



# ASSESSING THE INTEGRITY OF FINANCIAL REPORTING IN ROMANIAN REAL ESTATE COMPANIES: AN INTEGRATED APPROACH BASED ON STATISTICAL MODELS

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**Rezumat:** Într-o economie globală marcată de digitalizare accelerată și de presiunea performanței financiare, fraudă nu mai este doar o abatere izolată, ci un risc sistemic ce afectează încrederea și stabilitatea piețelor. Sectorul imobiliar devine tot mai vulnerabil, prin complexitatea și dimensiunea investițiilor sale. Această cercetare explorează în profunzime riscurile de fraudă financiară specifice acestui domeniu, prin aplicarea unor modele standard de detecție – Modelul Beneish, Legea lui Benford și Testul Chi-Square – și prin dezvoltarea unui model propriu, adaptat particularităților pieței imobiliare. Rezultatele obținute subliniază necesitatea unor mecanisme riguroase de guvernanță corporativă și a unei culturi organizaționale bazate pe transparență și integritate. Prin studiu se propune un cadru analitic integrat, menit să sprijine activitățile de prevenire eficientă a fraudei financiare în domeniul imobiliar.

**Cuvinte cheie:** sector imobiliar, fraudă financiară, detecție, manipularea rezultatelor financiare, analiză statistică antifraudă

**Abstract:** In a global economy characterized by accelerated digitalization and increasing pressure for financial performance, fraud has evolved from an isolated misconduct into a systemic risk that threatens market confidence and stability. The real estate sector has become progressively more exposed, owing to the complexity and magnitude of its investments. This research conducts an in-depth examination of the financial fraud risks inherent to this sector by employing established detection models—the Beneish Model, Benford’s Law, and the Chi-Square Test—alongside the development of a proprietary model adapted to the specificities of the real estate market. The findings underscore the imperative for rigorous corporate governance mechanisms and for an organizational culture rooted in transparency and integrity. The study proposes an integrated analytical framework designed to enhance the effectiveness of fraud prevention practices within the real estate industry.

**Keywords:** real estate sector, financial fraud, detection, financial statement manipulation, anti-fraud statistical analysis

**JEL Classification:** G11, G15, C53, O33

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## 1. INTRODUCTION

The phenomenon of financial fraud represents one of the major challenges facing the global economy, generating profound effects on market stability, institutional credibility, and investor confidence. As processes of digitization and automation in accounting reporting intensify, the complexity of the methods through which financial data can be manipulated also increases. Identifying and preventing fraud has therefore become a strategic necessity for ensuring sound governance within any organization.

Financial fraud, in its broad sense, refers to any intentional action aimed at distorting accounting information in order to obtain an undue advantage. Unlike accounting errors, which occur unintentionally, fraud is characterized by deliberation, premeditation, and often systematic coordination among multiple organizational actors. The consequences of such practices are significant, ranging from direct financial losses and deterioration of corporate reputation to the distortion of market mechanisms and the erosion of public trust in the financial system.

The real estate sector is a field with distinct particularities, where the risk of fraud is amplified by the scale of investments, long development cycles, and the high degree of flexibility in accounting estimates (Pinto, 2008). The considerable value of assets, the possibility of their revaluation, and the large number of transactions involving related parties create a favorable environment for fraudulent behavior. Premature revenue recognition, improper capitalization of expenses, or manipulation of asset values through selective revaluations are just a few practices capable of distorting the faithful representation of financial statements (Dragomir, 2020). In a continuously expanding real estate market, such practices can generate chain effects, influencing investor behavior, the stability of lending institutions, and ultimately the national economy.

## 2. THE STATE OF KNOWLEDGE IN THE FIELD OF FINANCIAL FRAUD

### 2.1. General Context of Research on Financial Fraud

Financial fraud represents one of the most significant challenges to corporate governance and the accounting profession at the global level. Over the past two decades, the specialized literature has expanded considerably in examining the causes, typologies, and mechanisms through which accounting fraud manifests.

The classical model known as the *Fraud Triangle* (Cressey, 1953), explains the emergence of fraud through the interaction of three elements: pressure, often generated by financial needs, unrealistic performance targets, or external constraints; opportunity, associated with ineffective internal controls or insufficient managerial oversight; and rationalization, meaning the individual's moral justification for committing the fraudulent act.

Building on this behavioral framework, subsequent research has developed increasingly complex analytical models designed to quantify and predict the likelihood of fraud. Wolfe and Hermanson (2004) expanded the concept into the *Fraud Diamond*, adding the element of capability—that is, the individual's competence and position that enable the commission and concealment of fraud (Wolfe, 2004).



A meta-statistical analysis conducted by the Association of Certified Fraud Examiners (ACFE, 2022) revealed that average global losses resulting from financial fraud exceed 5% of organizations' annual revenues, with high-risk sectors including construction, real estate, and financial services.

In the real estate sector in particular, fraud commonly manifests through asset overvaluation, premature revenue recognition, or the underestimation of provisions—mechanisms intended to artificially enhance a company's financial performance.

These findings indicate that although statistical models can detect numerical anomalies in financial reporting, complete fraud detection also requires an examination of organizational factors such as professional ethics, managerial transparency, and the effectiveness of audit mechanisms. Consequently, contemporary research increasingly adopts integrated approaches that combine quantitative analysis with qualitative evaluations of the corporate governance environment (Button, Gee, & Brooks, 2018).

## **2.2. Standard Models for Detecting Financial Fraud**

An important direction in the specialized literature focuses on developing statistical and analytical models for identifying accounting manipulations. Among the most widely used are:

The Beneish M-Score Model (Beneish, 1999), which estimates the likelihood of earnings manipulation by analyzing eight financial indicators (Beneish, 1999);

Benford's Law (Benford, 1938), which examines the distribution of leading digits in accounting datasets to detect deviations from expected numerical patterns (Benford, 1938);

The Chi-Square Test, applied to verify the statistical significance of deviations from normal distributions.

At the international level, Beneish (1999) demonstrated the effectiveness of statistical models in identifying firms that manipulate earnings, proposing the M-Score, an indicator constructed using eight accounting variables. Later empirical studies (Dechow et al., 2011; Repousis, 2016; Albrecht, 2018) validated the model's applicability in various economic contexts, confirming that certain combinations of indicators—such as rapid sales growth, changes in asset structure, and increases in administrative expenses—may signal manipulative behavior.

In Romania, (Mihalcea, 2020) applied the Beneish model to companies listed on the Bucharest Stock Exchange, finding that over 55% of the entities analyzed exhibited a high risk of financial statement manipulation. Similar results were obtained by Timofte et al. (2021), who identified major vulnerabilities in internal control structures and a positive correlation between company size and the probability of fraud.

## **2.3 Premises for the Development of Real Estate Fraud Research**

The main gap identified in the specialized literature concerns the limited applicability of existing fraud detection models to specific economic sectors, such as real estate, where financial structures and revenue patterns differ substantially from other industries. Moreover, (Albrecht, Albrecht, & Albrecht, 2015) there is insufficient interest in correlating financial

indicators with non-financial factors, such as managerial transparency, ownership structure, or the quality of corporate governance.

Additionally, the literature lacks an integrated fraud detection model that connects financial indicators with corporate governance factors and organizational culture. This gap underscores the need for further research aimed at developing comprehensive frameworks tailored to the particular risks and characteristics of the real estate sector.

### **3. DEFINITION OF THE PROBLEM AND RESEARCH METHODOLOGY**

Accordingly, the present study seeks to address three research questions that emerge logically from the issues previously identified:

1. What are the principal financial fraud risks specific to companies operating within the Romanian real estate sector?
2. To what extent are established statistical models—namely the Beneish Model, Benford’s Law, and the Chi-Square Test—capable of effectively detecting accounting anomalies in this sector?
3. Which financial and non-financial variables can be integrated into a customized fraud detection framework tailored to the specificities of the Romanian real estate market?

The formulation of these research questions reflects our intention not only to evaluate the applicability and diagnostic capacity of existing fraud detection instruments, but also to design an applied framework for identifying fraud risks that aligns with the contemporary economic dynamics of the real estate market. Moreover, the study aims to elucidate the relationship between managerial ethics, the quality of financial reporting, and the effectiveness of internal control mechanisms—dimensions frequently cited in the literature, yet insufficiently operationalized in empirical research focused on sector-specific fraud risks.

Grounded in these considerations, the study investigates financial fraud vulnerabilities within the real estate industry by employing standardized analytical tools. Subsequently, based on the empirical evidence obtained, we aim to develop a tailored fraud risk assessment model suited to the structural and operational characteristics of this sector. The methodological design integrates quantitative analysis—through the application of the Beneish Model, Benford’s Law, and the Chi-Square Test—with an applied, conceptual component dedicated to constructing a customized detection instrument: the IMI Model (Real Estate Manipulation Indicator). Within this model, we consider the correlation between financial and non-financial indicators essential for identifying potential signals of accounting manipulation.

The research sample comprises three companies active in the Romanian real estate sector: One United Properties S.A. (Company 1), Impact Developer & Contractor S.A. (Company 2), and Star Residence Invest S.A. (Company 3). These entities were selected based on the following criteria: listing on the Bucharest Stock Exchange; availability of complete and comparable financial statements for the 2019–2023 period; and representativeness in terms of size, market capitalization, and organizational maturity.

The data sources consisted of publicly available financial statements, the Bucharest Stock Exchange database (<https://m.bvb.ro/>, n.d.), publicly disclosed audit reports, and periodic financial communications.

#### **3.1 Identification of Financial Fraud Risks in the Romanian Real Estate Sector**

Investigations conducted on real estate companies listed on the Romanian capital market have enabled the identification of the main forms through which financial fraud risks

manifest. The synthesized results are presented in Table 1, which classifies the main fraudulent practices and their effects on financial statements.

**Table no. 1. Main Forms of Financial Manipulation Identified in Romanian Real Estate Companies (2018–2023)**

No.	Type of Risk / Form of Manipulation	Description of the Mechanism	Effect on Financial Statements
1	Premature revenue recognition	Recording revenue from real estate projects before their completion or without actual delivery of the asset	Artificial increase in turnover and profit
2	Overvaluation of fixed assets	Revaluation of assets above market value, often without full disclosure of the methods used	Overstatement of assets and equity
3	Unjustified capitalization of expenses	Recording current expenses as investments (capitalized costs)	Artificial increase in assets and reduction of period expenses
4	Underestimation of provisions and contingent liabilities	Insufficient provisioning for litigation, penalties, or tax risks	Overstated profits and unreported future losses
5	Manipulation of costs and expenses	Reclassification of operating expenses or postponement of their recognition	Artificial improvement of profit margins
6	Transactions with related parties	Transfer of assets or services between entities within the same group at distorted prices	Distortion of profit and cash flows
7	Excessive short-term indebtedness	Use of short-term financing to fund long-term assets	Misrepresentation of liquidity and solvency indicators

*Source: Author's processing of data identified in the publicly available financial statements of the companies*  
*<https://www.impactsa.ro/rapoarte-financiare> <https://starresidenceinvest.ro/rapoarte-curente/>,*  
*<https://www.one.ro/ro/relatii-investitori/>*

Content analysis of the audit reports and the explanatory notes accompanying the financial statements indicates that, in numerous cases, these practices were facilitated primarily by deficiencies in internal control mechanisms and by a reduced level of transparency in the disclosure of applied accounting policies. The absence of robust supervision frameworks and the inconsistent documentation of valuation methodologies further contribute to an environment in which manipulative practices can persist undetected.

These findings substantiate the conclusion that fraud risks within the real estate sector possess a predominantly structural and systemic character. They arise not only from economic incentives—such as performance pressures and the pursuit of favorable financial indicators—but also from institutional shortcomings, including insufficient corporate governance frameworks and inadequately designed internal control systems. Consequently, the vulnerability of real estate companies to financial manipulation is shaped by the interplay

between organizational behavior, regulatory compliance, and the effectiveness of oversight mechanisms.

### 3.2 Assessment of Established Statistical Models in Identifying Accounting Anomalies

To evaluate the risk of financial fraud within the analyzed real estate companies, three established models were applied: the Beneish Model (M-Score), Benford's Law, and the Chi-Square Test. These instruments were employed to capture both numerical irregularities in the financial statements and accounting behaviors that may indicate the intentional manipulation of reported results.

#### Results of Applying the Beneish Model (M-Score)

The Beneish Model enables the estimation of the likelihood of earnings manipulation based on eight accounting indicators. The analysis was conducted for the period 2020–2023, using data published in the annual financial statements. Table 2 presents the calculated M-Score values and their interpretation for each company.

**Table no. 2. Results of Applying the Beneish Model to the Analyzed Real Estate Companies (2020–2023)**

Company	Year	M-Score	Interpretation	Observations
Company 2	2019	−1.75	Close to the threshold (−1.78) → moderate risk	Significant revenue growth and reduced depreciation rate
	2021	−2.09	Low risk of manipulation	Stable Beneish indicators; conservative strategy
	2022	−1.31	High risk of manipulation	Most vulnerable year; rapid sales growth
	2023	−2.50	Low risk	Stabilization and a return to normal indicator values
Company 1	2021	−1.804	Moderate risk	Increasing DSRI and SGI; signs of revenue pressure
	2022	2.861	High probability of manipulation	Major fluctuation; potential revenue adjustments
	2023	−1.654	Low risk	Stabilized performance and accounting reporting
Company 3	2021	1.019	High risk	Rapid increases in SGI and SGAI; possible earnings smoothing
	2022	−3.895	Low risk	Accounting corrections and a conservative reporting policy
	2023	−8.503	Significantly below the threshold; no signs of manipulation	Prudent strategy and strict financial reporting adjustments

Source: Author's processing of data from publicly available financial statements issued by the companies  
<https://www.impactsa.ro/rapoarte-financiare> <https://starresidenceinvest.ro/rapoarte-curente/>  
<https://www.one.ro/ro/relatii-investitori/>

Overall, the Beneish Model highlights a moderate aggregate fraud risk among the selected real estate companies, confirming the hypothesis that financial statement manipulation is more likely to occur in entities with fluctuating profitability and rapid revenue growth (Cecchini, 2010).

### **Degree of Numeric Conformity According to Benford's Law**

Benford's Law offers an empirical framework for evaluating the authenticity and numerical consistency of accounting data by analyzing the distribution of the leading digit of reported values. In an unmanipulated dataset, the digit 1 typically occurs with a frequency of approximately 30%, while higher digits (8 and 9) are less frequent. Substantial deviations from this theoretical distribution can serve as indirect indicators of deliberate manipulation or systematic accounting errors.

The application of Benford's Law to the financial statements of the sampled companies for the period 2020–2023 revealed significant differences in the quality of financial reporting and the degree of conformity to the expected distribution. The results are presented in Table 3.

**Table no. 3. Degree of Conformity with Benford's Distribution**

<b>Company</b>	<b>Conformity with Benford Distribution</b>	<b>Over-/Underrepresented Digits</b>	<b>Interpretation</b>
Company 2	Partial	Overrepresentation of digit 9 in revenues; underrepresentation of digit 1	Marginal conformity – potential deliberate numerical adjustments
Company 1	High	Near-ideal distribution across all categories of indicators	No significant deviations – reporting appears transparent and consistent
Company 3	Low	Overrepresentation of digits 5 and 6 in asset and revenue structures	Significant deviations – high likelihood of numerical manipulation

*Source: Author's processing of publicly available financial statements of the companies under analysis*  
<https://www.impactsa.ro/rapoarte-financiare> <https://starresidenceinvest.ro/rapoarte-curente/>,  
<https://www.one.ro/ro/relatii-investitori/>

Collectively, these findings suggest that Benford's Law constitutes a robust instrument for detecting subtle numerical anomalies in financial reporting, complementing the quantitative assessments obtained through the Beneish Model. Observed deviations do not, in themselves, confirm the existence of fraudulent activity; however, they may indicate elevated risks of non-compliant reporting arising from either performance pressures or insufficiently rigorous internal accounting controls.

These results further substantiate the hypothesis that informational transparency and the effectiveness of corporate governance mechanisms are critical determinants in maintaining numerical compliance and mitigating the risk of accounting manipulation within the Romanian real estate sector.

Based on the elements presented above, and considering that the information disclosed in financial statements is published under the responsibility of the companies' management—being referred to as management assertions (IAASB, 2022) we argue that informational transparency and the quality of the governance system constitute decisive factors for maintaining numerical accuracy and reducing the risk of accounting manipulation in the Romanian real estate sector.

### Statistical Significance Testing of Data Using the Chi-Square Test

To assess the significance of deviations observed in the Benford distribution analysis, the Chi-Square Test was applied to evaluate whether the differences between observed and theoretical frequencies are random or statistically significant. This test complements the Benford analysis by providing a quantitative measure of the authenticity of accounting data, thereby contributing to the identification of potential numerical manipulations in financial reporting.

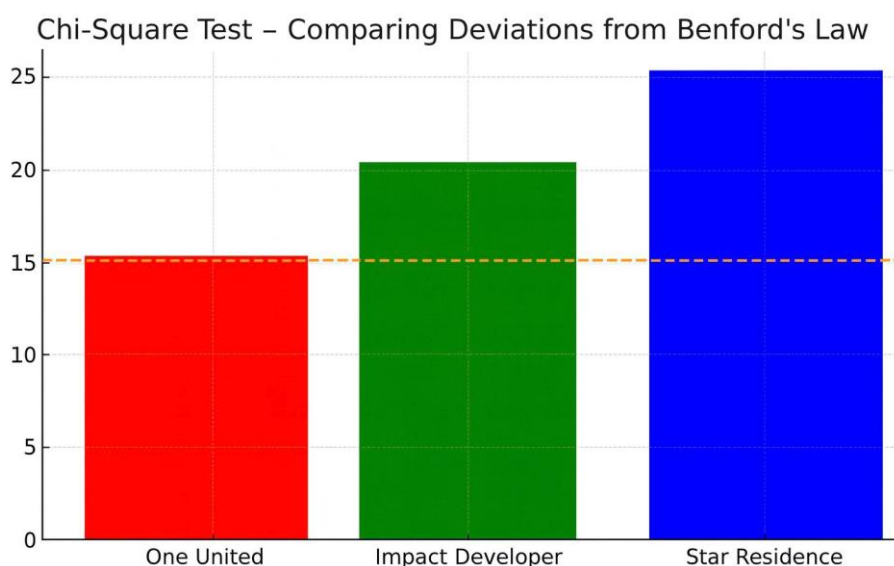
Comparing the results of the sampled companies reveals clear differences regarding the degree of deviation from Benford's theoretical distribution.

Company 1 falls near the threshold of statistical significance, with a Chi-Square value of 15.77 and a p-value of 0.0458. This suggests that the distribution is not entirely random but does not indicate a major anomaly. Consequently, the evaluation is cautious, though not devoid of uncertainty.

Company 2, on the other hand, exhibits a Chi-Square value of 20.61 and a considerably lower p-value of 0.0083. This distinction indicates a more pronounced deviation from the theoretical model, which may imply intentional construction of financial figures.

The most pronounced discrepancy was observed for Company 3, where the Chi-Square score exceeds 25 and the p-value is minimal (0.0024). This finding highlights a clear and persistent incongruity relative to Benford's distribution, suggesting that the data may have been structured systematically. The unusually high frequency of the digit 1 and the clustering of values around specific thresholds could indicate reporting that is oriented toward perception rather than reflecting economic reality.

**Figure no. 1. Analysis of Chi-Square Test Results**



*Source: Author's processing of the results*

Overall, the data indicate that while Company 1 appears relatively compliant, the other two companies—particularly Company 3—exhibit clear signals warranting further

investigation. Greater deviation and lower p-values correspond to a higher risk that financial reporting may be influenced by non-economic factors. Thus, the Chi-Square Test is confirmed as a relevant preliminary instrument for identifying potential fraud risks in the real estate sector (Moore, 2017).

#### **4. RESULTS AND RECOMMENDATIONS**

##### **Custom Model for Detecting Real Estate Fraud Risk ( IMI- Real Estate Manipulation Indicator)**

Applied research on the selected real estate companies revealed that standard fraud detection models—Beneish, Benford, and Chi-Square—provide valuable insights but do not fully capture the specificities of the real estate sector, where the production cycle is lengthy, investments are capital-intensive, and revenue recognition depends on the project completion stage.

Based on these observations, the IMI Model (Real Estate Manipulation Indicator) was developed to integrate both financial and non-financial factors specific to the real estate industry, allowing for a more precise assessment of accounting manipulation risk and corporate governance vulnerabilities.

The model is structured along two primary dimensions:

Financial Dimension – based on accounting indicators derived from the Beneish and Benford models, measuring numerical deviations and abnormal behaviors in financial reporting.

Non-Financial Dimension – encompassing elements related to organizational culture, transparency, frequency of accounting adjustments, and the quality of corporate governance.

$$IMI = \frac{\chi^2}{M+1} + (1 + Ri)$$

Where :

**$\chi^2$  – Chi-Square Test Value**

The higher is this value, the less likely it is that the accounting data are natural, indicating a potential manipulation.

**$|M|+1$  - Absolute Value of the Beneish Score + 1**

The Beneish score identifies classical accounting anomalies. We add 1 to avoid division by zero and to improve mathematical stability. Dividing  $\chi^2$  by  $(|M| + 1)$  creates a ratio between numerical irregularity and observable accounting behavior.

**$1+Ri$ – Real Estate Risk Amplifier**

$Ri$  is a weighted measure (ranging from 0 to 1) that reflects the extent to which a company is exposed to risks characteristic of the real estate sector, based on the presence of factors generally considered risk-inducing in real estate firms. We introduced this amplifier because the real estate industry displays certain tolerated yet risky accounting practices that standard detection models do not highlight. This indicator increases the model's sensitivity to

industry-specific elements, allowing for a more realistic and sector-focused assessment.

**Table no. 4. Description of the RI Component in the IMI Model**

Assessed Behavior	Weight	Description
Frequent capitalization of expenses	0.2	Classifying current costs as investment properties.
Premature revenue recognition	0.2	Recording sales before the transfer of goods.
Gross margin > 80%	0.1	Suspiciously high profitability.
Revenue growth > 30% annually	0.1	Aggressive expansion rate.
Investment properties > 70% of assets	0.1	Lack of diversification, subjective revaluations.
Frequent related-party transactions	0.1	Potential distortions of revenues or expenses.
Unstable financing	0.1	Uncertain bonds, leasing arrangements, or pre-contracts.

*Source: Author's own interpretation of real estate risk areas*

### Interpretation of the IMI Score

- $IMI < 1 \rightarrow$  low risk of accounting manipulation (no sufficient direct or indirect evidence indicating potential financial manipulation);
- $1 \leq IMI < 2 \rightarrow$  moderate risk;
- $IMI \geq 2 \rightarrow$  high risk.

The IMI mathematical model was applied to the three selected companies in order to assess the risk of accounting manipulation by integrating the Chi-Square test, the Beneish M-Score, and the real-estate-specific risk factor (Ri). A synthesis of the results is presented in Table 5.

### RI Calculation

Company 1 ( $Ri = 0.4$ ):

Overcapitalization – Yes  $\rightarrow +0.2$ ;  
 Revenue recognition in advance – Yes ( $DSRI > 1$  in 2022)  $\rightarrow +0.2$ ;  
 Gross margin > 80% – No;  
 Sales growth > 30% – No;  
 Real estate investments > 70% of assets – Not consistently reported;  
 Related-party transactions & unstable financing – Not reported;  
 Total: 0.4.

Company 2 ( $Ri = 0.3$ ):

Overcapitalization – No;  
 Revenue recognition in advance – Yes ( $DSRI = 1.069$  in 2021)  $\rightarrow +0.2$ ;  
 Gross margin > 80% – No (normal margins);  
 Sales growth > 30% – Yes in 2022  $\rightarrow +0.1$ ;  
 Other criteria – Not highlighted in reports;  
 Total: 0.3.

Company 3 ( $R_i = 0.6$ ):

Overcapitalization – Yes (over 90% of assets in real estate investments)  $\rightarrow +0.2$ ;

Revenue recognition in advance – Yes ( $SGI = 6$  in 2021)  $\rightarrow +0.2$ ;

Gross margin  $> 80\%$  – Yes in 2022  $\rightarrow +0.1$ ;

Sales growth  $> 30\%$  – Yes  $\rightarrow +0.1$ ;

Other criteria – Not reported;

Total: 0.6.

**Tabel nr. 5. Scorul IMI calculat pentru anul 2023**

Companie	Chi-Square	M-Score	$R_i$	$ M  + 1$	$\text{Chi}^2 / ( M +1)$	IMI
Compania 1	15.77	-1.654	0.3	2.654	5.942	7.725
Compania 2	20.61	-2.500	0.2	3.500	5.889	7.066
Compania 3	23.75	-8.503	0.4	9.503	2.499	3.499

*Source: : Author's processing of data from publicly available financial statements*

Company 1 reports an IMI score of 7.725, the highest among the three entities analyzed. This outcome signifies a pronounced risk of accounting manipulation, driven by an M-score positioned near the conventional alert threshold and by a substantial deviation from Benford's distribution. Moreover, sector-specific features—such as structurally elevated profit margins and the extensive capitalization of assets—further intensify the overall risk profile.

Company 2 records an IMI score of 7.066, likewise placing the entity within the high-risk category. Although its Beneish M-score suggests comparatively more conservative reporting practices, the Chi-Square statistic reveals notable inconsistencies in the distributional integrity of the financial data. The structural characteristics inherent to the real estate sector contribute only marginally to the aggregate score.

Company 3 achieves an IMI score of 3.499, situating the company in a moderate-risk bracket. The lower M-score, combined with a more limited deviation from Benford's law, exerts a mitigating effect on the final assessment, despite the fact that the  $R_i$  component is the highest among the three. This configuration may indicate a comparatively less complex operational structure or more prudent financial reporting behaviors.

In summary, the IMI model demonstrates considerable utility in differentiating the degrees of accounting manipulation risk across firms by integrating numerical irregularity tests, behavioral accounting indicators, and sector-specific risk factors. Its composite structure enables a more nuanced and context-aware evaluation of financial reporting quality.

### **Anti-fraud Measures in the Real Estate Sector**

In a context in which the risks associated with accounting fraud can compromise both the transparency of financial reporting and investor confidence, the adoption of a coherent and rigorously designed set of preventive measures becomes imperative. Based on the findings derived from the analysis of the sampled companies, the implementation of the following anti-fraud mechanisms is deemed essential:

Strengthening internal audit and internal control function. Companies should ensure the existence of an independent internal audit unit with unrestricted access to financial and non-

financial data, enabling the early detection of anomalies and irregularities across reporting stages.

Establishing clearly defined and thoroughly documented financial policies. Real estate companies should implement robust policies governing revenue recognition—particularly in the context of ongoing development projects—to ensure the production of high-quality accounting information, especially with respect to revenue measurement and property revaluations.

Conducting periodic assessments of key financial indicators. Indicators such as annual revenue growth exceeding 30%, profit margins above 80%, variations in depreciation rates, the proportion of investment properties within total assets, or significant increases in receivables should be systematically monitored. These indicators can activate early-warning mechanisms signalling potential irregularities.

Integrating the IMI model into internal audit procedures. The IMI model developed and presented in this study may serve as an additional analytical tool for evaluating the risk of fraudulent financial reporting. Its annual application could facilitate the early identification of companies requiring more comprehensive investigative procedures.

Enhancing the responsibilities and composition of the Board of Directors. Boards should include independent members with recognized accounting expertise who can oversee the application of accounting policies and verify the accuracy and integrity of financial disclosures..

Promoting ethics and an integrity-driven organizational culture. The adoption of ethical codes, employee training programs, and anonymous reporting channels can strengthen a culture of compliance and reduce the likelihood of both opportunistic and systemic fraud.

By implementing these measures, companies operating in the real estate sector can not only mitigate fraud risks but also reinforce their reputation among investors, auditors, and the broader market. Such practices contribute to the advancement of corporate governance and the strengthening of self-regulatory mechanisms in an industry exposed to financial performance pressures and market volatility.

## CONCLUSIONS

The research conducted and presented in this study demonstrates that the risk of financial fraud within the Romanian real estate sector constitutes a complex phenomenon, shaped both by accounting behaviors identifiable through statistical models and by non-financial factors related to governance, transparency, and performance pressures. The combined application of the Beneish, Benford, and Chi-Square models indicates that no single model is sufficiently comprehensive in isolation; however, when used together, they provide a robust and multifaceted perspective on the integrity of financial reporting.

The findings reveal consistent differences among the companies examined. Company 1 exhibits a low-risk profile, marked by numerical conformity, mature governance structures, and prudent accounting practices. Company 3 reflects a moderate level of risk, attributable to occasional accounting adjustments and the influence of market volatility on reporting outcomes. Conversely, Company 2 demonstrates a high-risk profile, with elevated vulnerabilities stemming from both accounting indicators and institutional factors, thereby confirming the susceptibility of firms undergoing rapid expansion or operating in early consolidation stages.

Based on these results, the proposed IMI (Real Estate Monitoring Indicators) model emerges as a valuable instrument for the integrated assessment of fraud risk, as it consolidates both quantitative and qualitative information within a structure tailored to the specific characteristics of the real estate industry. The IMI not only facilitates the detection of financial



anomalies but also aids in anticipating organizational contexts in which fraudulent practices are more likely to occur.

A central contribution of this research lies in underscoring the importance of a multidimensional approach to fraud-risk analysis, demonstrating that fraud within the real estate sector does not arise from a single source but rather from the interplay of pressure, opportunity, and rationalization—elements that are observable and coherently embedded within the IMI model. Consequently, the implementation of strengthened internal control mechanisms, enhanced informational transparency, and independent auditing emerges as essential for improving the credibility of real estate companies and safeguarding investor interests.

In conclusion, this study provides an analytical framework relevant both to practitioners in auditing and accounting and to researchers investigating fraud phenomena in industries characterized by high volatility. The practical application and further development of the IMI model may represent a significant step toward mitigating risks and enhancing the financial resilience of the Romanian real estate sector.

## Bibliography

**Albrecht, W. S., Albrecht, C. C., & Albrecht, C. o.** (2015). *Fraud Examination*. Cengage Learning, 5th Edition.

**Beneish, M.** (1999). The Detection of Earnings Manipulation. *Financial Analyst Journal*, Vol. 55, No. 5, 24-36.

**Benford, F.** (1938). The Law of Anomalous Numbers . *Proceedings of the American Philosophical Society*, 78(4), 551-572.

**Button, M., Gee, J., & Brooks, G.** (2018). *The Financial Cost of Fraud 2018*. University of Portsmouth, Centre for Couter Fraud Studies.

**Cecchini, M. L.** (2010). Detecting Earnings Management and Fraud Using Data Mining. *Decision Support Systems*, 398-407.

**Cressey, D.** (1953). *Other People's Money: A study in the Social Embezzlement*. Glencoe: Free Press.

**Dragomir, V.** (2020). *Instrumente de diagnostic și evaluare a riscului de fraudă financiară*. Bucharest: Editura ASE.

**IAASB.** (2022). *Supplement t the Handbook of International Quality Management, Auditing, Review, Other Assurance, and Related Services Pronouncements*. International Auditing ans Assurance Standards Board, Edition Volume III.

**Mihalcea, M.** (2020). Detecting the Risk of Manipulation of Financial Statements for Companies on the Bucharest Stock Exchange Applying the Beneish Model. *LUMEN Proceedings*, 13, 182-195.

**Moore, D. M.** (2017). *Introduction to the Practice of Statistics ( 9th ed.)*. W.H.Freeman.

**Pinto, J. L.** (2008). Fraudulent Financial Reporting and Real Estate. *Journal of Business Ethics*, 733-745.

**Wolfe, D. T.** (2004). The Fraud Diamond: Considering the Four Elements of Fraud. *The CPA Journal*, vol 74, no. 12, 38-42.

**Zumbrun, J. (2023).** Accounting-Fraud Indicator Signals Coming Economic Trouble. Wall Street Journal.

<https://m.bvb.ro/>

<https://starresidenceinvest.ro/rapoarte-curente/>

<https://www.impactsa.ro/rapoarte-financiare>

<https://www.one.ro/ro/relatii-investitori/>