



Integrating ESG and Transactional Analysis in Modelling Intellectual Capital: The CI-PEI Conceptual Framework

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ABSTRACT

The growing dominance of intangible assets in firm valuation has exposed a critical gap between what organizations report and what effectively drives market value. While traditional accounting frameworks fail to capture human capital, organizational know-how, and the psychological dynamics of managerial decision-making, recent advances in ESG measurement and organizational psychology offer new opportunities for integrating these dimensions into a unified conceptual model. Building on secondary analysis of a panel regression conducted on 32 firms during 2006–2013, where unrecognized intangible value (IDE) and operational human capital emerged as the strongest predictors of market value added, this paper develops the CI-PEI (Capital Intellectual – Psychological and ESG Institutional) model. The model reinterprets historical determinants of value using contemporary constructs: Human Capital Index (HCI), Corporate Governance Index (CGI), and Transactional Analysis (AT). CI-PEI consolidates institutional maturity (ESG-S and ESG-G) with managerial psychological maturity, offering a coherent framework for understanding how organizations transform people, processes and decision architectures into intangible value. This integrated perspective demonstrates a structural continuity between pre-ESG value drivers and today's theoretical paradigms, providing scholars and practitioners with a robust lens for capturing the mechanisms through which firms create, accumulate and activate intellectual capital. The model opens new avenues for empirical validation and for advancing the strategic management of intangible resources in modern organizations.

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1. Introduction

Over the past two decades, profound transformations within the global economy have radically altered the manner in which firms generate value. Whereas performance was once explained predominantly through tangible assets, today intangible structures, human capital, organisational processes, the cognitive capabilities of management, and the quality of governance, have become the principal determinants of value creation. The knowledge-based economy, accelerated digitalisation, new forms of work organisation, and the institutional pressures generated by ESG standards have further amplified the importance of intellectual capital, shifting it from a theoretical notion to a central driver of competitiveness.

Nevertheless, although recent literature acknowledges the fundamental role of intangibles, a persistent gap remains between the ways in which they are theorised and the ways in which they are measured. Much empirical research relies on accounting or quasi-accounting indicators that capture only a limited portion of intellectual capital, frequently omitting precisely those dimensions that generate the greatest value: decision-making structures, the deeper layers of human capital, the psychological climate, and institutional processes. At the same time, ESG standards have introduced an international framework for assessing several components of intellectual capital; yet, somewhat surprisingly, these have not been systematically integrated into the theoretical models advanced in the academic literature.

The context becomes even more intriguing when viewed retrospectively. Empirical analysis conducted during 2006–2013 (Sandru, 2015), a pre-ESG period still largely dominated by the traditional accounting paradigm, shows that capital markets attributed significant value to elements unrecorded in balance sheets: unrecognised intangible assets (IDE), the critical mass of human capital (Ni), the dynamics of structural investments (RCI), and the composition of long-term assets (TA₂). In the absence of modern reporting standards, investors intuitively identified the invisible value created by firms, suggesting that the contemporary mechanisms of intellectual capital were already operating long before they were formally conceptualised.

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In other words, the earlier results anticipated, without explicitly naming it, the transition towards an economic regime dominated by intangibles. Today, this transition is visible in the convergence between intellectual capital literature, research on leadership and decision-making psychology, and international ESG standards. Yet a central problem remains: how can we reconstruct a contemporary, coherent conceptual model capable of translating the empirical evidence from 2006–2013 into the institutional and psychological language of 2025?

The answer proposed by this study is the development of an integrated model, CI-PEI (Intellectual Capital – Psychological and Institutional ESG), which reinterprets the historical variables in modern terms of human capital (HCI), corporate governance (CGI), and the psychological maturity of the decision-making process (Transactional Analysis). The model does not aim to re-estimate empirically the original relationships; rather, it seeks to provide a harmonised conceptual framework aligned with current literature and contemporary analytical instruments.

Although the econometric model estimated for the 2006–2013 period identified four principal determinants of market value added (IDE, Ni, RCI, and TA₂), the new CI-PEI framework does not adopt them in their previous empirical form, as it does not seek to replicate the earlier structure. Instead, these variables are reinterpreted through internationally validated institutional and psychological indicators. IDE, the expression of intangible value unrecognised by accounting rules, underpins the need for modern measurement of intellectual capital, operationalised today through ESG components. Ni is captured conceptually within HCI, which reflects the complexity of human capital beyond its quantitative dimension. RCI and TA₂ are subsumed within the domain of governance and institutional infrastructure, represented through CGI. Thus, the CI-PEI model does not exclude the determinants of the original model, but translates them into robust conceptual variables coherent with contemporary scholarship on intangibles, ESG, and decision-making psychology.

Through this reconstruction, the article offers a new perspective on how intellectual capital should be understood in the post-ESG era: not merely as a set of internal resources, but as a complex interaction between institutions, psychological processes, knowledge, governance, and the capacity to transform human potential into economic value.

2. Literature review

2.1. Intellectual Capital, Intangible Assets, and the Market Value of the Firm

Recent literature confirms that the shift towards a “knowledge-based economy” has moved the centre of gravity of market value from tangible assets to intangible ones, knowledge, human capital, organisational processes, innovative capacity, relationships, and reputation. From an accounting perspective, part of these assets is formally recognised (for example, intangible fixed assets, goodwill, software, patents), yet a substantial proportion remains unrecorded and is reflected only in the difference between the firm’s market value and its book value. Recent empirical studies show that, in many cases, it is precisely this “invisible” intangible component that explains variations in companies’ market value beyond what tangible assets and traditional financial indicators can capture (Cosmulese, Socoliuc, Ciubotariu, Grosu, & Mateş, 2021).

In 2021 some authors in a study of 180 companies listed on NASDAQ and the NYSE, demonstrate that both accounting-recognised and unrecognised intangible assets exert a significant influence on market value; the authors emphasise that intangibles have become “the principal driver of market value,” and the greater their magnitude, the stronger their positive impact on firm valuation (Cosmulese, Socoliuc, Ciubotariu, Grosu, & Mateş, 2021). Similar findings are reported by Andrioaia et al. (2025) for the Romanian capital market: using Tobin’s Q as a proxy for market value, the authors show that value created for shareholders is influenced far more powerfully by intangible assets, such as intellectual property, technology, and brand, than by tangible assets (Andrioaia, et al., 2025).

In a cross-country analysis, Dancaková and Glova (2024) investigate the relationship between intellectual capital and financial performance for 250 publicly listed companies from France, Germany, and Switzerland. Although the literature frequently highlights the central role of human capital, the authors’ findings indicate that this component is not always the dominant factor in explaining firm performance. More important is the interaction between structural capital and employed capital, a combination that amplifies the impact of physical and financial resources on economic outcomes. The study also stresses that the effect of each component of intellectual capital is not independent, but contingent on complementarities among resources and on sectoral and national specificities. Furthermore, although patents and trademarks provide competitive advantages, the costs and complexity of managing them may temporarily affect accounting performance. Overall, the authors conclude that the effects of intellectual capital, measured by VAIC™-type indicators, are mixed and context-sensitive, confirming the need for more nuanced and integrated analytical models. (Dancaková & Glova, 2024)

At the sectoral level, recent studies in emerging economies reinforce the same conclusion. Intara (2024), analysing Thai listed companies over a ten-year period, 2012–2021, shows that intangible assets exert a significant positive influence on firm value and financial performance, particularly in intangible-intensive firms. The authors argue that internal processes and unique, inimitable resources determine a firm’s financial success. (Intara & Suwansin, 2024).

These results are congruent with the regression findings reported by Sandru for 32 companies listed on the Bucharest Stock Exchange, covering the years 2006–2013. In this analysis, the variable IDE, a residual indicator of unrecognised intangible assets, proved to be the strongest predictor of market value added (MVA). The fact that, within the analysed sample, IDE explains MVA better than the classical accounting indicators of intellectual capital suggests that the market “reads” and capitalises precisely that intangible component which financial statements cannot directly capture, aligning with what recent international literature document (Sandru, 2015).

Parallel to the literature on accounting-reported intangible assets, there exists an extensive body of research that approaches intellectual capital (IC) as a set of intangible resources, human capital, structural capital, and relational capital, and examines its relationship with firm value. A substantial portion of empirical studies employs quantitative indicators derived from accounting data (such as VAIC or its variants), while another strand focuses on disclosure scores (intellectual capital disclosure) constructed from companies’ narrative reporting.

A recent synthesis of the specialist literature by Malikah and Nandiroh (2024), covering studies published between 2013 and 2023, shows that intangible resources play a fundamental role in shaping organisational value. The resource-based and knowledge-based perspectives provide the theoretical foundation through which intellectual capital can be understood as a source of competitive advantage and superior performance. Although the methods for measuring and evaluating intellectual capital are still being refined, empirical results generally indicate a positive association between intellectual capital and firm value. However, the strength and nature of this relationship vary across contexts, depending on industry, structure, and organisational capabilities. Consequently, the literature highlights the need for further investigations capable of capturing the dynamics of intellectual capital and its influence on long-term value creation (Malikah & Nandiroh, 2024).

We consider that standard quantitative indicators of intellectual capital exhibit notable limitations. Many VAIC-type evaluations capture predominantly the efficiency of financial and human resource utilisation rather than the actual level of intellectual capital, which may lead to inconsistent results when correlated with market value. Against this backdrop, the IDE indicator, defined as the portion of normalised profit unexplained by tangible and financial assets, aligns with an emerging strand of literature proposing residual measures of intangibles grounded in economic performance and asset structure rather than derivative accounting indicators (Sandru, 2015).

Accordingly, the empirical finding that IDE is significant and strongly associated with MVA, while VAIC is not (Sandru, 2015), becomes entirely understandable for the period 2020–2025 in light of these debates: the market responds to genuine intangible value generated by knowledge, processes, and relationships, rather than to standardised accounting indicators.

2.2. ESG, Human Capital, and Governance as the Institutional Architecture of Intellectual Capital

After 2018–2020, the literature on intellectual capital increasingly intersected with the literature on ESG (Environmental, Social, Governance). On the one hand, the “S” and “G” components of ESG, human capital, organisational culture, employee wellbeing, governance structures, and ethics, substantially overlap with the dimensions of intellectual capital; on the other hand, researchers, investors, and regulators have begun to employ standardised ESG scores as proxies for the quality of firms’ intangible resources.

In addition to traditional financial metrics, incorporating ESG considerations constitutes a significant enhancement of the analytical landscape in the post-2020 period. A growing body of research shows that ESG functions as a meaningful signalling device for investors (Ciupac-Ulici, Nistor, Beju, & Marchis, 2024). Drawing on a dataset of 1,042 firms from 26 emerging markets, emerging markets, Naeem, Farid, Ferrer, and Shahzad (2022) demonstrate that both aggregate ESG ratings and their individual components exhibit a positive and statistically significant association with market valuation and stock-performance measures, underscoring their effectiveness as indicators of corporate sustainability. (Naeem, Farid, Ferrer, & Shahzad, 2022).

A recent systematic review examining the influence of ESG and intellectual capital on firm value shows that, during 2013–2023, most empirical studies identify a positive relationship between ESG and company value, albeit with nuanced patterns: at times, only the social and governance components exhibit positive effects, while the environmental dimension may be neutral or even negative in the short run owing to compliance costs. Regarding intellectual capital, the 18 studies identified by the author indicate a positive effect on firm value, whereas seven report insignificant results, suggesting both the importance of IC and the sensitivity of the relationship to context and measurement approaches. The review further highlights that scientific interest in the ESG–IC–firm value nexus has been steadily increasing over the past decade, reflecting not only the relevance of the topic but also the fact that many organisations still do not fully integrate ESG principles into reporting and strategy. In this context, the use of an indicator such as IDE (the contribution of unrecognised intangible assets to the economic performance of the entity), which captures residual intangible value unrecorded in accounting, becomes especially pertinent: it responds to the limitations identified in the literature reviewed by Arnán, in which a considerable share of studies relies on accounting indicators or partial

proxies of intellectual capital without capturing the invisible dimensions of value perceived by the market (Arnan & Kusumah, 2024).

For emerging markets, recent literature shows increasingly clearly that ESG performance and disclosure are associated with higher market valuations, particularly when the governance and transparency components are effectively communicated to investors. Rahat (2024), analysing a broad sample of firms from emerging economies, shows that ESG profile has a significant positive effect on firm value (measured through Tobin's Q and EV/Sales), with the governance pillar playing a central role in this relationship (Rahat & Nguyen, 2024).

In the case of Africa, the review by Oussoufa and Mumbuli (2024) highlights that the integration of ESG within industries such as energy and agro-industry is associated with improved stakeholder relations, increased attractiveness to investors, and the potential for enhanced firm value, particularly when ESG practices include clear governance and reporting mechanisms (Oussoufa & Mumbuli, 2024). Additionally, recent research in emerging markets indicates that transparency and accountability in sustainability reporting, especially in relation to human capital, stakeholder rights, and internal controls, strengthen investor trust and support higher market valuations (Wang & Sarkis, 2021) (Ahmed, Bashir, Ahmed, Rocha, & Yau, 2025).

At the same time, many authors argue that ESG integration should be pursued as a substantive value driver rather than as a form of symbolic compliance (Sandru, 2025).

These findings are relevant for the present study in two important respects. First, they confirm that human capital and corporate governance, captured in the CI-PEI model proposed in Section 4 through the Human Capital Index (HCI) and the Corporate Governance Index (CGI), are not merely "soft dimensions" but structural determinants of market value, fully comparable to the roles played by Ni (number of employees), RCI (growth rate of fixed assets), or TA₂ (type of activity - commerce) in the initial regression from which this article originates (Sandru, 2015). Second, the literature indicates that ESG can be viewed as a form of "institutionalisation" of intellectual capital: what appeared during 2006–2013 merely as a residual effect (IDE) or an indirect signal (employee numbers) is now formalised through scores, indicators, and reporting practices. A recent study conducted on a large sample of Romanian managers and consumers shows that interactivity and dialogic communication in social media significantly influence the quality of the relationship between organisations and their publics, underscoring the importance of communicative processes in the dynamics of decision-making behaviours and in the generation of intangible value (Dănescu, et al., 2021).

Recent research also shows that cognitive heuristics, such as availability and confirmation, strongly shape the way individuals process information under conditions of uncertainty, generating decision-making behaviours that may be amplified by the digital environment (Chiorean, 2020). These findings support the inclusion of psychological factors in models that explain how firms generate and activate intellectual capital, since the decision-making processes of leaders directly shape both the use of human capital and the organisation's innovative capacity.

Viewed in this light, the CI-PEI model developed in this article, which combines a simplified ESG score (HCI + CGI) with a psychological indicator of decision-making profile, aligns with a clear trend in the literature to explicitly link intellectual capital to the institutional architecture of the organisation.

2.3. Human Capital, Psychological Capital, and Organisational Performance

A central pillar of the model proposed in this article is human capital, both in its "classical" sense (number of employees, skills development, workforce structure) and in its psychological sense, psychological capital (PsyCap) and the decision-making profile of leadership.

At the macro level, studies on human capital show that firms which invest systematically in skills development, training, and employee wellbeing achieve, on average, superior financial and market performance. Cross-country analyses, such as those synthesised by Cosmulese et al. (2021) (Cosmulese, Socoliuc, Ciubotariu, Grosu, & Mateş, 2021) and Andrioaia et al. (2025) (Andrioaia, et al., 2025), highlight that in knowledge-intensive sectors, the human resource is the key element enabling the valorisation of intangible assets and their transformation into market value.

At the micro-organisational level, the concept of psychological capital (PsyCap), defined by hope, efficacy, resilience, and optimism, is strongly linked to performance, both at individual and organisational levels. Several authors show that PsyCap correlates positively with performance outcomes, organisational attitudes, and employees' psychological health, and negatively with burnout and dysfunctional behaviours (Lupsa, Virga, Maricutoiu, & Rusu, 2019). PsyCap is not merely an individual resource; it can also be conceptualised at the organisational level. Analyses conducted on psychological capital within small and medium-sized enterprises (SMEs) indicate that this form of capital influences performance and innovation through cooperative and solidarity-based behaviours (Grözinger, Wolf, Ruf, & Moog, 2022).

Numerous recent studies confirm that cognitive processes, risk preferences, and personality traits significantly influence how individuals and leaders make financial decisions. Recent research on investment behaviour in Romania shows that traits such as openness and extraversion shape preferences for risky or tangible assets, while the level of financial education conditions informed decision-making (Jurita, Lazar, Butoi, Pop, & Dragomir, 2025). The study also highlights relevant demographic differences: younger and urban

investors tend to orient themselves towards innovative assets, whereas older and risk-averse individuals prefer more stable products. These findings support the broader literature arguing that psychological mechanisms play a central role in decision-making processes and confirm the need to integrate psychological factors into models explaining organisational performance and value creation.

At the intersection between PsyCap and firm performance, a study conducted on a sample of family businesses shows that the psychological capital of owners is positively associated with business performance during crises, with this relationship being mediated by the characteristics of the firm and its owners. (Lanchimba, Welsh, & Kaswengi, 2024) Such results reinforce the argument that the psychological resources of leaders and management teams are not merely “soft variables” but genuine components of value-creation processes.

Accordingly, the inclusion of a psychological dimension in the CI-PEI model (Capital Intellectual – Psychological & ESG Institutional), operationalised through Transactional Analysis and the indicator AT_{CI} (Integrated Psychological Indicator), rests on a solid body of evidence linking psychological capital to organisational performance and, indirectly, to the capacity to accumulate intellectual capital.

2.4. Transactional Analysis, Leadership Style, and Intellectual Capital

Although most studies on PsyCap employ instruments derived from positive psychology, there is also a smaller yet growing body of literature that uses Transactional Analysis (TA) to understand leadership styles, relational dynamics, and conflict management within organisations.

Kraczla (2023), in a study published in the European Research Studies Journal, examines ego states from the perspective of Transactional Analysis (Parent, Adult, Child) and explores how managers employ these states to resolve conflicts; the article shows that managers’ ego-state profiles are associated with the strategies they use to address conflict and with the quality of organisational relationships (Kraczla, 2023). Another study, conducted in IT companies in India, finds that managers’ ego-state configurations influence their interaction style with subordinates, peers, and superiors, with direct implications for team motivation and efficiency (Rahiman & Kodikal, 2020).

More recently, Tassabehj (2024) proposes the use of Transactional Analysis to diagnose toxic behaviours within organisations, demonstrating that certain dysfunctional configurations of ego states (for example, an excessively Critical Parent combined with an inhibited Adapted Child) are associated with recurrent conflict, reduced cooperation, and declining performance in software development teams (Tassabehj, Lee, & Harding, 2024). Other works in leadership studies and clinical management suggest that TA can be integrated into leadership-development programmes to enhance awareness of communication styles and to improve decision-making processes (Thiagarajan & McKimm, 2019).

Although these studies do not directly link Transactional Analysis to market indicators such as MVA or Tobin’s Q, they converge on the idea that leaders’ decision-making and relational profiles, conceptualised through ego states (NP, A, FC, CP, AC), influence the quality of human capital, the level of innovation, and the efficiency of internal processes. These are precisely the components through which intellectual capital is formed and transformed into economic value. Moreover, literature on PsyCap indicates that leaders’ psychological resources can translate into financial and firm-level performance through well-defined behavioural and organisational mechanisms (Grözinger, Wolf, Ruf, & Moog, 2022).

In this context, the indicator AT_{CI} proposed in the CI-PEI model in this article, constructed on the constructive ego states (NP, A, FC), can be seen as a logical continuation of these research strands: it transforms a qualitative psychological construct into a numerical score that can be integrated alongside institutional indicators (HCI, CGI) and the empirical results of the initial regression (IDE, Ni, RCI, TA_2). Thus, literature on TA and PsyCap provides the theoretical foundation for including a psychological dimension in the intellectual-capital model used in this article.

3. Research Methodology

The methodology of this article is based on a two-stage approach:

(1) an analysis of the empirical results obtained in the initial study (2006–2013) (Sandru, 2015), and (2) the development of a contemporary conceptual model that reinterprets those results through modern theoretical lenses (ESG and decision psychology).

The foundational empirical study uses a panel-data set consisting of 32 economic entities ($i = 1, 2, \dots, 32$), observed over an eight-year period, 2006–2013 ($t = 1, 2, \dots, 8$), resulting in 256 observations. The sample is composed of firms operating in a capital-intensive sector for which detailed information on financial statements and average employee numbers is available.

The dependent variable is market value added (MVA_{it}) for entity i in year t , used as a proxy for shareholder value creation. In financial literature, MVA is defined as the difference between the market value of the firm and the invested capital. In the original study, MVA is computed based on the market value of equity and the book value of interest-bearing debt, adjusted by invested capital at historical cost.

The initial model starts from the following specification:

$$MVA_{it} = A + b_1 IDE_{it} + b_2 RCI_{it} + b_3 IN_{it} + b_4 SatC_{it} + b_5 VAIC_{it} + b_6 Ni_{it} + b_7 Sat_{ang,it} + b_8 TA_{it} + \mu_i + \varepsilon_{it}$$

Where:

IDE_{it} – contribution of intangible assets unrecognised in accounting to the performance of entity i in year t ;

RCI_{it} – growth rate of fixed assets;

IN_{it} – a control variable for income/renewal (defined according to the original thesis/article);

Sat_C_{it} – customer satisfaction, approximated through the dynamics of operating revenues;

$VAIC_{it}$ – Value Added Intellectual Coefficient;

Ni_{it} – average number of employees;

Sat_ang_{it} – employee satisfaction, approximated through the intensity of personnel costs;

TA_{it} – total assets (potentially disaggregated into TA_1 and TA_2 according to balance-sheet structure).

IDE_{it} is defined as follows:

$$IDE_{it} = PrNorm_{it} - contribIC_{it} - contribIF_{it}$$

Where:

Through this formula, IDE captures the portion of the normalised profit that cannot be attributed to tangible capital (physical and financial), and is interpreted as value generated by intangible assets unrecognised in accounting (know-how, processes, reputation, relationships, implicit human capital, etc.).

Table 1. Correlation Matrix of the Independent Variables

Variabilele	MVA	IDE	RCI	IN	Sat_C	VAIC	Ni	Ef_ang	Sat_ang
MVA	1.0000								
IDE	0.1946	1.0000							
RCI	0.0831	-0.1375	1.0000						
IN	0.0599	0.1024	-0.0131	1.0000					
Sat_C	0.0242	-0.0210	0.0359	-0.0286	1.0000				
VAIC	0.0824	0.0239	-0.0255	0.1640	0.0202	1.0000			
Ni	0.2686	-0.2128	0.0821	0.3360	-0.0324	0.2489	1.0000		
Ef_ang	0.0325	-0.1556	-0.0313	0.0263	0.0600	0.4366	0.3076	1.0000	
Sat_ang	-0.0701	0.1017	0.0127	-0.0662	-0.1449	-0.3098	-0.1389	-0.5917	1.0000

Source: own processing with PSPP

The results of the correlation matrix for the independent variables, presented in Table 1, indicate the presence of multicollinearity only between two variables: human capital efficiency (Ef_ang) and employee satisfaction (Sat_ang). These two variables could not be included simultaneously in the same regression because they are strongly correlated with one another. Only one of them, namely Sat_ang, was retained in the regression, as it shows a stronger correlation with the endogenous variable, market value added.

The model was estimated using panel data. Given the structure of the dataset ($N = 32$, $T = 8$) and the potential presence of unobserved firm-level heterogeneity, a fixed-effects or random-effects specification was employed (depending on the Hausman test performed in the original study). The overall significance of the model was assessed using the Wald test, while the significance of the individual coefficients was evaluated on the basis of their associated p-values (***) $p < 0.01$; ** $p < 0.05$; * $p < 0.10$).

The results presented in Table 2 indicate that the following variables, considered in explaining market value added, are statistically significant:

- ◆ with 99% probability: the contribution of intangible assets unrecorded in accounting to the economic entity's performance (IDE), and the average number of employees (Ni);
- ◆ with 90% probability: the growth rate of fixed assets (RCI), and the type of activity, commerce (TA_2).

Table 2. Results of the Model Estimation: Dependent Variable – Market Value Added; Analytical Focus – Intellectual Capital

Independent Variables	Estimated Coefficients
IDE	0,826(0,001)***
RCI	0,133(0,096)*
IN	-0,003(0,994)
Sat_C	0,027(0,762)
VAIC	0,002(0,937)
Ni	0,244(0,000)***

Independent Variables	Estimated Coefficients
Sat_ang	-0,276(0,578)
TA_1	0,186(0,227)
TA_2	0,557(0,074)*
Wald(8)(i)	37,08
Number of economic entities	32
Number of observations	256

Source: own processing with PSPP

The probabilities associated with the t-test are shown in parentheses.

*Significant at the 90% level. ** Significant at the 95% level. *** Significant at the 99% level.

(i) The Wald test is a chi-square-distributed test assessing the overall significance of the model parameters under the null hypothesis of joint insignificance and absence of correlation among the coefficients.

We also observe that the value of intangible fixed assets (IN), customer satisfaction (Sat_C), the value-added intellectual capital coefficient (VAIC), employee satisfaction (Sat_ang), and the type of activity – production (TA₁) – are, with 95% probability, not statistically significant with respect to the influence these variables might exert on market value added.

In the present article, these results are not re-estimated but are instead reinterpreted theoretically, in line with a secondary-data, theory-building methodology (EISENHARDT, 1989), which is frequently employed in economic and managerial research that develops new conceptual models on the basis of existing empirical evidence.

The second stage is based on a triangulation of three sources of knowledge:

1. historical empirical results,
2. recent literature (2020–2025) on intellectual capital and ESG, and
3. psychological models applied to managerial decision-making.

This approach enables the connection of the variables that proved significant in the initial study (IDE, human capital, structural investments) with internationally validated contemporary instruments (ESG indices and Transactional Analysis).

Methodologically, the conceptual reconstruction follows the logic of design-based theorising (Jaakkola, 2020), in which earlier data are recontextualised within a modern framework in order to generate an explanatory model aligned with current trends.

The CI-PEI model proposed in this paper has two dimensions.

The first dimension is the institutional component of the current model is operationalised through two internationally validated instruments:

- ◆ the Human Capital Index (HCI) – for assessing human capital, and
- ◆ the Corporate Governance Index (CGI) – for assessing corporate governance.

These instruments are selected on the basis of their coherence with the empirically identified determinants of MVA (human capital, structural investments, and the quality of decision-making processes) and are subsequently synthesised into an integrated ESG indicator. The methodological procedure corresponds to an indicator-development approach, widely used in ESG and intellectual-capital research.

The psychological dimension is introduced through Transactional Analysis (TA), an internationally validated psychological framework widely employed in organisational studies. The instrument enables the evaluation of the decision-making profile of leadership (NP, A, FC, CP, AC), of which only the ego states that are constructive for intellectual capital are incorporated into the model.

This methodological stage draws on psychometric organisational modelling approaches, which allow psychological factors to be integrated into analyses of organisational performance.

By combining the two dimensions, the institutional (ESG) and the psychological (TA), an integrated conceptual model is constructed, one which reinterprets the historical determinants of MVA in contemporary theoretical terms.

The CI-PEI model (Intellectual Capital – Psychological & ESG Institutional) does not seek empirical estimation; rather, it provides a modern conceptual structure grounded in:

- ◆ the statistically validated results of the initial study,
- ◆ contemporary literature on intangibles and intellectual capital, and
- ◆ recognised institutional and psychological instruments.

This approach produces a coherent methodological framework through which historical data are “translated” into terms relevant for research in the year 2025.

4 Conceptual framework the CI-PEI Model (Capital Intellectual – Psychological & ESG Institutional)

The results of the initial study (2006–2013) provide a remarkably clear picture of how capital markets valued firms’ intangible elements during a period preceding the emergence of the modern ESG framework. At the heart of this mechanism were two categories of determinants: on the one hand, intangible resources

unrecognised in accounting, captured by the IDE indicator (the contribution of unrecorded intangible assets to the economic entity's performance), and, on the other, human and structural resources, reflected in variables such as the average number of employees (N_i), the dynamics of investment in fixed assets (RCI), and the balance-sheet structure (TA_2).

The fact that IDE is the strongest predictor of market value added (coef. 0.826; $p < 0.01$) demonstrates that the market recognized, even in the absence of any formal framework, the existence of an "invisible" intellectual capital which financial statements did not explicitly record. IDE captures precisely this residual intangible value, being defined as the portion of normalised profit that cannot be explained by the contribution of physical and financial assets. Through its consistency and explanatory strength, the indicator confirms what current literature on intangibles and non-financial reporting emphasises: a substantial proportion of organisational value cannot be deduced from traditional accounting structures, but is formed in the complex sphere of human capital, internal processes, relationships, and tacit knowledge.

At the same time, the results indicate the significance of operational human capital, measured through the average number of employees (N_i), which exhibits a positive and highly statistically significant coefficient (0.244; $p < 0.001$). This association suggests that firms with a critical mass of human capital, irrespective of how this was formally reported, generated superior market value. In other words, even before ESG policies became a global requirement, investors were already assessing organisational potential through the human resource, an element that is now central to the "S" component of ESG.

The structural variables RCI and TA_2 , although marginally significant, indicate that investments in infrastructure, technology, and ongoing operational assets remained relevant in the generation of value. This aligns with modern literature on the complementarities between structural and human capital: material investments create the framework within which knowledge can be accumulated and the human resource can perform.

In contrast, approximate indicators of employee and customer satisfaction, as well as VAIC, do not exhibit statistical significance. This finding is particularly relevant in the present context. During 2006–2013, there were no reporting standards that made visible dimensions such as wellbeing, psychological safety, governance practices, or organisational culture. Consequently, the market could not directly incorporate such information. The lack of statistical significance for VAIC confirms recent criticisms arguing that the indicator captures accounting efficiency more than intellectual capital itself.

Taken as a whole, the results of the initial study are not merely a snapshot of the analysed period but constitute a robust conceptual foundation for constructing a contemporary model for evaluating intellectual capital. Four observations are decisive for this transition:

1. Unrecognised intangible value (IDE) is real, powerful, and predictive, serving as a direct precursor to current concepts of reported intellectual capital.
2. Human capital is a fundamental determinant of value, even in the absence of a formal reporting framework.
3. Governance and investment structures matter, but they are insufficient without the integration of human and intangible resources.
4. Classical accounting indicators are incomplete, and the market rewards elements that financial data cannot capture.

On the basis of these findings, the development of an updated conceptual model becomes justified, one capable of translating the mechanisms evidenced in the historical data into the theoretical, institutional, and psychological language of 2025. Thus, the proposed model CI-PEI (Intellectual Capital – Psychological and ESG Institutional) does not represent a break from the initial empirical analysis but rather a natural evolution that integrates:

- ◆ the institutional component (human capital and governance) through HCI and CGI,
- ◆ the psychological component (the decision-making profile of leadership) through Transactional Analysis,
- ◆ the empirical foundation (IDE, N_i , RCI, TA_2) derived from the initial study.

The following section presents in detail the construction of the CI-PEI model and the manner in which it reinterprets, in contemporary terms, the determinants of market value identified during 2006–2013.

Although the initial analysis covers a pre-ESG period, the way in which capital markets valued elements such as human capital, investment structure, or unrecorded intangible performance clearly highlights the existence, even then, of value-creation mechanisms that current literature integrates into ESG paradigms and extended theories of intellectual capital. IDE, the component with the highest level of significance, may be interpreted today as the aggregated expression of the organisation's invisible capital: tacit knowledge, internal relationships, processes, reputation, and operational routines. Likewise, N_i , RCI and TA_2 mirror the organisation's capacity to accumulate and leverage human and structural capital, elements that are now central in the architecture of any ESG report.

Building on these observations, the present paper proposes an updated conceptual model, CI-PEI (Intellectual Capital – Psychological and ESG Institutional), which coherently links historical empirical evidence with internationally validated evaluation instruments and with modern psychological theories of decision-making. The model combines two fundamental dimensions of intellectual-capital formation: the institutional

maturity of the organisation, captured through simplified and validated ESG indicators (Human Capital Index – HCI and Corporate Governance Index – CGI), and the psychological maturity of managerial decision-making, assessed through Transactional Analysis (TA).

The ESG component of the model is grounded in two instruments recognised in international literature. HCI (Human Capital Index), developed by the World Economic Forum and extensively used in human-capital research, enables the evaluation of competence development, human-capital utilisation, know-how levels, and employee wellbeing (*The Global Human Capital Report 2017 – Preparing People for the Future of Work*, 2017). CGI (Corporate Governance Index) measures governance quality through criteria such as board structure, transparency, ethics, and internal control (Adinegara & Sukamulja, 2021). Together, these two instruments standardise the dimensions empirically identified as relevant for MVA during 2006–2013: human capital (Ni) and investment structure (RCI, TA₂). The integrated ESG score is constructed as a weighted average of the two indices, ensuring a conceptual balance between the human resource and institutional architecture. HCI and CGI have the advantage of translating, into standardised form, the mechanisms that the historical data captured only indirectly, thereby providing a common language between past analysis and contemporary interpretation.

The Human Capital Index (HCI), inspired by the World Economic Forum’s methodology, assesses an organisation’s capacity to develop, utilise, and retain human capital. Structured around four fundamental dimensions, development, skills utilisation, know-how, and wellbeing, HCI captures not only the current level of the human resource but also the manner in which it contributes to generating intellectual capital. The development dimension includes items on access to training programmes, upskilling, and competence enhancement (e.g., “the organisation provides regular training programmes”, “employees have access to technical and soft-skills development”). The deployment dimension reflects the alignment between employees’ skills and occupational roles, as well as internal mobility. The know-how dimension measures mechanisms for knowledge accumulation and transfer, while the wellbeing dimension captures psychological safety, organisational climate, and employee satisfaction.

For empirical application, HCI may be constructed from 21 Likert-scale items (1–5), using the formula:

$$HCI = \frac{1}{21} \sum_{i=1}^{21} HCI_i, \quad (\text{Equation 1})$$

Each item represents an indicator belonging to one of the four dimensions of human capital.

In parallel, the Corporate Governance Index (CGI), grounded in classical corporate-governance literature (Gompers, Ishii & Metrick, 2003; Brown & Caylor, 2006), measures the structural maturity of the organisation. CGI covers five domains: board structure, transparency, stakeholder rights, internal control, and ethics. This structure directly reflects the empirical findings regarding the contribution of structural and investment-related assets to MVA. For example, a well-structured and independent board (CGI1, CGI2), adequate transparency in decision-making processes (CGI3, CGI4), and robust internal-control and audit systems (CGI7, CGI8) are associated in the current literature with an organisation’s capacity to accumulate structural capital. The ethics and compliance dimension (CGI9, CGI10) supports reputation and process stability, essential components of long-term intellectual capital. The final CGI indicator may be constructed as the mean of ten items:

$$CGI = \frac{1}{10} \sum_{j=1}^{10} CGI_j, \quad (\text{Equation 2})$$

with items evaluable either binarily or on a Likert scale, depending on the research design.

By combining the two components, HCI and CGI, the final form of the institutional ESG indicator is obtained:

$$ESG = 0.5 \cdot HCI + 0.5 \cdot CGI. \quad (\text{Equation 3})$$

This symmetrical structure aligns with international literature, which emphasises the complementarity between human capital and governance in the process of intellectual-capital formation. HCI captures the human resource’s potential to contribute to knowledge, learning, and innovation, whereas CGI captures the institutional architecture required to transform these resources into market value.

By integrating HCI and CGI, the CI-PEI model provides a valid and operational framework for evaluating intellectual capital in the contemporary context. ESG thus becomes not merely a terminological extension of historical data, but the conceptual instrument through which we interpret and explain how firms generated intangible value before modern reporting standards were formalised. In this way, ESG, constructed on the basis of HCI and CGI, harmoniously complements the psychological component of the model (TA), offering a holistic perspective on the interaction between human resources, governance, and decision-making mechanisms.

Within the MI-ECI model (Integrated ESG-Behaviour-AT Model), the psychological dimension plays an essential role in explaining how an organisation’s leadership transforms intangible resources into

intellectual capital. To evaluate this dimension, we employ Transactional Analysis (TA) (Berne, 2011), a psychological framework developed by Eric Berne, well established in organisational studies and frequently operationalised through the Egogram, particularly via the internationally validated Tokyo Egogram (TEG-3) (Badam & Bagheri, 2023).

TA conceptualises individual and managerial behaviour through five ego states: CP (Critical Parent), NP (Nurturing Parent), A (Adult), FC (Free Child), and AC (Adapted Child). In organisational contexts, each of these states influences performance, culture, and the process of intellectual-capital creation in different ways. For this reason, all five states are evaluated within the model; however, not all make a constructive contribution to intellectual capital itself.

The CP – Critical Parent state is associated with rule orientation, discipline, and control. Although these traits may strengthen the consistency of internal processes, a high CP score may inhibit team flexibility, adaptability, and creativity, negatively affecting human capital and innovation.

CP: control, rules; may inhibit innovation, used as a control variable.

The NP – Nurturing Parent state reflects support, protection, and people-orientation. Organisational psychology literature associated with TA shows that NP fosters human-capital development by creating psychological safety, reducing staff turnover, and promoting learning behaviours.

NP: support, empathy; enhances human capital and psychological safety.

The A – Adult state represents the rational, analytical, data-driven dimension of managerial behaviour. The Adult state is recognised as central for strategic decision-making, investment processes, and corporate governance, elements that strengthen structural capital and ensure the coherent deployment of intangible resources.

A: rationality, analysis; optimises governance and organisational processes.

The FC – Free Child state embodies spontaneity, creativity, exploration, and the generation of new solutions. This state is fundamental for innovation processes, the development of tacit knowledge, and emergent structural capital, and is associated with adaptability and long-term competitiveness.

FC: creativity, flexibility; essential for innovation.

The AC – Adapted Child state reflects conformity, obedience, and self-restraint. Although it may have positive effects on operational discipline, the literature indicates that a high AC score can limit personal initiative and impair creative performance. For these reasons, AC is included in the model only as a control variable.

AC: conformity, inhibition → used as a control variable.

Although all five ego states are measured, only three of them contribute positively and directly to the development of organisational intellectual capital:

- ◆ NP – stimulates human capital and promotes psychological safety and organisational learning.
- ◆ A – strengthens structural capital and governance quality; increases decision accuracy and efficient resource allocation.
- ◆ FC – fuels innovation, creativity, and adaptability; supports emergent structural capital.

The other two states (CP and AC) may be included only as control variables, as they influence organisational climate but do not structurally contribute to intellectual-capital creation.

To integrate the psychological dimension into the composite indicator of intellectual capital, a synthetic score is constructed based on the constructive ego states NP, A, and FC. In line with leadership and organisational-psychology literature, the weights are assigned according to the relative importance of each state in generating intellectual capital:

- ◆ A – Adult: 0.50 (managerial rationality is decisive for governance and structural coherence);
- ◆ NP – Nurturing Parent: 0.30 (fundamental for human capital);
- ◆ FC – Free Child: 0.20 (essential for innovation, though its impact depends on balance).

Integrated Psychological Indicator

$$AT_{CI} = 0.30 \cdot NP + 0.50 \cdot A + 0.20 \cdot FC \text{ (Equation 4)}$$

The weighting scheme is theoretically informed by Transactional Analysis (Berne, 1961), dual-process decision theory (Kahneman, 2011), cognitive style and intuition research (Sadler-Smith, 2004; 2008), and creativity research (Amabile, 1996). The specific numerical weights represent an author-constructed integrative model

Final formula for CI-PEI is:

$$CI_{PEI} = 0.5 \cdot ESG + 0.5 \cdot AT_{CI} \text{ (Equation 5)}$$

The CI-PEI model is not intended to replace accounting indicators; rather, it aims to provide a comprehensive framework that explains why and how firms in the period 2006–2013 generated market value through mechanisms that correspond precisely to today's paradigms of intellectual capital, organisational

culture, governance, and intangibles. By integrating a validated psychological tool and a simplified yet robust set of ESG indicators, the model enables the reinterpretation of historical data through a contemporary lens, revealing the continuity between the earlier determinants of MVA and modern models of organisational performance.

4 Conclusions

The results of the initial study and the conceptual model developed in this paper allow the formulation of several relevant discussions, both from a theoretical and a managerial perspective. A first important element is that the firms analysed over the period 2006–2013 generated market value primarily through mechanisms that are today recognised as core components of intellectual capital. Thus, variables such as IDE and Ni, which exhibited a robust statistical association with MVA, can be reinterpreted, in the light of current literature, as early proxies for unquantified intangible capital and, respectively, for operational human capital. Although at the time the study was conducted there were no ESG reporting standards and no systematic interest in the evaluation of intellectual capital, capital markets were already reacting to these determinants, anticipating the conceptual directions that would become dominant in the years 2020–2025. In the contemporary context, IDE may be interpreted as an early form of residual intellectual capital, incorporating elements such as tacit knowledge, organisational culture, internal processes, relationships, and operational routines. This finding confirms recent literature indicating that a considerable share of firms' value derives from resources that traditional financial statements are unable to capture.

The discrepancy between the relevance of IDE and the lack of statistical significance of VAIC confirms the criticisms directed at purely accounting-based metrics in recent literature. While VAIC captures mainly accounting efficiency, IDE reflects a real, residual, emergent intangible component. This observation justifies the shift from traditional accounting indicators to modern institutional and psychological instruments capable of capturing the complexity of intellectual capital. In this respect, the CI-PEI model integrates these developments analytically and conceptually: it brings together the empirically identified determinants from the initial analysis (human capital, structural investments, implicit decision mechanisms) with internationally validated tools for assessing human capital (HCI), corporate governance (CGI), and decision-making profile (Transactional Analysis).

A second important aspect emerging from the discussion is the growing relevance of human capital in the value-creation process. In the initial study, the number of employees was one of the strongest predictors of MVA. In current literature, the "S" dimension of ESG, which includes human capital, organisational wellbeing, and skills dynamics, has become a central element in company evaluation. The link between Ni and HCI, established in the CI-PEI model, provides a coherent explanation for this continuity: what was once a simple operational indicator now becomes an institutionalised component of intellectual capital. Accordingly, the present model highlights that this dimension is not a recent trend, but a structural determinant of organisational performance, operating even before the emergence of the ESG framework.

The marginal contribution of the structural variables (RCI and TA₂) suggests that, in the pre-ESG period, investments in material assets and operational infrastructure represented a necessary, but not sufficient, condition for generating market value. In the current CI-PEI model, the structural function is reinterpreted in institutional terms: CGI captures the quality of decision-making processes, internal control, and governance architecture, which are now regarded as key elements of intangible structural capital. Thus, what appeared in the initial study as material investment is recontextualised, within the contemporary logic, as institutional maturity, even though CGI does not replace RCI, but offers a modern perspective on the structural component of intellectual capital.

Finally, the integration of a psychological dimension through Transactional Analysis provides an innovative conceptual contribution. While the initial study suggested, via the contribution of IDE, that unquantified decision-making mechanisms and internal processes had a substantial influence on MVA, the CI-PEI model offers a rigorous way to conceptualise and measure these mechanisms. Through the AT_CI indicator, the model introduces a psychologically validated framework for assessing the decision-making maturity of leadership, an element now recognised as crucial for the creation of intellectual capital through human-capital development, the stimulation of innovation, and the strengthening of internal processes. In this way, the CI-PEI model brings organisational psychology and intellectual-capital theory into direct dialogue, offering an integrated, multidimensional framework.

Overall, the discussion supports the central claim of the article: the mechanisms through which firms generated value in 2006–2013 are embedded in the conceptual core of ESG methodologies and modern theories of intellectual capital. The proposed model does not replace the empirical analysis; rather, it reinterprets it through a contemporary lens, providing a coherent, theoretically grounded, and applicable framework for evaluating intellectual capital in today's organisations. CI-PEI demonstrates that there is a structural continuity between the historical determinants of market value and current evaluation instruments and this continuity justifies the need for integrated, interdisciplinary models capable of capturing the interaction between institutions, decision-making, and intangible resources.

5. Implications, Limitations, and Future Directions

The paper brings several relevant contributions to the specialist literature:

1. Reinterpretation of IDE as a precursor of modern intellectual capital:

The initial results show that intangible assets unrecognised in accounting have a consistent impact on market value. This observation supports contemporary literature on the “intangibles-based economy” and provides an empirical basis for developing conceptual models that incorporate residual intangibles.

2. Direct connection between historical variables and ESG dimensions:

The CI-PEI model demonstrates that what is now conceptualised as ESG-S and ESG-G was implicitly present in the historical determinants of value. This theoretical continuity strengthens the validity of the ESG framework as an instrument for evaluating intellectual capital.

3. Integration of organisational psychology into intellectual-capital theory:

By using TA, the CI-PEI model extends the intellectual-capital literature through the introduction of a validated psychological dimension. This approach responds to calls in the international literature for the inclusion of behavioural factors in explanatory models of organisational performance.

4. A hybrid institutional-psychological model for evaluating intellectual capital:

CI-PEI represents one of the first attempts to combine ESG instruments, psychological analyses, and historical empirical results within an integrated structure, offering a more comprehensive theoretical framework than traditional accounting-based models.

On the managerial side, the findings and the CI-PEI model suggest several directions for action:

1. Human capital and governance must be treated as strategic investments:

Firms that invest in skills development, wellbeing, and decision-making transparency accumulate intellectual capital with a direct effect on market value.

2. Decision-making leadership directly influences the formation of intellectual capital:

The constructive ego states, NP, A, and FC, can be assessed and developed through dedicated training programmes, with direct impact on organisational performance.

3. ESG is not merely a reporting requirement, but a value-creation mechanism:

The model shows that ESG dimensions conceptually reflect the real determinants of organisational value, already present in the pre-ESG period.

4. Intangibles unrecognised in accounting must be evaluated strategically:

IDE indicates that organisations possess an “invisible” zone of value which can be expanded through intellectual-capital management and through investment in internal processes and organisational culture.

Although the CI-PEI model has solid conceptual coherence, the research presents certain limitations:

1. The empirical data are historical (2006–2013) and do not directly reflect the post-ESG context; their reinterpretation is conceptual rather than empirical.

2. There is no new econometric estimation of the proposed model – CI-PEI is a theoretical model, not one statistically estimated.

3. The ESG indicators used are simplified versions – although internationally validated, HCI and CGI in the proposed form are operationalisations adapted for the purposes of this article.

4. The psychological dimension has not been measured empirically – TA is introduced as a conceptual instrument, to be tested in future studies.

Continuing this work, future methodological and empirical directions include:

1. Empirical validation of the CI-PEI model using current data: applying HCI, CGI, and AT_CI to a sample of contemporary firms would enable testing of the model’s relationship with current market value.

2. Extending the model by including the organisational-climate dimension: variables such as psychological safety, learning culture, and employee engagement could further enrich the model’s structure.

3. Developing a composite instrument for measuring contemporary IDE: building on the logic of IDE, modern indicators for intangible assets unrecognised in accounting could be designed and integrated with ESG reporting.

4. Testing the relationship between decision-making profile and financial performance: empirical assessment of AT_CI in real firms would contribute to strengthening the literature on managerial psychology.

5. Comparative analyses across sectors and countries: given that the role of intellectual capital varies by sector, testing CI-PEI in multiple contexts could provide additional clarity. Top of Form.

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