute in companies that do not have the appropriate organisational or competence resources. Improper implementation of AI can lead to strategic errors, weakened control over financial processes and increased vulnerability to external shocks.

Importantly, artificial intelligence does not eliminate risk, but only changes its nature. Instead of operational risks associated with human error, new threats emerge: model risk, algorithmic opacity, dependence on data quality, and difficulties in assigning responsibility for decisions made with the support of AI.

From the perspective of SMEs, the key question is not only "should we implement artificial intelligence?", but above all "how should we do it?". The implementation of AI should be treated not as a technological project, but as part of a deeper organisational transformation, encompassing strategy, culture, structure and competencies.

In conditions of high volatility and uncertainty in the economic environment - as demonstrated by the experiences of the pandemic and geopolitical crises - the advantage will be gained by those companies that are able to flexibly combine modern tools with managerial reflection.

Taleb's (2012) concept of "antifragility" suggests that it is not just about resilience to disruption, but about the ability to thrive in chaos. AI can support this ability, but only if it operates in a controlled, understandable manner and is embedded in a well-thought-out management structure.

Final conclusions:

- AI does not replace strategic thinking, it only supports it. Analytical tools are helpful, but it is people who give them meaning and context.
- Implementing AI without organisational preparation is a risk, not an investment. SMEs need not only technology, but above all competence and a coherent vision.
- Responsibility and ethics are not add-ons to management, but its foundations. Model transparency, auditability, and algorithm control are key to building trust.
- Regulations can be an opportunity, not just a constraint. The AI Act and other legal initiatives, while demanding, can streamline the approach to technology and protect companies from costly mistakes.
- Digital transformation is a process, not a one-off implementation. Effective use of AI requires integration with organisational culture and strategic thinking over the long term.

References :

Agrawal, A., Gans, J., Goldfarb, A. 2018. Prediction machines: The simple economics of artificial intelligence. Harvard Business Review Press.

Berman, K., Knight, J. 2013. Financial intelligence: A manager’s guide to knowing what the numbers really mean. Harvard Business Review Press.

Brealey, R.A., Myers, S.C., Allen, F. 2020. Principles of corporate finance (13th ed.). McGraw-Hill Education.

Harnish, V. 2014. Scaling up: How a few companies make it... and why the rest don't. Gazelles, Inc.

Iansiti, M., Lakhani, K.R. 2020. Competing in the age of AI: Strategy and leadership when algorithms and networks run the world. Harvard Business Review Press.

Kahneman, D. 2011. Thinking, fast and slow. Farrar, Straus and Giroux.

Kearns, M., Roth, A. 2019. The ethical algorithm: The science of socially aware algorithm design. Oxford University Press.

O'Neil, C. 2016. Weapons of math destruction: How big data increases inequality and threatens democracy. Crown Publishing Group.

Przychocka, I., Sikorski, M. 2024. Revolutionising SME management: The digital transformation of financial operations. European Research Studies Journal, 27(2), 74-89.

Provost, F., Fawcett, T. 2013. Data science for business: What you need to know about data mining and data-analytic thinking. O'Reilly Media.

Ries, E. 2011. The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Business.

Rumelt, R. 2011. Good strategy bad strategy: The difference and why it matters. Crown Business.

Shane, J. 2019. You look like a thing and I love you: How AI works and why it's making the world a weirder place. Little, Brown and Company.

Taleb, N.N. 2007. The Black Swan: The Impact of the Highly Improbable. Random House.

Taleb, N.N. 2012. Antifragile: Things that gain from disorder. Random House.

Tyagi, P., Grima, S., Sood, K., Balamurugan, B., Özen, E., Thalassinos, E.I. (Eds.). 2023. Smart analytics, artificial intelligence and sustainable performance management in a global digitalised economy. Emerald Publishing Limited.