

Methodologies for Digital Profiling of Foreign Partners to Assess Their Reliability and Solvency

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Annotation. Relevance of the study is determined by the increasing instability of the international economic environment, the intensification of cross-border financial, reputational, and regulatory risks, and the limited effectiveness of traditional approaches to assessing the reliability and solvency of foreign partners. The ongoing digitalization of business processes and the expansion of available data sources necessitate the development of scientifically grounded digital profiling methodologies as tools for improving the quality of managerial decision-making in foreign economic activity.

The purpose of the article is to substantiate and systematize methodological approaches to the digital profiling of foreign partners in order to ensure a comprehensive assessment of their reliability and solvency under conditions of heightened instability in the international economic environment.

Research methods include analytical generalization of contemporary practices in foreign economic risk management, systematization of digital data and information sources used in partner profiling, analytical review of digital analysis methods and data analytics tools, as well as logical and structural analysis of scientific and practical challenges associated with the application of digital profiling methodologies.

The results of the study demonstrate that digital profiling functions as an integrated analytical instrument for evaluating both financial stability and behavioral patterns of foreign counterparties. Key types of digital data and information sources forming a partner's digital profile are investigated, and the main methods of digital analysis used to construct reliability and solvency assessment models are characterized. It is identified that the effectiveness of digital profiling is constrained by data fragmentation, algorithmic bias risks, legal and regulatory limitations, and restricted interpretability of complex analytical models.

Conclusions indicate that the integration of digital profiling methodologies into enterprise risk management systems is justified and enables a transition from static, one-time counterparty verification to continuous analytical monitoring, thereby increasing the validity of managerial decisions and reducing partnership risks in foreign economic activity.

Prospects for further research are associated with the development of interpretable digital profiling models, improvement of heterogeneous data integration methods, and empirical validation of the proposed approaches across different sectors of international economic activity.

Keywords: foreign economic risks, data analytics, counterparty assessment, uncertainty management, alternative data, behavioral indicators, composite scoring models.

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Методології цифрового профілювання іноземних партнерів для оцінки їхньої надійності та платоспроможності

Анотація. Актуальність дослідження зумовлена зростанням нестабільності міжнародного економічного середовища, посиленням транскордонних ризиків і недостатньою ефективністю традиційних підходів до оцінювання іноземних партнерів. Цифровізація зовнішньоекономічної діяльності актуалізує потребу в розвитку методологій цифрового профілювання. Метою статті є обґрунтування методологічних підходів до цифрового профілювання іноземних партнерів для комплексного оцінювання їхньої надійності та платоспроможності в умовах нестабільного міжнародного економічного середовища. Методи дослідження ґрунтуються на аналітичному узагальненні сучасних підходів до управління зовнішньоекономічними ризиками, систематизації цифрових даних і методів аналітики. Результати дослідження підтверджують, що цифрове профілювання функціонує як інтегрований аналітичний інструмент для оцінки як фінансової стабільності, так і моделей поведінки іноземних контрагентів. Досліджено основні типи цифрових даних та джерел інформації, що формують цифровий профіль партнера, а також охарактеризовано основні методи цифрового аналізу, що використовуються для побудови моделей оцінки надійності та платоспроможності. Виявлено, що результативність цифрового профілювання обмежується фрагментацією даних, наявністю алгоритмічних упереджень, нормативно-правовими чинниками та складністю інтерпретації багатовимірних аналітичних моделей. У висновках зазначено, що інтеграція методологій цифрового профілювання в систему управління ризиками підприємства формує передумови для переходу від статичної одноразової перевірки контрагентів до безперервного аналітичного моніторингу, що сприяє підвищенню обґрунтованості управлінських рішень і зниженню ризиків партнерства в зовнішньоекономічній діяльності. Перспективи подальших досліджень пов'язані з розробкою інтерпретованих моделей цифрового профілювання, удосконаленням методів інтеграції гетерогенних даних та емпіричною валідацією запропонованих підходів у різних секторах міжнародної економічної діяльності.

Ключові слова: зовнішньоекономічні ризики, аналітика даних, контрагентський аналіз, управління невизначеністю, альтернативні дані, поведінкові індикатори, інтегральні скорингові моделі.

Introduction

The relevance of this study is determined by the growing role of digital data in managerial decision making in the field of international economic cooperation, foreign economic activity, and transnational value chains. Under conditions of increased global instability, financial volatility, regulatory fragmentation, and the escalation of cross border risks, traditional approaches to assessing the reliability and solvency of foreign partners, which are based mainly on financial statements and formalized credit ratings, prove insufficient for the timely identification of latent threats and the forecasting of counterparty behavior. This situation necessitates the scientific substantiation and further development of digital profiling methodologies capable of integrating heterogeneous sets of structured and unstructured data, including financial indicators, information from open sources, digital footprints of corporate activity, and network interconnections among economic entities.

The issue of digital profiling of foreign partners lies at the intersection of economic risk theory, financial analysis, information technologies, and applied data analytics, which determines its significant importance for addressing a range of relevant scientific and practical tasks. From a scientific perspective, this is associated with the need to develop models for assessing reliability and solvency that take into account the nonlinearity of economic processes,

information asymmetry, and the dynamic nature of economic agent behavior in a digital environment. From a practical standpoint, this issue is directly related to improving the effectiveness of enterprise risk management systems, ensuring the economic security of foreign economic operations, and reducing the probability of financial losses, fraud, and breaches of contractual obligations in international partnership relations. Addressing this issue will contribute to the formation of scientifically grounded approaches to the implementation of digital tools for analytical support of managerial decision making, adapted to the conditions of a globalized and digitally transformed economy.

The analysis of contemporary research indicates a gradual expansion of the analytical framework from reputation- and value-based characteristics to comprehensive models of digital data processing. A significant body of scholarly work emphasizes the role of intangible assets and public trust as initial markers of counterparty reliability in the international environment. Thus, V. Levit demonstrates that the implementation of ESG strategies contributes to the formation of sustainable territorial brand value and, consequently, may be regarded as an indicator of the anticipated responsibility and stability of economic actors engaged in international cooperation [1].

Scholar Ye. Hrushko shows that trust in brands significantly affects the effectiveness of market communications in the United States and Europe, which, in the context of digital profiling, implies the necessity of considering reputational risks, levels of public trust, and the resilience of a partner's image as factors of its behavioral reliability [2].

Researcher M. Bogopolsky, analyzing the aesthetic economy, substantiates the influence of intangible and perceptual factors on the economic choices of Generation Z, which actualizes the use of digital behavioral signals and social evaluations as auxiliary indicators of the viability and market adaptability of potential counterparties [3].

At the same time, scholarly literature reveals a tendency toward a more formalized analysis of the operational and financial-economic characteristics of partners that directly reflect their solvency and capacity to fulfill contractual obligations. In particular, V. Ganchev demonstrates the potential of artificial intelligence technologies for service personalization, which methodologically justifies the use of machine learning algorithms in digital profiling for counterparty segmentation and predicting their behavior based on interaction data [4].

Scholar Yu. Hasenko demonstrates that effective inventory management has a direct impact on the financial stability of enterprises, enabling the utilization of turnover, liquidity, and sensitivity to logistical disruptions as key components of the digital solvency profile [5]. Researcher A. Ilina emphasizes the role of human capital and managerial capacity in ensuring the sustainable development of organizations, thereby substantiating the integration into the digital profile of indicators related to personnel stability, managerial competence, and the ability to maintain effective internal processes [6].

A distinct body of research conceptualizes digital profiling as a compliance and regulatory alignment tool in the context of international economic interaction. In particular, O. Korobkova analyzes innovative approaches to improving the efficiency of customs brokerage activities in the United States, emphasizing the importance of procedural transparency, documentary discipline, and regulatory capacity as components of partner reliability in foreign economic operations [7]. Scholars S. Mekhovych and A. Laushkin propose approaches to modeling digital key performance indicators in international economic relations, which provides a methodological basis for aggregating compliance, process, and performance indicators into integrated digital profiles of counterparties [8]. International digital competence is conceptualized by F. Cahen and F. Borini, who consider the digital maturity of economic actors as a prerequisite for their effective and reliable participation in global value creation networks [9].

A concluding logical element of contemporary approaches is the application of analytical and algorithmic methodologies for integrating heterogeneous digital data into decisions on partner selection and the management of foreign economic risks. In particular, A. Alhammedi et al. substantiate the role of national digital identities and profiling systems in accelerating digital transformation, which is of fundamental importance for cross border identification and comparison of data on foreign counterparties [10]. Quantitative approaches to the selection of foreign markets for digital platforms, which can be adapted to the multicriteria ranking of partners based on a combination of financial and nonfinancial parameters, are proposed by D. Eskiyeerli and X. Perez [11]. The challenges of the digital era for international marketing, particularly the risks of algorithmic bias and data instability that directly affect the reliability of automated counterparty assessments, are emphasized by C. Katsikeas et al. [12]. The transformation of financial inclusion in fintech environments is analyzed by D. Gabor and S. Brooks, who justify the use of alternative financial and transactional data to assess solvency under conditions of limited traditional financial information [13]. The application of the Internet of Things in industry is systematized by K. Wójcicki et al., which creates a basis for integrating objective operational data into digital profiles as indicators of the stability of obligation fulfillment [14].

Despite significant scientific advances in the assessment of the reliability and solvency of foreign partners, unresolved issues remain regarding the integration of digital data within a unified analytical counterparty profile, the alignment of digital analysis methods with practical tasks of foreign economic risk management, as well as the interpretability of results and the legal correctness of information use. Existing approaches are predominantly fragmented and do not fully account for dynamic changes in partner behavior in a digital environment. The proposed study is aimed at addressing these gaps through the systematization of digital data and sources, the generalization of digital analysis methods, and the substantiation of their applied use in the management of foreign economic activity. This makes it possible to develop a coherent approach to the digital profiling of foreign partners and to enhance the soundness of managerial decision making, which determines the scientific novelty and practical relevance of the study.

The *purpose* of the article is to substantiate methodological approaches to the digital profiling of foreign partners with the aim of comprehensive assessment of their reliability and solvency under conditions of increased instability in the international economic environment.

To achieve this purpose, the article provides for the solution of the following objectives:

- 1) to generalize contemporary approaches, digital data, and analytical methods used to assess the reliability and solvency of foreign partners within foreign economic risk management systems;
- 2) to identify key scientific and practical problems of digital profiling of foreign partners related to data quality, algorithmic bias, legal constraints, and the interpretability of assessment results;
- 3) to substantiate practical recommendations for the implementation of digital profiling in the management of foreign economic activity in order to enhance the soundness of managerial decisions and reduce partnership risks.

Results

In contemporary practice of foreign economic risk management, the assessment of the reliability and solvency of foreign partners is considered a multidimensional analytical process that goes beyond traditional financial analysis. The intensification of global economic instability, the increasing complexity of international settlements, the growth of sanctions and regulatory constraints, as well as the digitalization of business processes have driven the evolution of counterparty due diligence approaches toward the integration of financial,

behavioral, institutional, and digital indicators. In enterprise practice, combined models are increasingly applied that integrate classical financial diagnostic tools with elements of risk management, compliance control, and digital analytics, which makes it possible to improve assessment accuracy and to identify potential cooperation threats in a timely manner (Table 1).

Table 1

Contemporary Approaches to Assessing the Reliability and Solvency of Foreign Partners

Approach	Analytical Basis	Practical Purpose
Financial and economic	Financial statements, liquidity and solvency indicators	Primary assessment of the financial capacity to fulfill obligations
Credit rating based	Data from international rating agencies, scoring assessments	Comparative evaluation of counterparty credit risk
Risk oriented	Country, industry, currency, and macroeconomic risks	Consideration of external environment impacts on partnership relations
Compliance analysis	Sanctions lists, judicial and regulatory registers	Ensuring legal and reputational security of cooperation
Digital profiling	Big data, open digital sources, network linkages	Dynamic and comprehensive assessment of partner reliability

Source: compiled by the author based on [1; 5, p. 88; 7; 8, p. 81; 10; 13, p. 75]

In the activities of modern enterprises, these approaches are applied sequentially and in a complementary manner, forming a multilevel model of foreign economic risk management. At the stage of selecting a foreign partner, financial and economic and credit rating based approaches are used for the initial determination of solvency and the overall level of financial reliability. Further assessment is deepened through risk oriented analysis, which makes it possible to take into account the impact of macroeconomic and national factors on the fulfillment of contractual obligations. In practical terms, compliance analysis ensures verification of a partner's conformity with applicable international restrictions and regulatory requirements. Of particular importance under current conditions is digital profiling, which is used for continuous monitoring of counterparty business activity, prompt response to changes in its financial behavior, and adaptation of cooperation terms, including through the adjustment of payment conditions, credit limits, or forms of guarantee support. This approach enables the practical implementation of preventive management of partnership risks and enhances the resilience of enterprises' foreign economic activity.

The formation of a digital profile of a foreign partner under contemporary conditions is based on the systematization of heterogeneous digital data that reflect the financial, operational, communication, and behavioral aspects of an economic entity's activities in the global digital environment [5, p. 88]. Unlike traditional assessment approaches, a digital profile is oriented not only toward capturing static characteristics of a partner but also toward identifying dynamic patterns of its functioning, the stability of business processes, and the consistency of actual behavior with declared obligations. The analytical significance of digital data is determined by their ability to ensure timely information updates, to detect indirect risk signals, and to enhance the accuracy of applied managerial decisions in the field of foreign economic activity (Table 2).

Table 2

Types of Digital Data and Information Sources for Forming a Digital Profile of a Foreign Partner

Type of digital data	Main information sources	Analytical and applied role
Financial and digital	Electronic financial statements, payment platforms, trade registers	Monitoring financial discipline and settlement dynamics
Operational and business	Corporate web resources, electronic trading platforms, customs databases	Analysis of actual business activity and operational stability
Reputational	Media resources, professional networks, public mentions	Assessment of reputational background and partner trustworthiness
Legal and regulatory	Court registers, regulatory and licensing databases	Control of legal status and compliance with requirements
Network and behavioral	Data on counterparty linkages, digital interactions, partnership networks	Identification of hidden interdependencies and changes in behavior

Source: compiled by the author based on [2; 3; 6, p. 16; 9; 10; 12, p. 412]

Under contemporary conditions, digital data that form the profile of a foreign partner are used as an applied analytics tool to reduce information asymmetry and improve the accuracy of assessing its behavioral and financial stability. In particular, alternative digital data are increasingly integrated into systems for evaluating solvency and business reliability, as evidenced by the practice of international financial institutions. According to World Bank estimates, the use of alternative digital sources makes it possible to increase the predictive accuracy of credit risk models by 20-30 percent compared with models based exclusively on traditional financial statements [15]. Such data include records of digital payments, regularity of financial obligation fulfillment, and activity on payment and trading platforms, and are applied to the formation of a dynamic digital profile of a business counterparty.

The practical implementation of this approach is demonstrated by commercial analytical platforms with global coverage. For example, the RepRisk platform analyzes more than 100,000 public information sources in 23 languages on a daily basis and generates reputational indicators for over 150,000 companies worldwide, which are used by international banks and multinational corporations to assess partnership risks and to support cooperation decisions [16]. According to company data, the implementation of reputational digital indicators makes it possible to identify potential risks at early stages, even before they are formalized in financial or legal domains, which is critically important for international contracts with deferred settlements.

Another example of the applied use of digital sources is the implementation of alternative scoring models on financial and trading platforms. According to analytical materials from CredoLab, the integration of behavioral digital data, including the frequency of digital transactions, stability of online activity, and the history of digital interaction with counterparties, makes it possible to expand the coverage of business entity assessments by 30-40 percent by including companies that lack complete financial statements or an established credit history [17]. In applied terms, this approach is used to set individualized payment conditions, determine credit limits, and select forms of financial collateral in international trade. Thus, the systematization of digital data and sources within the digital profile of a foreign partner ensures a transition from one time counterparty verification to continuous analytical monitoring. This enables enterprises to adapt managerial decisions to changes in partner behavior, to respond promptly to signals of potential instability, and to enhance the overall resilience of foreign economic activity in a digitally transformed global market.

In contemporary practice of assessing counterparty reliability and solvency, digital analysis is regarded as a tool for the formalized transformation of heterogeneous data sets into quantitative and interpretable analytical indicators suitable for managerial decision support. Unlike approaches focused on information sources or data types, digital analysis methods concentrate on processing, modeling, and forecasting algorithms that make it possible to identify latent patterns, assess probabilistic scenarios of counterparty behavior, and generate integrated risk indicators. The analytical value of such methods is determined by their ability to operate with nonlinear relationships, incomplete observations, and dynamic changes in external environment parameters without direct replication of classical financial models (Table 3).

Table 3

Digital Analysis Methods and Data Analytics Tools for Assessing Counterparty Reliability and Solvency

Digital analysis method	Analytical toolkit	Functional role in models
Statistical and probabilistic modeling	Regression models, Bayesian approaches	Assessment of the probability of obligation fulfillment
Machine learning	Decision trees, ensemble models, neural networks	Identification of complex nonlinear risk patterns
Time series analysis	ARIMA, LSTM, dynamic filters	Forecasting changes in payment and business behavior
Network analysis	Graph models, centrality measures, clustering	Analysis of interdependencies and risk concentration
Integrated scoring	Composite indices, risk scores	Aggregation of results for managerial decision making

Source: compiled by the author based on [4; 8, p. 86; 11, p. 166; 13, p. 78; 14; 18; 19]

Digital analysis methods and data analytics tools function as a single integrated managerial decision support system oriented toward forecasting counterparty behavior in an uncertain international environment. Statistical and probabilistic modeling is used as a basic analytical level for the quantitative assessment of the probability of breaches of payment or contractual obligations under various development scenarios, which is a typical practice in export credit insurance and bank financing of foreign economic operations [14]. At this level, initial risk assessments are generated, which serve as a starting point for further in depth analysis.

Machine learning methods in applied reliability assessment models are used to process complex data sets in which traditional linear relationships do not produce stable results. In applied terms, such models make it possible to identify atypical combinations of behavioral and operational features that may signal latent risks, for example, a gradual decline in a counterparty's business activity under formally stable financial indicators [8, p. 86]. Time series analysis complements these approaches by tracking the dynamics of key indicators over time and is used for early warning of negative trends, which enables participants in foreign economic activity to adjust settlement terms or financial security mechanisms in a timely manner.

Network analysis in the practice of digital profiling acquires particular importance under conditions of globalized supply chains, as it makes it possible to assess not only the individual characteristics of a counterparty but also the degree of its dependence on other network participants. In applied cases, this approach is used to identify risk concentration situations in which the financial instability of one entity may have a cascading effect on a group of interconnected companies [20]. Integrated scoring models perform the final function of practical synthesis of digital analysis results by transforming complex multidimensional assessments into standardized indicators that are directly applied in managerial practice to set

credit limits, determine settlement forms, establish control levels, and make decisions regarding the feasibility or terms of cooperation. Within this configuration, digital analysis methods become not a supplementary but a system forming element of contemporary models for assessing counterparty reliability and solvency.

The application of digital profiling methodologies for foreign partners in the practice of assessing their reliability and solvency is accompanied by a range of interrelated scientific and practical problems that limit the accuracy, universality, and managerial usefulness of the results obtained. One of the key problems is the fragmentation and heterogeneity of information, which is обусловлена by differing levels of digital maturity across economies, asymmetry of data access, variations in information disclosure standards, and uneven quality of open sources. This leads to the formation of incomplete or structurally unbalanced digital profiles in which certain aspects of a partner's activities may be overrepresented, while critically important indicators remain outside the analytical scope [6, p. 17].

A significant challenge involves the risks of algorithmic bias associated with biased training samples, the transfer of historical patterns to new economic conditions, and the limited ability of models to respond appropriately to structural breaks in counterparty behavior. In applied terms, this may result in the systematic overestimation or underestimation of risk levels for specific partner groups, particularly under conditions of crisis phenomena, geopolitical shocks, or abrupt changes in the regulatory environment [10]. The situation is further complicated by the problem of excessive automation of analytical decisions, when the results of digital profiling are perceived as objective and final without adequate expert validation.

Significant limitations are associated with the legal and regulatory aspects of using digital data, particularly requirements for the protection of personal and commercial information, cross border data transfer, and adherence to principles of transparency in information processing. Divergence among national and supranational regulatory regimes creates a situation of legal uncertainty in which some potentially valuable digital data cannot be used or require substantial resources for legal adaptation and compliance procedures [21]. This reduces the scalability of digital profiling methodologies and complicates their standardization for international practice.

A distinct scientific and practical problem is the limited interpretability of assessment results, particularly in cases involving complex machine learning models and ensemble algorithms [22]. Low transparency of the internal logic of such models complicates the explanation of the reasons behind generated risk assessments, reduces trust in the results among managerial staff, and limits the use of digital profiles as a well substantiated basis for negotiations and contractual decisions.

The implementation of digital profiling methodologies in enterprise foreign economic activity management processes should be carried out through their integration into existing risk management systems as tools for continuous analytical support of managerial decision making. It is practically justified to apply digital profiling not only at the stage of selecting foreign partners but also in a continuous monitoring mode of their financial and business behavior throughout the entire cooperation period, which makes it possible to respond in a timely manner to changes in counterparties' risk profiles.

In order to enhance the reliability of digital analysis results, it is advisable to combine automated scoring models with expert interpretation, thereby ensuring transparency and practical applicability of the assessments obtained. The use of integrated indicators should be accompanied by analytical explanations of key risk factors, which increases trust in the results and facilitates their application in contractual and negotiation practices. An important practical direction is the regulatory and organizational support of digital profiling, including the regulation of data use, compliance of analytical procedures with regulatory requirements, and the development of personnel digital competencies. The implementation of such

recommendations creates prerequisites for reducing partnership risks, improving the soundness of managerial decisions, and strengthening the resilience of enterprises' foreign economic activity in a digitally transformed international environment.

Conclusions

As a result of the study, it has been established that digital profiling of foreign partners is an effective tool for improving the quality of assessing their reliability and solvency within foreign economic activity management systems. It is substantiated that the integration of heterogeneous digital data and the application of advanced analytical methods make it possible to move from one time counterparty checks to dynamic monitoring of their economic behavior and timely identification of risk related changes.

It is identified that the main challenges in applying digital profiling methodologies remain data fragmentation and heterogeneity, risks of algorithmic bias, legal constraints on the cross border use of information, and limited interpretability of complex analytical model outputs. It is emphasized that these factors reduce the universality of digital assessments and require the combination of automated analysis with expert interpretation.

The practical significance of the study lies in the substantiation of recommendations for integrating digital profiling into enterprise foreign economic risk management systems based on the principles of continuity, analytical transparency, and regulatory compliance. Prospects for further research are associated with the development of interpretable digital analysis models, the improvement of methods for integrating heterogeneous data, and the empirical validation of the effectiveness of the proposed approaches across different sectors of international economic activity.

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