Les Cahiers du CEDIMES
2026, Volume 21, numéro 3, https://doi.org/10.69611/cahiers21-3-09
ISSN 2110-6045

Beyond traditional financial ratios: An integrated diagnostic model of value creation, value retention, profitability, and financial sustainability

Valerica (TĂTĂRANU) SOARE[1*], Constantin Aurelian IONESCU[2], Elena (TOADER) VASILE[3]

[1] « Valahia » University of Târgoviște, Romania, valerica.tataranu.ct@valahia.ro

[2] « Valahia » University of Târgoviște, Romania & Hyperion University of Bucharest, Romania, aurelian.ionescu@valahia.ro, ORCID: 0000-0001-6063-2921

[3] « Valahia » University of Târgoviște, Romania, elena.toader.ct@valahia.ro

[*] author corresponding

Abstract: Traditional financial analysis frequently relies on isolated accounting ratios, limiting its ability to capture the mechanism through which companies create, retain, and sustain financial performance over time. This study develops an Integrated Financial Diagnostic Model (IFDM) combining four dimensions: value creation, value retention, profitability mechanisms, and long-term financial sustainability. The model is applied to 77 company-year observations from seven Romanian listed energy and utility companies over 2014-2024. Operational value creation is assessed through the Operating Value Added (OVA) Ratio and its temporal stability, while value retention is measured using EBIT/OVA and Net Profit/OVA. Profitability mechanisms are examined through DuPont decomposition of ROA into net profit margin and asset turnover, complemented by standardized trajectory comparisons using Mean Absolute Distance. The long-term financial sustainability dimension is examined from the perspective of long-term financial balance, assessed through the Long-Term Financial Balance (LTFB) Ratio. Results reveal substantial heterogeneity in both the level and stability of value creation and show that comparable profitability may arise from different underlying mechanisms. OVA Ratio is positively associated with ROA ($\rho = 0.469$), while value-retention indicators show stronger associations ($\rho = 0.810$ for EBIT/OVA and $\rho = 0.841$ for Net Profit/OVA). LTFB is also positively associated with ROA ($\rho = 0.38$, $p = 0.001$), with Mann-Whitney analysis confirming higher profitability among stronger-sustainability observations. The IFDM provides a multidimensional diagnostic framework that preserves the managerial information contained in individual performance dimensions.

Keywords: financial performance, integrated financial diagnosis, value creation, value retention, DuPont analysis, financial sustainability, energy and utilities.

Résumé : L'analyse financière traditionnelle repose souvent sur des ratios comptables isolés, ce qui limite sa capacite à saisir les mécanismes par lesquels les entreprises créent, conservent et pérennisent leur performance financière au fil du temps. Cette étude développe un modèle de diagnostic financier intégré combinant quatre dimensions : la création de valeur, la conservation de la valeur, les mécanismes de rentabilité et la pérennité financière à long terme. Le modèle est appliqué à 77 situations annuelles des compagnies, portant sur sept sociétés roumaines cotées du secteur de l'énergie et des services publics, sur la période 2014-2024. La création de valeur opérationnelle est évaluée à l'aide du ratio de valeur ajoutée opérationnelle (OVA) et sa stabilité temporelle, tandis que la conservation de la valeur est mesurée par les ratios EBIT/OVA et bénéfice net/OVA. Les mécanismes de rentabilité sont examinés via la décomposition du DuPont du rendement des actifs (ROA) en marge bénéficiaire nette et taux de rotation des actifs, complétée par des comparaisons de trajectoires

normalisées utilisant la distance absolue moyenne. La dimension de pérennité financière à long terme est analysée sous l'angle de l'équilibre financier à long terme, évalué par le ratio d'équilibre financier à long terme (LTFB). Les résultats révèlent une hétérogénéité substantielle, tant au niveau de la création de valeur que de sa stabilité, et montrent qu'une rentabilité comparable peut découler de mécanismes sous-jacents différents. Le ratio OVA est positivement corrélé au ROA (ρ = 0,469), tandis que les indicateurs de conservation de la valeur présentent des corrélations plus fortes (ρ = 0,810 pour EBIT/OVA et ρ = 0,841 pour bénéfice net/OVA). Le LTFB est également positivement associé au ROA (ρ = 0,38, p = 0,001) ; l'analyse de Mann-Whitney confirme par ailleurs une rentabilité plus élevée pour les observations présentant une meilleure pérennité financière. L'IFDM constitue un cadre de diagnostic multidimensionnel qui préserve les informations de gestion contenues dans les dimensions individuelles de la performance.

Mots-clés : performance financière, diagnostic financier intégré, création de valeur, conservation de la valeur, analyse DuPont, pérennité financière, énergie et services publics.

Classification JEL : G3, M42.

1. Introduction

Corporate financial performance is a multidimensional concept that may be assessed from financial, operational, strategic, social, environmental, and other complementary perspectives (Patrocínio et al., 2024; Lima & Jucá, 2024). Financial performance remains a central component of managerial and investment decision-making as it reflects the capacity of companies to generate economic results, use resources efficiently, and maintain financial viability over time. Traditional financial analysis generally relies on accounting ratios related to profitability, liquidity, solvency, efficiency, and leverage (Mohammed, 2020). Although these measures provide useful information regarding specific aspects of corporate performance, their separate interpretation may offer only a partial view of the mechanism underlying financial outcomes. Previous research has emphasized the need for more integrated performance measurement systems capable of connecting different dimensions of organizational performance while preserving their individual informational content (Giovannoni & Maraghini, 2013; Omran et al., 2021).

Within the financial dimension of corporate performance, profitability remains one of the most widely used measures of a company's ability to generate economic returns from the resources employed. Financial performance is commonly assessed through indicators such as Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and other accounting-based ratios, each capturing a specific aspect of the company's capacity to generate profits (Savickas, 2020). Moreover, the informational content of individual profitability ratios may depend on their measurement specification, as alternative calculation approaches can lead to different empirical conclusions (Patrocínio et al., 2024). ROA, for instance, provides a synthetic measure of the return generated by the company's asset base, but does not indicate whether this profitability originates primarily from stronger profit margins or from more efficient asset utilization (Bauman, 2014). This distinction is particularly relevant for managerial diagnosis, as comparable profitability levels may result from substantially different operating configurations. Evaluating financial performance requires moving beyond the observed level of profitability toward an examination of the mechanisms through which that profitability is generated.

Profitability represents the final accounting outcome of a broader operating process and does not directly capture the value generated through the company's core operating activities. The value-added literature provides a complementary perspective by defining value added as the wealth generated by a company through its productive activity, conceptually reflecting the difference between the value of output and the intermediate inputs consumed in generating that output (Sahoo & Pramanik, 2017; Haller et al., 2018). Value-added measures have therefore been proposed as complementary to conventional profit-based indicators in assessing corporate operating performance,

as they focus on the value generated before its subsequent allocation among the different participants in the value-creation process (Sahoo & Pramanik, 2017; Çopur Vardar & CiĞer, 2022). Building on this conceptual foundation, the present study focuses specifically on operational value creation, captured through Operating Value Added (OVA) as the difference between operating revenues and intermediate consumption. Within this perspective, operational value creation and accounting profitability represent related but distinct dimensions of corporate financial performance: OVA captures the value generated through operating activity, whereas profitability reflects the financial outcome remaining after successive recognition of costs and expenses (Tudose et al., 2022). Value retention can be considered a complementary diagnostic dimension, representing the extent to which operational value created by the company is preserved throughout the profit-generation process and ultimately reflected in operating and net profit. Accordingly, companies generating comparable levels of operational value may differ substantially in their capacity to retain that value as profitability.

Beyond the generation and retention of operational value, the sustainability of financial performance also depends on the financial structure supporting the company's activities. The composition and maturity of financing sources influence the capacity of companies to maintain financial equilibrium, absorb operating fluctuations, and support investment over time (Adachi-Sato & Vithessonthi, 2019; Wang et al., 2023). In this context, the alignment between long-term financing sources and long-term asset requirements represents an important dimension of financial stability, consistent with the maturity-matching principle according to which the maturity of financing should reflect the economic life of the assets being financed (Geelen et al., 2024).

Despite the extensive literature on corporate financial performance, its underlying dimensions are frequently examined separately through sets of financial indicators capturing different aspects of organizational performance (Hamann & Schiemann, 2021). (Lazăr, 2016) provides substantial evidence regarding profitability and its determinants, including value added and financing structure. Comparatively, less attention has been devoted to integrating these dimensions into a sequential diagnostic perspective.

To address the literature gap, our study applies an integrated, diagnostic-oriented empirical design to develop and illustrate the Integrated Financial Diagnostic Model (IFDM). The proposed framework evaluates corporate financial performance as a sequential process comprising four interconnected dimensions: value creation, value retention, profitability, and financial sustainability. Unlike approaches based on isolated accounting ratios, the IFDM examines how value is generated through operating activities, how much of the value is retained by the company, how retained values is transformed into profitability, and whether the resulting performance is supported by a sustainable long-term financing structure.

The study addresses the following research questions:

RQ1. To what extent do the sampled companies create and retain operational value during the period 2014-2024?

RQ2. Which DuPont component, net profit margin, asset turnover, or their balanced contribution, predominantly characterize corporate profitability dynamics over the period 2014-2024?

Based on the relationship underlying the IFDM, two hypotheses are examined:

H1. Stronger operational value creation and value retention are positively associated with corporate profitability.

H2. Stronger long-term financial balance is associated with higher corporate profitability.

2. Literature review

2.1. Operational Value Creation and Value Retention

Value-added analysis provides a complementary perspective on corporate financial performance by focusing on the wealth generated through productive activity rather than exclusively on final accounting profit. Value added generally reflects the difference between the value of output

and the externally acquired goods and services consumed in generating that output, thereby capturing the contribution created internally by the company (Sahoo & Pramanik, 2017; Haller et al., 2018; Signori et al., 2021). This perspective differs from Economic Value Added (EVA), which means economic profit after considering the cost of invested capital, and therefore represents a distinct approach to corporate value creation.

The literature has increasingly recognized value-added information as complementary to traditional accounting measures of corporate performance (Petravičius & Tamošiūnienė, 2008). Sahoo and Pramanik (2017) argue that value-added information provides an additional perspective for evaluating operational efficiency and profitability, while Singh and Saxena (2017) demonstrate the usefulness of value-added ratio as indicators of corporate profitability and productivity. From a performance-evaluation perspective, value-added statements extend conventional profit-oriented reporting by identifying not only the wealth generated by the company but also its subsequent allocation among employees, providers of finance, governments, shareholders, and other participating stakeholders (Haller et al., 2018; Çopur Vardar & Ciğer, 2022). Accordingly, value added can provide information that is not fully captured by final accounting profit alone, as it focuses on the value-generation process before the complete allocation of the wealth created.

A further stream of research emphasizes the distinction between value creation and value distribution. Lieberman et al. (2017) demonstrate substantial company level heterogeneity in both the creation of value and its appropriation by different stakeholders, supporting the view that generating value and capturing its financial consequences should not be regarded as equivalent phenomena. Similarly, Haller et al. (2018) conceptualize value-added information in terms of both wealth creation and its distribution, while Signori et al. (2021) explicitly distinguish value-added creation from the allocation of the resulting wealth among stakeholder groups. These findings suggest that companies generating value through their operating activities may nevertheless differ considerably in what subsequently happens to the value.

Most value-added research has concentrated on the generation and distribution of value among stakeholders rather than on the proportion of operational value that remains visible through successive stages of accounting profit formation (Lieberman et al., 2017; Lieberman et al., 2018). This distinction creates an additional diagnostic perspective. In this study, value retention refers specifically to the extent to which operational value generated by the company is preserved as the financial process moves from operational value creation toward operating and final profit. Operational value creation and value retention are treated as complementary rather than interchangeable dimensions: the former identifies the capacity to generate value from core operations, whereas the latter assesses how effectively that value is preserved and translated into accounting profitability. This distinction provides the conceptual foundation for examining companies not only according to how much operational value they create, but also according to how much of that value is ultimately retained in operating and net profit.

2.2. Profitability Mechanism and Dupont Perspective

Profitability ratios summarize important financial outcomes, but their aggregate nature may conceal the operating mechanism through which those outcomes are generated (Chang et al., 2014). The DuPont framework addresses this limitation by decomposing profitability into components related to margin generation and asset-utilization efficiency, thereby allowing analysts to distinguish between different sources of financial return (Bauman, 2014; Jape & Malhotra, 2023). In its operating form, profitability can be interpreted through the interaction between profit margin and asset turnover, where profit margin reflects the company's capacity to generate earnings from sales and asset turnover captures the efficiency with which assets are employed to generate revenue (Turner et al., 2015). Recent research continues to confirm the diagnostic relevance of these components and shows that their relative contribution to profitability may vary substantially across companies and industries (Díaz-Ortega & García-Mogollón, 2022; Jape & Malhotra, 2023; Özçelik, 2024).

Empirical evidence also suggests that profit margin and asset turnover should not be

interpreted as interchangeable drivers of profitability. Their dynamics may differ in persistence, sensitivity to competitive conditions, and explanatory power for future operating performance. Recent large-sample evidence indicates that changes in profit margin and asset turnover contain different informational content and may exhibit different mean-reversion patterns, reinforcing the relevance of examining profitability at the component level rather than relying exclusively on an aggregate return measure (Wu & Jiang, 2026). Sector-specific studies further show that the dominant profitability mechanism can differ considerably across companies. Evidence from manufacturing companies identifies net margin as the strongest profitability component, followed by asset turnover, whereas energy-sector analyses reveal substantial differences between companies in margin and asset-utilization profiles (Díaz-Ortega & García-Mogollon, 2022; Özçelik, 2024).

2.3. Long-Term Financial Sustainability and Corporate Profitability

Long-term financial sustainability reflects a company's capacity to maintain a financial structure capable of supporting its activities and limiting exposure to financial distress over time. From this perspective, financial sustainability is associated with company survival, risk exposure, and the ability to maintain an adequate risk-return profile (Gleißner et al., 2022). The structure and maturity of financing are particularly relevant, as long-term finance enables companies to undertake investment whose returns materialize over extended periods, while reliance on short-term financing for long-term investment may increase rollover and refinancing risk (Sommer, 2024).

This perspective is consistent with the maturity-matching principle, according to which the maturity of financing should be aligned with the economic life of the assets being financed. Companies tend to match debt maturity with asset life and that such alignment represents an important component of corporate financing decisions (Geelen et al., 2024). Conversely, investment-financing maturity mismatch may increase financial constraints and exposure to liquidity risk, particularly when long-term investments depend excessively on short-term financing (Wen et al., 2024). These findings suggest that the financial structure supporting long-term assets represents a relevant component of corporate financial stability rather than merely a question of leverage.

The implications of financing structure for corporate performance are nevertheless heterogeneous. Debt maturity may affect operating performance differently across companies, while access to long-term financing can facilitate productive investment and improve company-level outcomes under appropriate conditions (Nakatani, 2023; Sommer, 2024). Evidence also suggests that the implications of capital structure extend beyond short-term profitability, as financing decisions may affect the capacity of companies to maintain financial sustainability over time (Kong et al., 2023). At the same time, the relationship between capital structure and profitability is sensitive to the composition of financing and may vary across profitability measures, reinforcing the need to distinguish financial structure from financial performance itself (Nguyen et al., 2023). Sector-specific evidence further indicates that the relationship between financing structure and financial performance remains relevant in the energy industry, although its magnitude and direction may depend on the particular financing component and performance measure considered (Samour et al., 2024).

Taken together, the literature suggests that a meaningful diagnosis of financial performance requires more than the simultaneous consideration of multiple financial indicators, as distinct performance dimensions may convey complementary rather than interchangeable information (Hamann & Schiemann, 2021). The analytical challenge lies in preserving the informational content of these dimensions while examining how they relate within the broader financial performance process. This perspective is consistent with research showing that aggregate profitability measures may conceal different underlying operating configurations and that their decomposition provides additional insight into the mechanism through which financial outcomes are generated (Bauman, 2014; Chang et al., 2014). Financial performance can be approached not merely as an observed outcome, but as the result of an interconnected process through which operating activity is translated into profitability and supported by the company's financial structure.

Building on this rationale, IFDM adopts a sequential diagnostic architecture in which

operational value creation provides the starting point, value retention captures its translation into operating and net profit, the DuPont decomposition identifies the configuration underlying profitability, and long-term financial balance evaluates the financing structure supporting the company's non-current asset base. These dimensions are examined separately and subsequently connected through their empirical relationships rather than combined into an aggregate score. The following methodology operationalizes this architecture through a set of complementary indicators and analytical techniques designed to capture both company-specific dynamics and the relationships among the core dimensions of the model.

3. Methodology

The research is diagnostic rather than predictive. Accordingly, the empirical analysis does not seek to forecast future performance or establish causal relationships (Shmueli, 2010). Instead, it examines the longitudinal evolution of the four IFDM dimensions, the mechanisms underlying corporate profitability, and the statistical associations among the indicators included in the model. The results are interpreted as in-sample accounting and financial associations and are not intended to provide causal or predictive inference.

The empirical analysis is based on a longitudinal dataset comprising seven Romanian listed energy and utility companies observed annually from 2014 to 2024, yielding 77 company-year observations. The selected companies operate in the energy and utilities field and were included based on the continuous availability of audited annual financial statements, consistency of financial reporting throughout the observation period, and comparability of their operating and financial characteristics.

Financial data were collected from audited annual reports, financial statements, and disclosures published through the Bucharest Stock Exchange. For indicators requiring average balance-sheet values or year-to-year changes, accounting information from 2013 was collected solely to provide the necessary opening or lagged values. The year 2013 was not included as a separate observation in the final analytical panel.

3.1. Integrated Financial Diagnostic Model

The IFDM comprises four complementary analytical modules. Each module addresses a distinct stage in the financial value-transformation process. The first module assesses whether the company generates operational value through its core activities. Value creation is measured using Operating Value Added (OVA) and the OVA Ratio. OVA represents the amount of operational value generated during the reporting period, while the OVA Ratio expresses OVA relative to operating revenues, thereby standardizing operational value creation for differences in company scale and facilitating comparisons across companies and years (Spirkova & Vinczeova, 2026).

$$\text{OVA Ratio}_{it} = \frac{OVAit}{Operating\ Revenuesit}$$

The first module addresses the initial component of RQ1 by examining whether the company generates operational value and how the intensity of value creation evolves over time. The analysis examines the sign, magnitude, trend, and cross-company distribution of OVA and the OVA ratio. Positive OVA values indicate that operating revenues exceed intermediate consumption and reflect positive operational value creation, whereas negative values indicate that operating revenues are insufficient to cover intermediate consumption.

The second module evaluates how much of the operationally created value is retained as successive levels of financial performance. Value retention is assessed using the following ratios:

$$\text{EBIT to OVA}_{it} = \frac{EBITit}{OVAit} \text{ and}$$

$$\text{Net Profit to OVA}_{it} = \frac{Net\ Profitit}{OVAit}$$

The EBIT to OVA ratio captures the proportion of operational value remaining after the

operating-cost structure reflected in earnings before interest and tax. The Net Profit to OVA ratio captures the proportion ultimately retained after financing costs, taxation, and other non-operating effects.

These indicators complete the analysis associated with RQ1 by distinguishing between the generation of operational value and its subsequent retention. Because ratio interpretation may become unstable when OVA is close to zero or negative, company-year observations with small or non-positive denominators are examined carefully, consistent with the methodological limitations associated with financial ratios when denominator values approach zero or become negative (Rondós-Casas, 2026). Such observations are not automatically interpreted as conventional efficiency ratios; instead, they are considered within the broader financial context of the corresponding company and year.

The third module evaluates how retained value is transformed into accounting profitability. Profitability is assessed through a two-component DuPont decomposition of Return on Assets (ROA)

$ROA_{it} = NPM_{it} \times AT_{it}$ where $NPM_{it} = \frac{Net\ Profit it}{Revenue it}$ and $ROA_{it} = \frac{Net\ Profit it}{Average\ Total\ Assets it}$

Average Total $Assets_{it} = \frac{Total\ Assets i,t-1 + Total\ Assets it}{2}$

Using the same average-asset denominator for Asset Turnover and ROA preserves the internal consistency of the DuPont identity. The DuPont analysis is used as a diagnostic tool to identify whether corporate profitability is more closely associated with the profit-margin mechanism, asset-utilization efficiency, or a balanced contribution of both components (Endris & Babu, 2026). Longitudinal comparisons allow changes in the profitability profile of each company to be assessed throughout the observation period, while cross-company comparisons identify persistent differences in the mechanisms underlying financial performance.

The fourth module examines the long-term financial sustainability dimension from the specific perspective of long-term financial balance, evaluating whether the company's non-current asset base is adequately supported by stable financing sources, consistent with the financial-equilibrium principle linking long-term asset requirements to permanent financing sources (Motlíček & Polák, 2015; Fletcher et al., 2018). Long-term financial balance is assessed using the LTFB Ratio. Permanent capital is calculated as:

$Permanent\ Capital_{it} = Equity_{it} + Long\text{-}term\ Liabilities_{it}$

The long-term financing buffer is:

$LTFB_{it} = Permanent\ Capital_{it} - Non\text{-}current\ Assets_{it}$

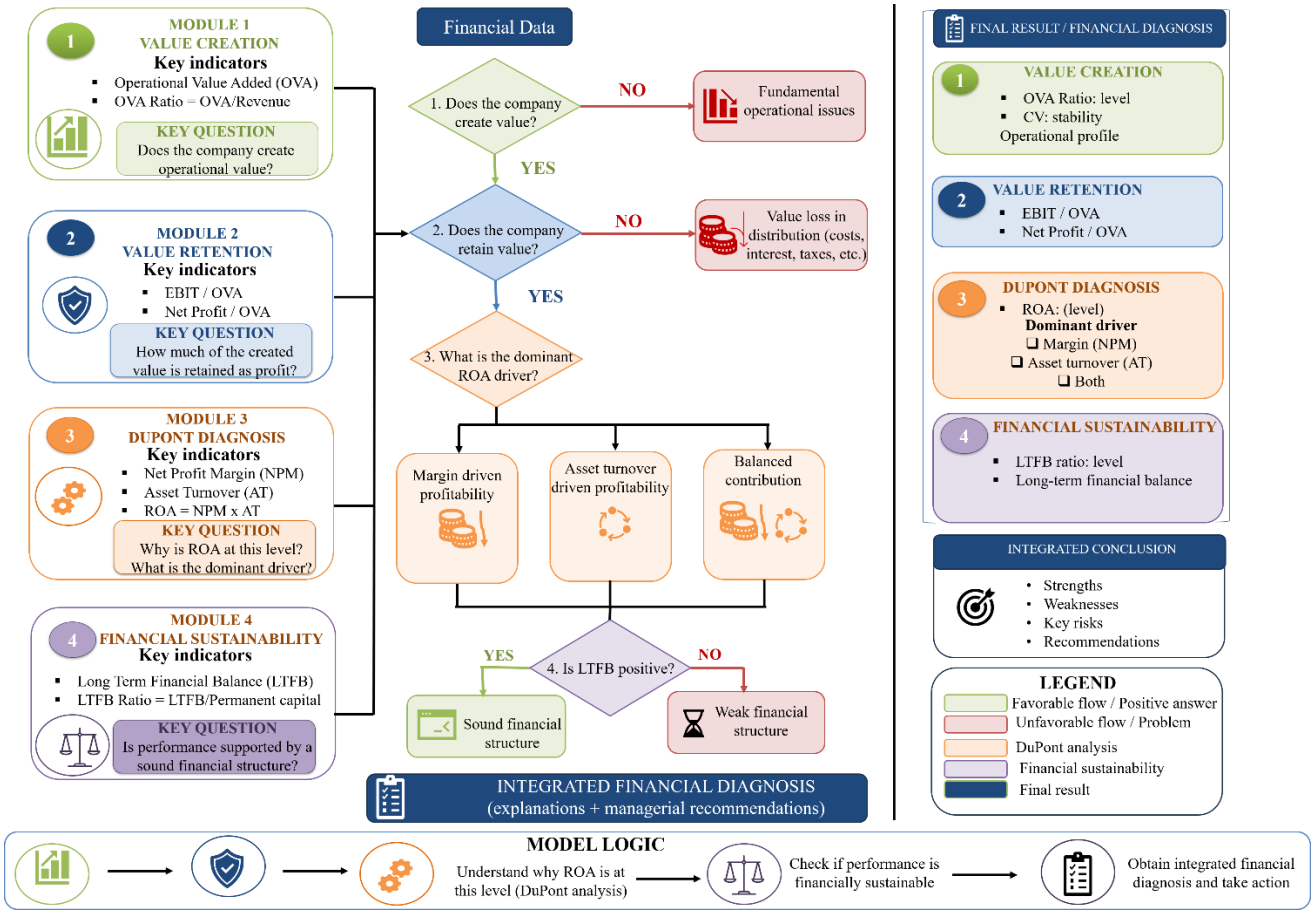
The corresponding ratio is calculated as:

$LTFB\ Ratio_{it} = \frac{LTFB it}{Permanent\ Capital it}$

A positive LTFB indicates that permanent capital fully finances non-current assets and additionally supports part of the company's working capital requirement. A negative LTFB indicates that part of the non-current asset base is financed through short-term resources, implying greater structural financing pressure (Motlíček & Polák, 2015).

Figure 1 presents the conceptual architecture of the IFDM. The model evaluates corporate financial performance through four interconnected analytical modules covering operational value creation, value retention, profitability mechanisms, and long-term financial balance. Each module addresses a specific component of the research framework while contributing to the integrated financial diagnosis. Rather than analyzing financial indicators independently, IFDM organizes them within a coherent diagnostic architecture linking the generation and retention of operational value, the mechanisms underlying profitability, and the long-term financing structure supporting corporate performance.

Fig. 1. Integrated financial diagnostic model



3.2. Empirical Analysis

To address the proposed research questions and evaluate the hypotheses, the empirical analysis combines descriptive, comparative, and inferential statistical techniques. Each analytical method is selected according to the objective of the corresponding IFDM module, allowing the framework to integrate company-level diagnosis with the assessment of relationships among its core financial dimensions.

RQ1 is addressed through descriptive statistics, longitudinal trend analysis, and cross-company comparisons of the indicators included in the Value Creation and Value Retention modules. Operational value creation is assessed through the OVA Ratio, while its temporal stability is evaluated using the coefficient of variation (CV), which provides a scale-independent measure of relative variability around the mean (Arachchige et al., 2022). Value retention is examined through the EBIT/OVA and Net Profit/OVA ratios, providing complementary evidence to the extent to which operational value is preserved throughout the profit-generation process.

For diagnostic purposes, the IFDM applies heuristic classification thresholds to the OVA Ratio and its CV, allowing the level and temporal stability of operational value creation to be interpreted jointly within the Operational Diagnostic Matrix. These thresholds are introduced as model-specific managerial decision rules and are not derived from statistically estimated breakpoints or established industry benchmarks. Accordingly, they are used for diagnostic classification rather than statistical inference and may require recalibration when IFDM is applied to different industries, samples, or institutional contexts. The classification criteria applied in this study are presented in Table 1.

Table 1. IFDM Classification Criteria for Operational Value Creation

OVA Ratio	Level	CV	Stability Level
<0.30	Low	<10%	Very Stable
0.30-0.50	Moderate-Low	10-20%	Stable
0.50-0.70	Moderate	20-30%	Moderately Stable
0.70-0.85	Moderate-High	30-50%	Volatile
>0.85	High	>50%	Highly Volatile

Source: Authors.

The two classifications are combined within the IFDM Operational Diagnostic Matrix to derive four managerial profiles. For this purpose, Moderate-High and High OVA levels are interpreted as stronger operational value creation, whereas Low, Moderate-Low, and Moderate levels represent comparatively weaker value creation. Similarly, Very Stable, Stable, and Moderately Stable CV levels represent greater temporal stability, whereas Volatile and Highly Volatile levels indicate weaker temporal stability. The interaction between these two dimensions generates four diagnostic profiles: Strategic Value Creator (stronger value creation-greater stability), Growth Opportunity (stronger value creation-weaker stability), Operationally Stable (weaker value creation-greater stability), and Value at Risk (weaker value creation-weaker stability).

RQ2 examines the mechanisms underlying corporate profitability. Within IFDM, ROA is decomposed into NPM and AT to determine whether its temporal dynamics are more closely aligned with margin generation, asset-utilization efficiency, or a balanced contribution of both components. The analysis is conducted at two complementary levels. First, the longitudinal profitability profile of each company is examined by comparing the standardized evolution of ROA with its two underlying components over the period 2014-2024. Second, the identified profitability profiles are compared across companies to identify common patterns within the analyzed sample.

To identify the dominant profitability mechanism within each company, the three DuPont indicators were first standardized using Z-scores, placing them on a common dimensionless scale and thereby facilitating direct comparison of their temporal trajectories (Wongoutong, 2024). The similarity between ROA and each DuPont component was subsequently quantified using a Mean Absolute Distance (MAD) measure, defined as the average absolute difference between the corresponding standardized observations of the two series. Absolute-distance measures provide a direct and interpretable assessment of the average discrepancy between paired observations, with lower values indicating greater similarity (Zhu & Huang, 2022). Lower MAD values indicate greater temporal similarity between the standardized evolution of ROA and the respective DuPont component. The MAD formula is:

$$\text{MAD}_{\text{ROA, X, I}} = \frac{1}{T}\sum_{t=1}^{T} \left| Z(ROAit) - Z(Xit) \right|, \text{X } \epsilon \{NPM, AT\}$$

Where T represents the number of annual observations for company I, and X denotes alternatively NPM or AT. Lower MAD values indicate greater temporal correspondence between ROA and the respective DuPont components.

To distinguish between dominant and balanced profitability mechanisms, the relative difference between the two MAD values was used as a diagnostic criterion. The formula for relative MAD difference is:

$$\text{Relative MAD Difference}_{\text{i}} = \frac{\left| MAD(ROA_NPM) - MAD(ROA{-}AT) \right|}{\left[MAD\ (ROA,NPM,i) + MAD(ROA,AT,i) \right]/2}\ x\ 100$$

The IFDM applies a 20% relative-difference threshold as a heuristic diagnostic rule rather than as a statistical significance criterion or an empirically estimated breakpoint. A relative MAD difference below 20% indicates comparable correspondence of NPM and AT with ROA and is

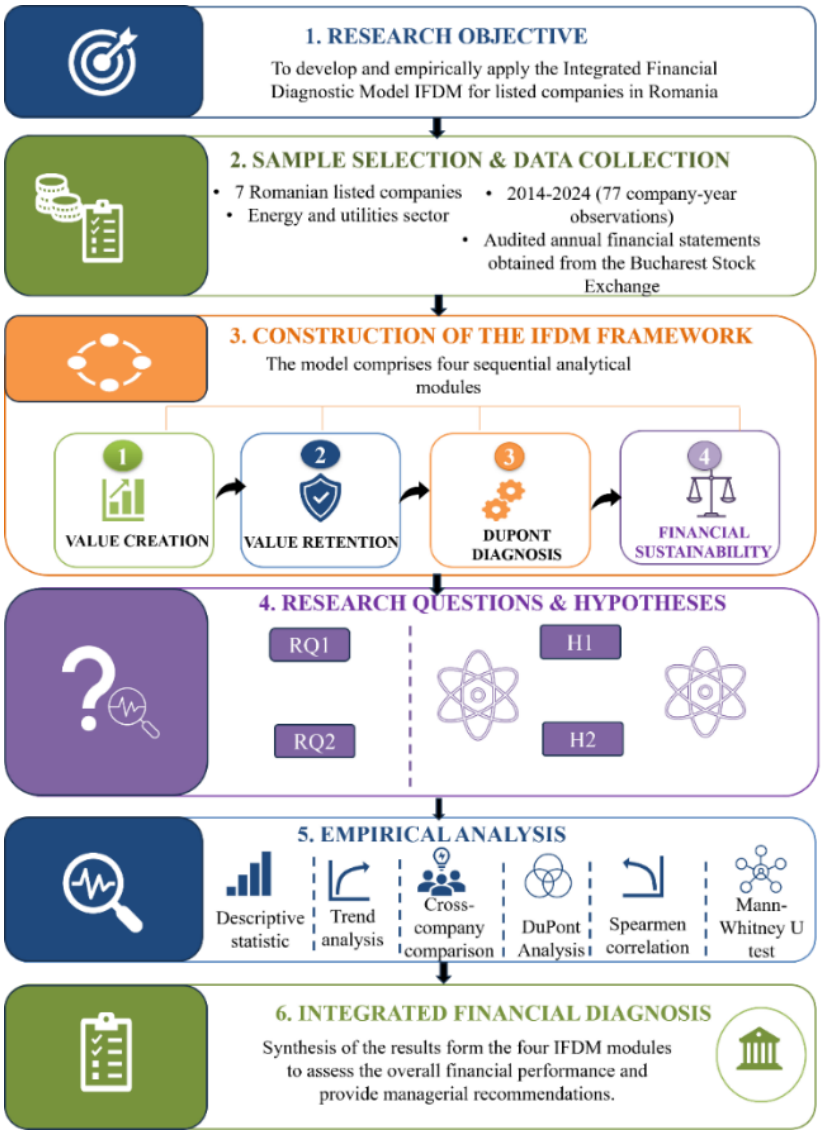
classified as Balanced Contribution. When the relative difference is equal to or greater than 20%, the component exhibiting the lower MAD determines the corresponding NPM-driven or AT-driven profile. The classification rules are summarized in Table 2.

Table 2. Classification Criteria for DuPont Profitability Mechanisms

Diagnostic condition	IFDM profitability profile	Interpretation
Relative MAD difference < 20%	Balanced contribution	NPM and AT display comparable temporal correspondence with ROA
Relative MAD difference ≥ 20% and MAD ROA-NPM < MAD ROA-AT	NPM-Driven	ROA dynamics are more closely aligned with NPM
Relative MAD difference ≥ 20% and MAD ROA-AT < MAD ROA-NPM	AT-Driven	ROA dynamics are more closely aligned with asset-utilization efficiency

Source: Authors.

Figure 2. Methodological framework



Hypothesis 1 is examined using Spearman's rank correlation coefficients, a non-parametric rank-based measure of association (Zar, 2014). The analysis evaluates the associations between the indicators of value creation, value retention, and ROA to determine whether stronger value creation and retention are associated with higher corporate profitability. Given the accounting relationships among these indicators, the resulting correlations are interpreted as diagnostic associations rather than as independent explanatory or causal effects.

Hypothesis 2 is evaluated through Spearman's rank correlation between the LTFB ratio and ROA to examine whether stronger long-term financial balance is associated with higher corporate profitability. As a supplementary group-based comparison, company-year observations are divided into relatively low- and high-LTFB groups using the sample median of the LTFB Ratio as a descriptive classification threshold. Differences in ROA between the two groups are assessed using the Mann-Whitney U test (McKnight & Najab, 2010). All statistical analyses are performed using IBM SPSS Statistics, with statistical significance evaluated at the 5% level. Figure 2 illustrates the overall methodological workflow adopted in this study.

Following the methodological framework presented above, the next section reports the empirical findings obtained from the application of the IFDM to the selected sample. The results are presented according to the four analytical modules of the model and follow the same sequence as the research questions and hypotheses, thereby ensuring consistency between the conceptual framework, empirical analysis, and integrated financial diagnosis.

4. Results and discussions

The first research question (RQ1) investigates the extent to which Romanian listed energy and utility companies create and retained operational value over the period 2014-2024. Within the IFDM, this dimension is assessed through two complementary perspectives: operational value creation, measured by OVA Ratio, and operational value retention, evaluated using the EBIT/OVA and Net Profit/OVA ratios. The analysis begins with the assessment of value creation and subsequently examines the extent to which the created value is preserved throughout the profit generation process. Table 3 presents the descriptive statistics of OVA Ratio for the seven Romanian listed energy and utility companies during the period 2014-2024. In addition to the mean values, the analysis includes the coefficient of variation (CV), which provides information regarding the stability of operational value creation over time. While the mean OVA Ratio reflects the average capacity of a company to generate operational value, the coefficient of variation indicates the consistency of this performance throughout the analyzed period.

Table 3. Descriptive statistics of Value Creation, 2014-2024

Company	Mean	Median	SD	CV (%)	Min	Max
COTE	0.645	0.708	0.133	20.620	0.370	0.720
OIL	0.634	0.667	0.075	11.830	0.500	0.730
PTR	0.462	0.531	0.260	56.277	-0.300	0.690
SNG	0.886	0.894	0.034	3.837	0.820	0.930
SNP	0.494	0.495	0.085	17.206	0.370	0.630
TEL	0.259	0.239	0.078	30.116	0.150	0.370
TGN	0.798	0.834	0.107	13.409	0.540	0.900

Source: Authors.

The results reveal substantial heterogeneity in operational value creation across the analyzed companies. The mean OVA Ratio ranges from 0.259 for TEL to 0.886 for SNG, suggesting important differences in efficiency with which companies transform their operational activities into value. However, these differences are not limited to the average level of value creation. Considerable

variation is also observed in the stability of operational performance, indicating that companies with similar average OVA Ratio values may exhibit markedly different patterns of value creation over time.

SNG recorded the highest average OVA Ratio (0.886) together with the lowest coefficient of variation (3.8%), indicating the highest operational value creation in the sample together with a high degree of temporal stability throughout the 2014-2024 period. A similarly favorable profile was observed for TGN, which achieved the second-highest average OVA Ratio (0.798) while maintaining relatively low variability (CV = 13.5%). These findings suggest that both companies generated operational value in a consistent manner rather than through isolated periods of high performance.

COTE and OIL reported comparable average OVA Ratio values (0.645 and 0.634, respectively). Nevertheless, their stability profiles differ. OIL exhibited a relatively low coefficient of variation (11.8%), whereas COTE showed almost twice the relative variability (20.7%). Although both companies generated similar average levels of operational value, OIL demonstrated a more consistent pattern of value creation throughout the period analyzed.

The comparison between SNP and PTR further illustrates the importance of incorporating the CV into the diagnostic framework. Despite relatively similar average OVA Ratio values (0.494 and 0.462, respectively), their operational behavior differs substantially. SNP displayed moderate variability (CV = 17.2%), whereas PTR recorded the highest variability among all analyzed companies (CV = 56.2%), reflecting pronounced year-to-year fluctuations in operational value creation. Moreover, the occurrence of a negative OVA Ratio during the analyzed period indicates that PTR experienced at least one episode of operational value destruction, followed by subsequent recovery.

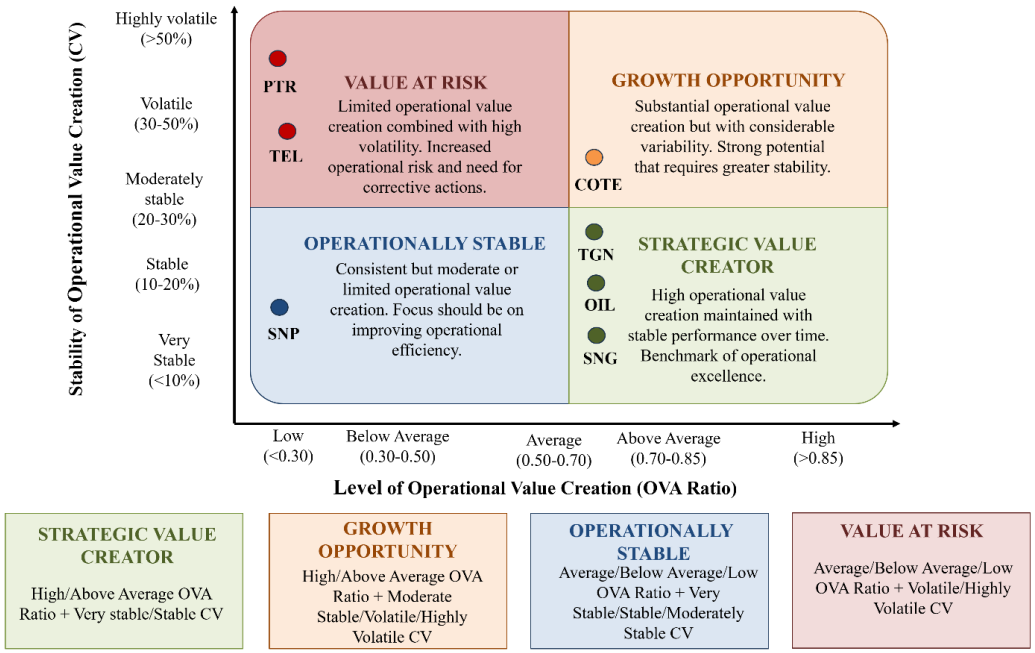
TEL recorded the lowest average OVA Ratio (0.259) and relatively high variability (CV = 30.2%), indicating both limited operational value creation and reduced consistency over time. This combination suggests persistent challenges in maintaining a stable process of operational value generation.

Overall, the results demonstrate that the level and temporal stability of operational value creation provide complementary diagnostic information. Companies with comparable mean OVA Ratio values may exhibit substantially different degrees of consistency, as illustrated particularly by the COTE-OIL and SNP-PTR comparisons. The joint consideration of these dimensions therefore reveals company-level operational differences that would remain obscured if value creation were assessed solely through average OVA Ratio values.

Applying the classification criteria and decision rules defined in Methodology, the analyzed companies were positioned within the IFDM Operational Diagnostic Matrix, as presented in Figure 3.

The resulting classification reveals distinct operational profiles across the analyzed companies. SNG, TGN, and OIL are positioned as Strategic Value Creators, combining stronger operational value creation with comparatively high temporal stability. COTE is classified as a Growth Opportunity, reflecting relatively strong value creation accompanied by greater temporal variability. SNP is positioned within the Operationally Stable profile, indicating comparatively lower but consistent operational value creation, whereas PTR and TEL fall within the Value at Risk profile, combining weaker value creation with greater temporal volatility. These results illustrate that the managerial interpretation of operational performance depends on the joint configuration of value-creation intensity and stability rather than on either dimension considered independently.

Figure 3. Operational Diagnostic Matrix



Source: Authors.

The second component of RQ1 evaluates the extent to which the operational value generated by each company is preserved throughout the profit generation process. Within the IFDM, value retention is assessed using the EBIT/OVA and Net Profit/OVA ratios, reflecting the proportion of operational value retained before and after financing and taxation effects. Table 4 reports the mean retention ratios, their temporal variability, and the average gap between operating and final value creation.

Table 4. Descriptive statistics of Value Retention Indicators, 2014-2024

Company	Mean EBIT/OVA	CV EBIT/OVA (%)	Mean Net Profit/OVA	CV Net Profit/OVA (%)	Retention Gap
COTE	0.228	21.05	0.212	19.34	0.016
OIL	0.092	53.26	0.053	79.25	0.038
PTR	-0.060	n.m.	0.01	n.m.	-0.070
SNG	0.373	19.57	0.322	22.36	0.051
SNP	0.272	69.85	0.248	57.66	0.024
TEL	0.279	57.35	0.232	64.22	0.047
TGN	0.222	69.37	0.219	51.60	0.003

Source: Authors.

Note: CV was calculated as the standard deviation divided by the absolute mean, multiplied by 100. The retention gap represents Mean EBIT/OVA minus Mean Net Profit/OVA. For PTR, CV was considered not meaningful because the annual sign changed and their means were close to zero. // n.m. = not meaningful

The value-retention results reinforce the heterogeneity identified in the value-creation analysis. SNG exhibits the strongest integrated profile, combining the highest EBIT/OVA and Net Profit/OVA ratios with comparatively stable retention, while COTE maintains moderate but consistent retention and limited post-operating erosion. TGN records the smallest retention gap (0.003), indicating only limited average erosion between the EBIT/OVA and Net Profit/OVA retention levels, although both ratios remain highly variable over time. SNP and TEL retain

meaningful proportions of operational value on average but display substantial year-to-year variability, whereas OIL combines low retention with pronounced instability. PTR presents the most fragile retention profile, characterized by a negative mean EBIT/OVA ratio and sign-changing annual values, making conventional CV interpretation inappropriate. Taken together, the findings answer RQ1 by demonstrating substantial heterogeneity not only in the level and stability of operational value creation, but also in the proportion and consistency with which created value is retained at the operating and final profit levels.

RQ2 examines whether company-level profitability dynamics are more closely aligned with changes in NPM, AT, or a balanced contribution of both DuPont components. Applying the trajectory-based diagnostic procedure defined in Methodology, Table 5 reports the company-level MAD values, relative MAD differences, and resulting IFDM profitability profiles.

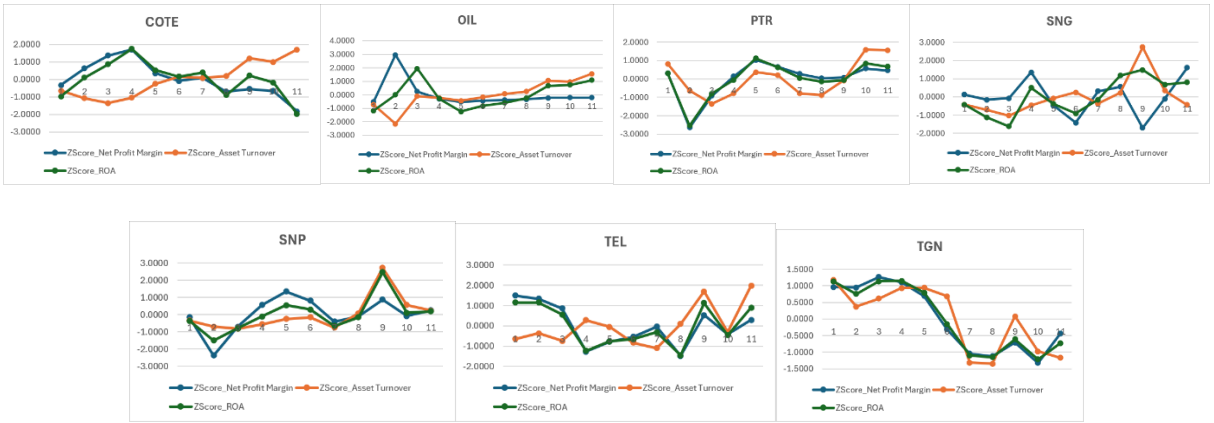
Table 5. Company-level DuPont Profitability Diagnosis (2014-2024)

Company	MAD ROA-NPM	MAD ROA-AT	Relative MAD Difference (%)	Profitability Profile
COTE	0.365	1.320	113.4	NPM-Driven
OIL	0.897	0.762	16.2	Balanced Contribution
PTR	0.145	0.731	133.9	NPM-Driven
SNG	0.942	0.676	32.9	AT-Driven
SNP	0.481	0.328	38.0	AT-Driven
TEL	0.234	1.012	124.9	NPM-Driven
TGN	0.128	0.357	94.4	NPM-Driven

Source: Authors.

The results reveal heterogeneous profitability mechanisms across the companies analyzed. Four companies, COTE, PTR, TEL and TGN, are classified as NPM-Driven, indicating that their ROA trajectories more closely follow changes in profit margins than changes in asset utilization. The strongest NPM-Driven patterns are observed for PTR, COTE, and TEL, which exhibit substantial relative differences between the two MAD measures. In contrast, SNG and SNP are classified as AT-Driven, suggesting that variations in asset-utilization efficiency are more closely associated with their profitability dynamics. OIL represents the only Balanced Contribution profile, with a relative MAD difference of 16.2%, indicating comparable proximity of both DuPont components to ROA. Overall, the findings show that margin generation represents the predominant profitability mechanism among the companies analyzed, although asset utilization and combined mechanism remain relevant for specific companies (Figure 4).

Figure 4. Longitudinal DuPont profitability profiles of the analyzed companies (2014-2024)



Source: Authors.

Figure 4 complements the MAD-based classification by illustrating the standardized trajectories of ROA, NMP, and AT over the analyzed period. The graphical patterns generally support the diagnostic profiles identified in Table 6, while also revealing changes in the relative contribution of the two DuPont components across individual years.

The cross-company comparison complements the longitudinal diagnosis by examining whether the identified profitability mechanisms are associated with different average levels of ROA. Table 6 ranks the companies analyzed according to their mean ROA over the 2014-2024 period and relates profitability level to the corresponding IFDM profile.

Table 6. Cross-Company comparison of profitability levels and IFDM DuPont Profiles

Company	Mean ROA	Profitability Profile
SNG	0.1441	AT-Driven
COTE	0.0761	NPM-Driven
TGN	0.0709	NPM-Driven
SNP	0.0639	AT-Driven
TEL	0.0377	NPM-Driven
OIL	0.0122	Balanced Contribution

Source: Authors.

The comparison shows that profitability level is not associated with a single DuPont mechanism. SNG records the highest means of ROA (0.1441) and is classified as AT-Driven, indicating that strong profitability can be supported primarily by asset-utilization efficiency. In contrast, COTE and TGN achieve the next highest average ROA values while exhibiting NPM-Driven profiles. SNP also presents an AT-Driven mechanism but a lower mean ROA than SNG, whereas TEL and PTR combine NPM-Driven profitability with comparatively modest average returns. OIL records the lowest mean ROA and is the only company classified as Balanced Contribution. These results indicate that the mechanism through which profitability is generated and the resulting level of profitability represent distinct diagnostic dimensions within the IFDM. Accordingly, RQ2 is answered by showing that similar or relatively high profitability levels may arise from different DuPont configurations, confirming the diagnostic relevance of distinguishing profitability level from the mechanism with which its temporal dynamics are most closely aligned.

Following the diagnostic analyses performed for RQ1 and RQ2, the relational consistency of the IFDM was assessed through H1 and H2. Spearman's rank correlations were used to assess the associations between operational value creation, value retention, long-term financial balance, and ROA. The results are reported in Table 7.

Table 7. Spearman Correlations for IFDM Hypothesis Testing

Hypothesis	IFDM relationship	Variables	Spearman ρ	p-value	Results
H1	Value Creation - Profitability	OVA Ratio - ROA	0.469	<0.001	Supported
H1	Value Retention - Profitability	EBIT/OVA - ROA	0.810	<0.001	Supported
H1	Final Value Retention - Profitability	Net Profit/OVA - ROA	0.841	<0.001	Supported
H2	Long-Term Financial Balance - Profitability	LTFB Ratio - ROA	0.381	0.001	Supported

Source: Authors.

The results provide support for H1. The OVA Ratio is positively and moderately associated with ROA ($\rho = 0.469$, $p < 0.001$), indicating that stronger operational value creation is associated with

higher corporate profitability. The relationships are substantially stronger for the value-retention indicators, with EBIT/OVA ($\rho = 0.810$, $p<0.001$), and Net Profit/OVA ($\rho = 0.841$, $p<0.001$) displaying strong positive associations with ROA. These findings suggest that, within IFDM, profitability is associated not only with the capacity to create operational value but, more strongly, with the ability to retain that value throughout the profit-generation process.

H2 is also supported, as the LTFB Ratio is positively and significantly associated with ROA ($\rho = 0.381$, $p = 0.001$). This result indicates that stronger long-term financing structures are associated with higher corporate profitability, supporting the relevance of long-term financial balance as a structural dimension of financial sustainability within the IFDM. Overall, the hypothesis-testing results provide relational evidence for the internal coherence of the proposed framework.

As a robustness check for H2, company-year observations were divided into low- and high-LTFB groups using the sample median LTFB Ratio (0.1338). The Mann-Whitney U test shows that the high-LTFB group exhibits significantly higher ROA ranks than the low-LTFB group (mean rank = 48.63 vs. 29.62; U 375.00, Z = - 3.729, $p < 0.001$). This result provides convergent evidence consistent with the Spearman correlation findings and offers additional support for H2.

5. Conclusions

This study developed and empirically applied the IFDM to assess corporate financial performance from a multidimensional perspective combining operational value creation, value retention, profitability mechanisms, and long-term financial sustainability. Using 77 company-year observations from seven Romanian listed energy and utility companies over the period 2014-2024, the analysis shows that financial performance cannot be adequately interpreted through isolated accounting ratios, as companies differ not only in the level of performance achieved but also in its stability, underlying mechanism, and capacity to preserve created value.

Regarding RQ1, the results reveal substantial heterogeneity in both the level and stability of operational value creation. The joint assessment of the OVA Ratio and its coefficient of variation demonstrate that similar average levels of value creation may be associated with markedly different temporal patterns. The proposed Operational Diagnostic Matrix therefore extends conventional ratio analysis further shows that the creation of operational value does not necessarily imply its equivalent preservation throughout the profit-generation process, supporting the distinction between value creation and value retention within the IFDM.

Regarding RQ2, the DuPont-based analysis demonstrates that corporate profitability is generated through different mechanisms across companies. The comparison of standardized ROA, NMP, and AT trajectories through MAD allowed companies to be classified as NPM-Driven, AT-Driven, or Balanced Contribution profiles. This finding emphasizes that similar profitability levels may result from fundamentally different operating configurations and that managerial diagnosis should therefore consider not only the level of ROA but also the mechanism through which it is generated.

The hypothesis-testing results provide additional evidence of the relational coherence of the proposed framework. H1 is supported, as operational value creation and both measures of value retention are positively and significantly associated with ROA. The association is moderate for the OVA Ratio ($\rho = 0.469$) and considerably stronger for EBIT/OVA ($\rho = 0.810$) and Net Profit/OVA ($\rho = 0.841$), suggesting that profitability is particularly closely associated with the company's capacity to retain operational value throughout the profit-generation process. H2 is also supported, with the LTFB Ratio showing a positive and significant association with ROA ($\rho = 0.381$, $p = 0.001$). The Mann-Whitney robustness analysis provides additional support for this relationship, as observations characterized by higher long-term financial balance exhibit significantly higher ROA ranks than those in the lower-LTFB group.

The findings support the central premise of the IFDM: corporate financial performance should be interpreted as an integrated process linking the creation of operational value, the retention of that

value, the mechanism through which profitability is generated, and the financial structure supporting its sustainability. The main contribution of the model lies not in reducing financial performance to a single composite score, but in preserving the diagnostic information contained in each dimension. From a managerial perspective, the IFDM can therefore distinguish whether weak financial performance originates from insufficient value creation, instability in operational performance, value leakage during the profit generation process, an unfavorable profitability mechanism, or insufficient long-term financial support.

The findings should nevertheless be interpreted considering several limitations. The analysis is based on a relatively small sample of seven Romanian listed energy and utilities companies and therefore does not permit broad generalization to other industries of institutional contexts. In addition, the pooled company-year analyses identify associations rather than casual relationships and do not fully account for the dependence of repeated observations within companies. The managerial thresholds introduced within IFDM are diagnostic rather than universal statistical cut-offs and should therefore be recalibrated when the framework is applied to other sectors or samples. Future research could validate IFDM using larger cross-sectoral or international panels, panel-data estimators, alternative measures of financial sustainability, and external performance indicators.

Bibliography

1. Adachi-Sato, M., & Vithessonthi, C. (2019). Corporate debt maturity and future firm performance volatility. *International Review of Economics & Finance,* 60, 216–237. https://doi.org/10.1016/j.iref.2018.11.001
2. Arachchige, C. N. P. G., Prendergast, L. A., & Staudte, R. G. (2022). Robust analogs to the coefficient of variation. *Journal of Applied Statistics,* 49(2), 268–290. https://doi.org/10.1080/02664763.2020.1808599
3. Chang, K. J., Chichernea, D. C., & HassabElnaby, H. R. (2014). On the DuPont analysis in the health care industry. *Journal of Accounting and Public Policy,* 33(1), 83–103. https://doi.org/10.1016/j.jaccpubpol.2013.10.002
4. Çopur Vardar, G., & CiĞer, A. (2022). PERFORMANS ÖLÇÜMÜNDE KATMA DEĞER TABLOSUNUN ÖNEMİ. Muhasebe Bilim Dünyası Dergisi, 24(MODAVICA Özel Sayısı), 110–130. https://doi.org/10.31460/mbdd.1062988
5. Díaz-Ortega, N. I., & García-Mogollón, J. M. (2022). Sistema Dupont: Factores influyentes de la rentabilidad en empresas del sector manufacturero. *Revista de Investigaciones Universidad Del Quindío,* 34(S5), 291–300. https://doi.org/10.33975/riuq.vol34nS5.1123
6. Endris, H., & Babu, N. K. (2026). Examining financial performance of manufacturing companies: An extended DuPont analysis. *Future Business Journal,* 12(1), 82. https://doi.org/10.1186/s43093-026-00792-y
7. Fletcher, E. S., Rose, J. T., & Mulford, C. W. (2018). Estimating Temporary and Permanent Working Capital to Discern a Firm's Asset Financing Strategy. *Journal of Accounting and Finance,* 18(6). https://doi.org/10.33423/jaf.v18i6.452
8. Geelen, T., Hajda, J., Morellec, E., & Winegar, A. (2024). Asset life, leverage, and debt maturity matching. *Journal of Financial Economics,* 154, 103796. https://doi.org/10.1016/j.jfineco.2024.103796
9. Giovannoni, E., & Pia Maraghini, M. (2013). The challenges of integrated performance measurement systems: Integrating mechanisms for integrated measures. *Accounting, Auditing & Accountability Journal,* 26(6), 978–1008. https://doi.org/10.1108/AAAJ-04-2013-1312
10. Gleißner, W., Günther, T., & Walkshäusl, C. (2022). Financial sustainability: Measurement and empirical evidence. *Journal of Business Economics,* 92(3), 467–516. https://doi.org/10.1007/s11573-022-01081-0
11. Haller, A., Van Staden, C. J., & Landis, C. (2018). Value Added as part of Sustainability Reporting: Reporting on Distributional Fairness or Obfuscation? *Journal of Business Ethics,* 152(3), 763–781. https://doi.org/10.1007/s10551-016-3338-9
12. Hamann, P. M., & Schiemann, F. (2021). Organizational performance as a set of four dimensions: An empirical analysis. *Journal of Business Research,* 127, 45–65. https://doi.org/10.1016/j.jbusres.2021.01.012
13. Jape, S., & Malhotra, M. (2023). A study of DuPont model: Its application and identification of key determinants for public limited companies. *International Journal of Business and Globalisation,* 35(1/2), 173–202. https://doi.org/10.1504/IJBG.2023.134396
14. Kong, Y., Donkor, M., Musah, M., Nkyi, J. A., & Ampong, G. O. A. (2023). Capital Structure and

Corporates Financial Sustainability: Evidence from Listed Non-Financial Entities in Ghana. *Sustainability*, 15(5), 4211. https://doi.org/10.3390/su15054211
15. Lazăr, S. (2016). Determinants of Firm Performance: Evidence from Romanian Listed Companies. *Review of Economic and Business Studies*, 9(1), 53–69. https://doi.org/10.1515/rebs-2016-0025
16. Lieberman, M. B., Balasubramanian, N., & Garcia-Castro, R. (2018). Toward a dynamic notion of value creation and appropriation in firms: The concept and measurement of economic gain. *Strategic Management Journal*, 39(6), 1546–1572. https://doi.org/10.1002/smj.2708
17. Lieberman, M. B., Garcia-Castro, R., & Balasubramanian, N. (2017). Measuring value creation and appropriation in firms: The VCA model. *Strategic Management Journal*, 38(6), 1193–1211. https://doi.org/10.1002/smj.2565
18. Lima, W., & Jucá, M. N. (2024). O impacto das práticas de sustentabilidade na performance financeira e na criação de valor das empresas. *Revista de Contabilidade e Organizações*, 18, e220597. https://doi.org/10.11606/issn.1982-6486.rco.2024.220597
19. McKnight, P. E., & Najab, J. (2010). Mann-Whitney U Test. In I. B. Weiner & W. E. Craighead (Eds.), The Corsini Encyclopedia of Psychology (1st ed., pp. 1–1). Wiley. https://doi.org/10.1002/9780470479216.corpsy0524
20. Mohammed, H. D. (2020). Corporate Governance and Financial Performance of Quoted Companies in Nigeria. *European Journal of Business and Management*, 12, 31–40. https://iiste.org/Journals/index.php/EJBM/article/view/51514
21. Motlíček, Z., & Polák, J. (2015). Appropriate Determination of Net Working Capital in Corporate Financial Management. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 63(4), 1323–1330. https://doi.org/10.11118/actaun201563041323
22. Nakatani, R. (2023). Debt maturity and firm productivity—The role of intangibles. *Research in Economics*, 77(1), 116–121. https://doi.org/10.1016/j.rie.2023.01.009
23. Nguyen, S. L., Pham, C. D., Truong, T. V., Phi, T. V., Le, L. T., & Vu, T. T. T. (2023). Relationship between Capital Structure and Firm Profitability: Evidence from Vietnamese Listed Companies. *International Journal of Financial Studies*, 11(1), 45. https://doi.org/10.3390/ijfs11010045
24. Omran, M., Khallaf, A., Gleason, K., & Tahat, Y. (2021). Non-financial performance measures disclosure, quality strategy, and organizational financial performance: a mediating model. *Total Quality Management & Business Excellence*, 32(5–6), 652–675. https://doi.org/10.1080/14783363.2019.1625708
25. Özçelik, M. (2024). Türkiye'de Yenilenebilir ve Geleneksel Enerji Şirketlerinin Finansal Performans Karşılaştırması: DuPont Analizi Yaklaşımı. *Akademik Araştırmalar ve Çalışmalar Dergisi (AKAD)*, 16(31), 345–359. https://doi.org/10.20990/kilisiibfakademik.1508111
26. P. Bauman, M. P. (2014). Forecasting operating profitability with DuPont analysis: Further evidence. *Review of Accounting and Finance*, 13(2), 191–205. https://doi.org/10.1108/RAF-11-2012-0115
27. Patrocínio, T., Madaleno, M., & Nogueira, M. C. (2024). Does the Way Variables Are Calculated Change the Conclusions to Be Drawn? A Study Applied to the Ratio ROI (*Return on Investment*). *Journal of Risk and Financial Management*, 17(7), 266. https://doi.org/10.3390/jrfm17070266
28. Petravičius, T., & Tamošiūnienė, R. (2008). CORPORATE PERFORMANCE AND THE MEASURES OF VALUE ADDED. *TRANSPORT*, 23(3), 194–201. https://doi.org/10.3846/1648-4142.2008.23.194-201
29. Rondós-Casas, E., Arimany-Serrat, N., Carreras-Simó, M., & Coenders, G. (2026). Using Financial and Sustainability Ratios to Map Sectors. An Approach With Compositional Data. *Corporate Social Responsibility and Environmental Management*, 33(4), 4797–4809. https://doi.org/10.1002/csr.70412
30. Sahoo, B. B., & Pramanik, A. K. (2017). Value Added: Technique for Corporate Performance Measurement under Social Perspective. *KINERJA*, 21(1), 109–128. https://doi.org/10.24002/kinerja.v21i1.1038
31. Samour, A., AlGhazali, A., Gadoiu, M., & Banuta, M. (2024). Correction: Capital structure and financial performance of China's energy industry: What can we infer from COVID-19? *PLOS ONE*, 19(12), e0316683. https://doi.org/10.1371/journal.pone.0316683
32. Savickas, V. (2020). Issues in selecting profitability indicators for the evaluation of corporate financial performance. *Buhalterinės Apskaitos Teorija Ir Praktika*, 20, 6. https://doi.org/10.15388/batp.2019.14
33. Shmueli, G. (2010). To Explain or to Predict? *Statistical Science*, 25(3). https://doi.org/10.1214/10-STS330
34. Signori, S., San-Jose, L., Retolaza, J. L., & Rusconi, G. (2021). Stakeholder Value Creation: Comparing ESG and Value Added in European Companies. *Sustainability*, 13(3), 1392. https://doi.org/10.3390/su13031392
35. Singh, P., & Saxena, P. (2017). Value Added Ratios as a Performance Indicator for Profitability and Productivity Measurement: A Study of Selected Indian Companies. Prastuti: *Journal of Management &*

Research, 6(1), 11–18. https://doi.org/10.51976/gla.prastuti.v6i1.611702

36. Sommer, C. (2024). The Impact of Long-Term Finance on Job Quality, Investments and Firm Performance: Cross-Country Evidence. *The European Journal of Development Research*, 36(4), 747–776. https://doi.org/10.1057/s41287-023-00611-y
37. Spirkova, J., & Vinczeova, M. (2026). Profitability index in the accommodation services sector in Slovakia. *E+M Ekonomie a Management*, 29(2), 92–106. https://doi.org/10.15240/tul/001/2026-2-007
38. Tudose, M. B., Rusu, V. D., & Avasilcai, S. (2022). FINANCIAL PERFORMANCE – DETERMINANTS AND INTERDEPENDENCIES BETWEEN MEASUREMENT INDICATORS. *Business, Management and Economics Engineering*, 20(01), 119–138. https://doi.org/10.3846/bmee.2022.16732
39. Turner, J., Broom, K., Elliott, M., & Lee, J.-F. (2015). A Decomposition of Hospital Profitability: An Application of DuPont Analysis to the US Market. *Health Services Research and Managerial Epidemiology*, *2*. https://doi.org/10.1177/2333392815590397
40. Wang, S., Wang, X., & Xu, L. (2023). Debt maturity structure and the quality of risk disclosures. *Journal of Corporate Finance*, 83, 102503. https://doi.org/10.1016/j.jcorpfin.2023.102503
41. Wen, H., Liu, Y., & Lee, C.-C. (2024). How ESG performance affects maturity mismatches between investment and financing: Evidence from Chinese A-share listed companies. *Research in International Business and Finance*, 71, 102412. https://doi.org/10.1016/j.ribaf.2024.102412
42. Wongoutong, C. (2024). The impact of neglecting feature scaling in k-means clustering. *PLOS ONE*, 19(12), e0310839. https://doi.org/10.1371/journal.pone.0310839
43. Wu, S., & Jiang, J. (2026). Earnings Predictability of DuPont Factors: Impact of Mean Reversion and Competitiveness. *Journal of Risk and Financial Management*, 19(6), 408. https://doi.org/10.3390/jrfm19060408
44. Zar, J. H. (2014). Spearman Rank Correlation: Overview. In R. S. Kenett, N. T. Longford, W. W. Piegorsch, & F. Ruggeri (Eds.), Wiley StatsRef: Statistics Reference Online (1st ed.). Wiley. https://doi.org/10.1002/9781118445112.stat05964
45. Zhu, H., & Huang, J. (2022). A New Method for Determining the Embedding Dimension of Financial Time Series Based on Manhattan Distance and Recurrence Quantification Analysis. *Entropy*, 24(9), 1298. https://doi.org/10.3390/e24091298