

## Intellectual Capital Disclosure and Value Relevance of Indian Firms: An Empirical Study

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### ABSTRACT

This study analyses how Intellectual Capital Disclosures influences the performances of Indian firms, focusing on 324 companies from Nifty 500 index over eight financial years (2016-2024). The Intellectual Capital has been measured using Modified Value-Added Intellectual Coefficients (MVAIC) which includes the components, namely, Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), Relational Capital (RCE), Innovation Capital (ICE). The study applies panel regression model to examine the impact of IC and its components on firm performance, measured through accounting-based indicators (Return on Assets and Employee Productivity) and a market-based indicator (Tobin's Q). The results reveal statistically significant positive effect of IC on Return on Asset and Employee Productivity. However, no such significant influence was observed on Tobin's Q. Among the components, Human Capital positively influences both Return on Asset and Employee Productivity, while Capital-Employed Efficiency positively affect Return on Assets, it negatively influences Employee Productivity. The results highlight strategic importance of intellectual capital, particularly human capital, in improving accounting-based performance. The study suggests that firms prioritize human capital development and efficient use of tangible resources to sustain competitiveness. Additionally, policymakers and regulators may consider strengthening intellectual capital disclosure practices to enhance transparency and investor confidence

**Keywords:** Intellectual Capital, MVAIC, Capital Employed, Human Capital, Structural Capital, Relational Capital, Innovation Capital, Firm Performance..

### INTRODUCTION:

The growing knowledge economy has transformed foundations of value creation, placing Intellectual Capital (IC) at the forefront of strategic decision-making for organizations across the globe. IC encompassing Human, Relational and Structural capital represents the intangible assets that drive innovation, competitive advantage, and long-term financial performance. Unlike tangible assets, IC is inherently dynamic and context-specific, making its measurement and management both a challenge and an opportunity. The growing differences between book-value and market-value of firms, specifically in knowledge-intensive sectors like pharmaceuticals, technology, and financial services, underscores the critical need to understand how IC contributes to firm performance and value creation (Edvinsson & Malone, 1997; Bontis, 1999).

Despite its growing importance, the integration of IC into mainstream financial reporting and organizational strategy remains inconsistent. Traditional accounting frameworks have struggled to accommodate intangible assets, leading to limited transparency and suboptimal resource allocation. Early frameworks like Value Added Intellectual Coefficient (Pulic, 2000) provided an initial step in quantifying IC by measuring Human, Structural, and Capital Employed Efficiency (HCE, SCE, & CEE). However, subsequent research has identified limitations in the VAIC model, particularly its inability to capture non-traditional IC components including innovation, relational, and Intellectual Capital Disclosure (ICD) (Xu & Liu, 2020; Gioacasi, 2014). These gaps have prompted calls for extended and sector-specific IC models that better align with the realities of a globalized, knowledge-driven economy.

Recent studies have also highlighted the contextual nature of IC's impact, emphasizing the need for localized research in emerging markets. For instance, while IC has been extensively studied in developed economies, its relevance in resource-constrained yet rapidly developing markets like BRICS remains underexplored (Nadeem et al., 2017). In Tanzania, Kasoga (2020) revealed the potential of structural capital in enhancing firm performance, while pointing out inefficiencies in human capital investment. Similarly, Halim (2024) demonstrated the significant role of IC components in driving firm performance in Indonesia but identified the lack of standardized IC disclosure as a critical barrier. These findings highlight the heterogeneity of IC's influence across different economic and industrial contexts, calling for a nuanced understanding of its role in value creation.

The interplay between IC and innovation further deepens its strategic significance. Innovation, often driven by research and development, is increasingly recognized as the key outcome of IC investments (Amin & Aslam, 2017). In the pharmaceutical industry, where knowledge-intensive processes dominate, IC has been shown to foster product innovation and market adaptability, thus enhancing both financial performance and competitive advantage. However, as Zambon and Monciardini (2015) argue, there remains a critical need in studying the structural linkage among intellectual capital, innovation, and performance, particularly in industries where IC plays a central role in generating economic value.

Moreover, Intellectual Capital Disclosure (ICD) has emerged as a critical dimension in understanding IC's contribution to firm value. Transparency in IC reporting not only reduces information asymmetry but also strengthens investor confidence and aligns stakeholder interests (Keter, Cheboi, & Kosgei, 2024). However, voluntary ICD practices remain inconsistent, particularly in developing economies like Kenya, where regulatory frameworks are either weak or non-existent. Kamath (2015), in his study of Indian firms, advocated for mandatory IC reporting to provide a more accurate reflection of firm value. Such findings underscore the need for robust policies that promote IC transparency and encourage its integration into corporate governance practices.

### 1.1 Relevance of the Study and Statement of Problem

This study seeks to address the critical gap by examining the role of IC in driving firm performance and value creation across diverse economic and industrial contexts. By incorporating extended IC frameworks that account for innovation, relational capital, and disclosure practices, this work aims to provide a holistic understanding of IC's strategic importance. Furthermore, the focus on emerging markets offers valuable insights into how resource constraints, regulatory environments, and cultural factors influence IC utilization and its outcomes. Ultimately, this research contributes to existing literature on IC, offering actionable recommendations for policymaker, managers, and stakeholders seeking to leverage IC for sustainable growth and competitive advantage in the 21<sup>st</sup> century.

Intellectual Capital has become a critical driver of firm performance, innovation, and sustainability in present

knowledge-based economy. However, in emerging markets like India, characterized by rapid industrialization, socio-environmental challenges, and diverse governance structures, the intellectual capital and performance relationship is still insufficiently explored. While existing research highlights IC's contribution to financial performance, its role in fostering sustainability outcomes, such as employee productivity and market-based performance, is less understood. The limited empirical evidence and comparative analyses hinder a nuanced understanding of how intellectual capital can be leveraged for sustainable growth in these economies. Therefore, the study attempts to assess the IC-performance relationship, providing insights to guide corporate strategies and policymaking for long-term, sustainable development.

### REVIEW OF LITERATURE

The concept of IC has garnered increasing scholarly attention as firms recognize value of intangibles like knowledge, organizational processes, and relationships in achieving sustainable competitive advantage. This review synthesizes empirical studies exploring the influence of intellectual capital on firm performances, sustainability, innovation, and firm valuation across varying geographic and industrial contexts.

A positive association of intellectual capital with firm performance has been confirmed by existing researchers. For example, Halim (2024) found that HCE, SCE, and CEE significantly improve Return on Assets and Return on Equity among Indonesian firms, with HCE being the most influential. Similarly, Poowadin et al. (2024) observed a strong link among intellectual capital and financial performance in Thai firms, supporting the resource-based view (RBV) that intangible resources contribute uniquely to firm value. In Bangladesh, Rana and Hossain (2024) reported positive influences of human capital and capital employed efficiency on firm performances, but SCE and relational capital efficiency (RCE) had negative and insignificant associations suggesting sectoral inefficiencies. A European perspective by Dancaková and Glova (2024) emphasized CEE as the most critical factor in enhancing asset turnover (ATO) in firms across France, Germany, and Switzerland, whereas HCE had a comparatively weaker effect.

The role of IC in enhancing market valuation is well-documented but mixed. Keter et al. (2024) introduced ICD as a moderator and found that ICD strengthens the positive impact of performances on firm value (Tobin's Q) in Nairobi Securities Exchange. However, paradoxically, more profitable firms disclosed less IC information, implying strategic withholding of IC data. Maditinos et al. (2011) similarly found that while HCE contributed to profitability in Greek firms, its influence on market value was limited. Kamath (2015) and Chen et al. (2005) argued for standardized IC disclosures to improve market recognition of intangible assets. Chen et al. also demonstrated that the integration of R&D and advertising expenditures strengthened the explanatory power of IC models in Taiwanese firms.

IC also drives innovation a key mediator in enhancing performance. Amin and Aslam (2017) found that IC,

particularly HCE, stimulates R&D activities and patent generation in UK pharmaceutical firms, ultimately boosting profitability and market valuation. This highlights IC's strategic role in knowledge-intensive industries. Xu and Liu (2020) expanded the traditional VAIC model by including innovation and relational capital in South Korea's manufacturing sector. While traditional components like HCE and CEE positively impacted profitability and productivity, innovation and relational capital had negative effects indicating mismanagement or context-specific challenges in those sectors.

Several studies underscore the importance of context in determining IC's effectiveness. Sany and Hatane (2014) showed that HCE was the critical component in improving profitability as well as employee productivity in Indonesia's banking sector. However, it had no effect on asset turnover, indicating inefficiencies in asset utilization. In contrast, Mahesh Joshi et al. (2013) found HCE to be the dominant driver in Australia's financial sector, while SCE and CEE played secondary roles. Tong and Saladrigues (2023) investigated Spanish start-ups across economic cycles and found CEE to be the strongest predictor of ROA, followed by HCE. SCE's effect varied depending on economic conditions, with high-tech firms excelling during upturns and low-tech firms remaining resilient during downturns.

Kasoga (2020) revealed that in Tanzanian firms, structural capital was the most significant contributor to performance metrics like ROA, sales growth, and Tobin's Q, while human capital and capital employed efficiency were negatively associated with performances. Phusavat et al., (2011), in Thailand's manufacturing sector, noted that innovation capital efficiency (InCE) was most associated with revenue growth, even though HCE improved productivity. Young *et al.* (2009) made a comparison of commercial banks across eight Asian countries and found HCE to be the key value driver, particularly in Hong Kong. However, structural inefficiencies limited the effectiveness of IC in less-developed economies like Indonesia and the Philippines.

The foundational framework for IC measurement stems from Pulic's (2000) introduction of Value-Added Intellectual Coefficient (VAIC), including HCE, SCE, and CEE. This model has become the dominant empirical tool for IC analysis. Bontis (2001) critically reviewed various IC models including the Skandia Navigator and Balanced Scorecard and highlighted the need for more comprehensive frameworks to capture IC's complexity. He also underscored IC's strategic role in value-creation as well as competitive advantages. At the macro level, Bontis (2004) introduced the National Intellectual Capital Index (NICI) to benchmark intellectual capital across 22 Arab countries. Findings showed that nations with strong renewal and market capital experienced higher GDP growth and economic resilience, reflecting the macroeconomic relevance of IC.

The existing literature offers strong empirical evidence towards role of intellectual capital in strengthening firm performance, sustainability, innovation, and market valuation. Human capital efficiency consistently emerges

as the dominant IC component, though its impact varies by industry and region. The inclusion of contextual moderators such as sustainability disclosure, governance diversity, and economic cycles—adds depth to the understanding of IC's dynamic role. Despite significant progress in IC measurement and application, gaps remain. Non-traditional IC dimensions (e.g., innovation and customer capital) are still underexplored, and inconsistent disclosure practices hinder market valuation. Future research should focus on refining IC models, standardizing disclosures, and exploring sector-specific strategies to leverage IC for sustainable and long-term growth in the knowledge-based economy.

### 1.1 Research Gap and Research Questions

Despite the growing recognition of IC comprising HC, SC, and RC as a driver of firm performance, innovation, and sustainability, its role in emerging markets remains underexplored. Existing research has predominantly focused on developed economies, overlooking the distinct socio-economic, institutional, and governance characteristics of these emerging markets. While studies emphasize IC's impact on financial performance, its detailed and factor-wise independent analysis is insufficiently examined. Furthermore, comparative analyses of IC's role in driving sustainability-specific innovations, such as R&D practices, are scarce. This gap in the literature calls for a comprehensive investigation into the relation of intellectual capital with firm performance outcomes of sample companies.

This study aims at answering the following questions developed from the research gap and statement of problem:

- Does the intellectual capital influence firm performance?

If yes, whether each component of intellectual capital influences firm performance?

### 1.2 Objectives of Study

The objectives formulated for the study include:

1. To assess the impact of intellectual capital on performances of sample companies.
2. To determine the influence of components of intellectual capital on performances of sample companies.

## RESEARCH METHODOLOGY

A Causal Research Design has been employed to study the influence of intellectual capital on the performances of firm. The necessary data for the study were collected from multiple sources, including companies' annual reports, official websites of companies, industry associations, trade journals, research institutions, and the Prowess CMIE database. The study adopted a purposive sampling method, focusing on Nifty 500 companies to align with the research objectives. However, based on data availability, the final sample comprised 324 companies. The analysis covered a period of eight financial years, from 2016–2017 to 2023–2024, with the starting point chosen to align with the implementation of the Indian Accounting Standards (Ind AS).

### 3.1 Variables used

Variables	Description
<b>Independent Variables:</b> (IC components in the Modified Value-Added Intellectual Coefficient (MVAIC) model)	
Capital Employed Efficiency (CEE)	VA / Capital Employed
Human Capital Efficiency (HCE)	VA / Employee costs
Structural Capital Efficiency (SCE)	(VA – employee costs – R&D expenses- marketing and advertising expenses)/ Value added
Relational Capital (RCE)	Marketing & Advertising expenses/ Value Added
Innovation Capital (ICE)	R&D expenditures/ Value Added
<b>Dependent Variables (Financial Performance):</b>	
Return on Assets (ROA)	Net income / Total Assets
Tobin's Q	(Equity at Market Value + Liabilities at Book Value) / Total Assets
<b>Dependent Variables (Non-Financial Performance):</b>	
Employee productivity	Profit before tax / number of employees
<b>Control Variables:</b>	
Firm size	Natural logarithm of Market Cap
Leverage	Long-term debt/ Total assets
Market-to-book ratio	Market Capitalisation / Shareholders' Equity

*\*Note: VA (Value Added) = Operating profit + Depreciation + Amortization + Employees' salaries and wages*

### 3.2 Hypotheses Development

The following null hypotheses were developed for the study:

H<sub>0</sub>1: Intellectual Capital doesn't significantly influence Employee Productivity.

H<sub>0</sub>2: Intellectual Capital doesn't significantly impact Return on Assets.

H<sub>0</sub>3: Intellectual Capital doesn't significantly affect Tobin's Q.

### 3.3 Equation Representation

The following model reflects a linear regression model designed to study the impact of intellectual capital on firm performance.

$$FP = \beta_0 + \beta_1 MVAIC + \sum \delta C + \epsilon \dots \dots \dots (i)$$

Where,

- FP = Dependent variable (firm performance indicators - ROA, Tobin's Q, Employee Productivity).
- MVAIC = Modified Value Added Intellectual Coefficient
- Controls (C) = Firm Size, Leverage, Market-to-Book Ratio.
- $\epsilon$  = Error term.
- $\beta_0, \beta_1$  = Constants

This model (ii) decomposes IC into its core components CEE, HCE, SCE, RDE, and RCE and assesses their individual contributions to firm performance. It provides a more granular analysis than models using a single aggregated measure (like MVAIC), allowing the researcher to identify which aspects of IC are most influential in driving performance.

$$FP = \beta_0 + \beta_1 CEE + \beta_2 HCE + \beta_3 SCE + \beta_4 RDE + \beta_5 RCE + \sum \delta C + \epsilon \dots (ii)$$

Where,

- FP = Dependent variable (firm performance indicators - ROA, Tobin's Q, Employee Productivity).
- Controls (C) = Firm Size, Leverage, Market-to-Book Ratio.
- $\epsilon$  = Error term.
- $\beta_0, \beta_1, \beta_2, \beta_3, \beta_5$  = Constants

## RESULTS AND DISCUSSION

This study examines the influence of the intellectual capital disclosures on the performance of 324 companies from Nifty 500 index during the period 2016–17 to 2023–24. Firm performance was examined both at the overall level and through individual indicators such as Return on Assets (ROA), Employee Productivity, and Tobin's Q, thereby integrating accounting- and market-based perspectives. The empirical analysis provides evidence on how intellectual capital efficiency influences firm outcomes over time.

### 4.1 Impact on Employee Productivity (EP)

Hausman test was conducted to identify the best-fit panel regression model for assessing the effect on Employee Productivity (EP). The results produced a Chi-square statistic of 19.02 with a p-value of 0.0008, suggesting that the Fixed Effects (FE) model is preferable for evaluating the influence of VAIC on EP.

Table 1 reflects the regression results where MVAIC is the only variable with a statistically significant positive effect on EP. This finding underscores the critical role of IC efficiency in driving firm performance, suggesting that companies which effectively utilize their intellectual

resources tend to achieve better economic outcomes. The model fits reasonably well, explaining about 46% of the variance in EP.

Variables	Coeff .	Std. Err	t-Stat	Probability
Constant	-1.335029	0.982152	-1.359289	0.1742
MVAIC	0.245313	0.007166	34.23434	0.0000
FIRMSIZE	0.1768	0.266013	0.664632	0.5064
DEBTTOASSE TRATIO	0.134809	0.402116	0.335249	0.7375
PRICETOBOOKVALUE	0.00202	0.030287	0.066711	0.9468
<b>Effects Specification</b>				
R <sup>2</sup>				0.458407
Adjusted R <sup>2</sup>				0.380182
F-stats				5.860123
Probability (F-stats)				0.000000
DW Stats				2.220323

Source: Author's Compilation through EViews

In contrast, the control variables Firm Size, Debt-to-Asset Ratio, and Price-to-Book Value do not exhibit significant relationships with EP in this model. This may imply that traditional financial indicators are becoming less influential in explaining firm performance compared to knowledge-based and intellectual resources. Regarding the overall model adequacy, the adjusted R<sup>2</sup> value of 0.38 indicates a moderate level of explanatory power, suggesting that a reasonable proportion of employee productivity is explained by variables under study. Furthermore, the significant F-stat confirms that regression model is statistically valid.

Further, the results of the impact study of individual components of IC on EP is displayed in Table 2. Results reveal statistically significant and positive influence of HCE on EP,  $\beta = 0.273$ , t-stat = 37.07,  $p < .001$ . This finding indicates that higher efficiency in managing HC is strongly associated with improved firm performance, reinforcing the critical role of skilled, knowledgeable, and well-utilized human resources in enhancing economic outcomes.

Variables	Coeff .	Std. Err	t-Stat	Probability
C	-0.740741	0.958405	-0.772889	0.4397
CEE	-0.438083	0.133507	-3.281337	0.001
SCE	-0.000577	0.052795	-0.010938	0.9913
HCE	0.273433	0.007377	37.06542	0.0000
ICE	0.001398	0.125157	0.011168	0.9911
RCE	0.001408	0.234917	0.005995	0.9952
FIRMSIZE	0.077286	0.258858	0.298564	0.7653
DEBTTOASSE TRATIO	0.18921	0.391917	0.482781	0.6293
PRICETOBOOKVALUE	0.001358	0.029445	0.046106	0.9632
<b>Effects Specification</b>				
R <sup>2</sup>				0.48905
Adjusted R <sup>2</sup>				0.414217
F-stats				6.535155
Probability (F-stats)				0.000000
DW Stats				2.213159

Source: Author's Compilation through EViews

CEE reveals a negatively significant impact on firm performance ( $\beta = -0.438$ ,  $p = .001$ ), suggesting firms may not be leveraging their physical and financial capital effectively, or it may reflect overinvestment in tangible assets that do not contribute proportionally to value creation. The remaining IC components SCE, ICE, and RCE do not demonstrate any statistically significant impact on EP, with all p-values exceeding .99, indicating no meaningful contribution to firm performance within this model. Other IC components (SCE, ICE, RCE) and control variables (Firm Size, Debt-to-Asset, Price-to-Book) show no significant effect ( $p > .60$ ). Results

emphasize human capital's key role in performance, guiding firms to invest in workforce and knowledge development. These findings have implications for strategic resource allocation, particularly the prioritization of investments in workforce development and knowledge management.

#### 4.2 Impact on Return on Asset (ROA)

To determine the best-fit panel regression model for impact assessment of IC on ROA, Hausmann test was run. The results give probability value less than 0.05, suggesting Fixed Effects (FE) model to be more appropriate for impact assessment on ROA.

Table 3 represents the results of the analysis conducted to assess the influence of intellectual capital on ROA. The regression model is statistically significant, with  $F(4, N-k) = 47.07$ ,  $p < .001$ , indicating that the independent variables collectively explain a substantial proportion of the variance in ROA.

Variables	Coeff.	Std. Err	t-Stat	Probab ility
Constant	0.992 191	0.05 544	17.89 748	0.0000
MVAIC	0.001 324	0.00 04	3.273 659	0.0011
FIRMSIZE	- 0.036 745	0.01 502	- 2.447 22	0.0145
DEBTTOASSET RATIO	- 0.001 831	0.02 27	- 0.080 66	0.9357
PRICETOBOOK VALUE	0.001 29	0.00 171	0.754 55	0.4506
<b>Effects Specification</b>				
R <sup>2</sup>				0.8717 6

Adjusted R <sup>2</sup>	0.8532 4
F-stats	47.065 0
Probability (F-stats)	0.0000 0
DW Stats	2.1421 5

Source: Author's Compilation through EViews

Regarding the individual predictors, MVAIC exhibits a positively significant influence on ROA ( $\beta = 0.0013$ ,  $t = 3.27$ ,  $p = .0011$ ). The finding underscores the value of intellectual capital efficiency in enhancing firm profitability, highlighting its relevance as a strategic resource in value creation. Firm Size is also a significant predictor but shows a negative relationship with ROA ( $\beta = -0.0367$ ,  $t = -2.45$ ,  $p = .0145$ ), suggesting that larger firms in the sample may be less efficient in utilizing their assets to generate returns compared to smaller firms.

In contrast, the Debt-to-Asset Ratio and Price-to-Book Value do not have a statistically significant influence on ROA, with p-values of .936 and .451, respectively. These results imply that traditional financial indicators, in this context, do not meaningfully influence firm profitability when intellectual capital is taken into account.

Table 4 presents the regression results assessing the influence of various IC components on firm profitability, as measured by ROA. Among the IC components, CEE demonstrated a significantly positive influence on ROA ( $\beta = 0.033$ ,  $t = 4.28$ ,  $p < .001$ ), indicating that the effective utilization of physical and financial capital significantly enhances a firm's ability to generate profits. This finding underscores the importance of managing tangible resources efficiently to achieve better financial outcomes.

Similarly, HCE also showed a positive and statistically significant association with ROA ( $\beta = 0.0010$ ,  $t = 2.35$ ,  $p = .0189$ ). This result highlights the strategic value of human resources, suggesting that investments in employee skills, knowledge, and capabilities contribute meaningfully to firm performance. Together, these results affirm that both capital efficiency and human capital are key drivers of profitability in contemporary organizations.

Variables	Coeff.	Std. Err	t-Stat	Probability
Constant	0.972855	0.055462	17.54083	0.0000
CEE	0.033037	0.007726	4.276091	0.0000
SCE	0.004949	0.003055	1.62001	0.1054
HCE	0.001003	0.000427	2.349671	0.0189
ICE	0.001073	0.007243	0.148161	0.8822
RCE	0.019617	0.013595	1.442981	0.1492
FIRMSIZE	-0.034638	0.01498	-2.312321	0.0208
DEBTTOASSETRATIO	0.003257	0.02268	0.14361	0.8858
PRICETOBOKVALU E	0.00126	0.001704	0.739442	0.4597
<b>Effects Specification</b>				
R <sup>2</sup>				0.872831
Adjusted R <sup>2</sup>				0.854206
F-stats				46.86300
Probability (F-stats)				0.000000
DW Stats				2.160980

Source: Author's Compilation through EViews

In contrast, the other IC components SCE, ICE and RCE did not exhibit statistically significant relationships with ROA. Although SCE and RCE had positive coefficients ( $p = .105$  and  $.149$ , respectively), their effects fell short of conventional significance thresholds. **ICE**, in particular, showed an insignificant result ( $p = .882$ ), suggesting minimal influence on profitability within this dataset. These findings imply that the contributions of structural, innovative, and relational capital may be more context-specific, potentially varying across industries or operational models.

Among the control variables, Firm Size was negatively linked to ROA ( $\beta = -0.0346$ ,  $t = -2.31$ ,  $p = .0208$ ), suggesting larger firms in the sample may experience diminishing returns on asset utilization or face operational inefficiencies due to complexity and scale. Meanwhile, Debt-to-Asset Ratio ( $p = .886$ ) and Price-to-Book Value ( $p = .460$ ) did not show any significance in the relation with profitability, indicating that these traditional financial indicators have limited explanatory power in the presence of intellectual capital variables.

#### 4.3 Impact on Tobin's Q

The Hausmann test results for determining the appropriate model in impact analysis of Tobin's Q indicated fixed effect model to be the best-fit panel regression model for the study, as the p-values are statistically significant ( $p < 0.01$ ). This implies that the unobserved heterogeneity

across firms is not random, but rather systematically related to the independent variables in the model.

Variables	Coeff.	Std. Err	t-Stat	Probability
Constant	0.275 656	0.64 602	0.426 697	0.6696
MVAIC	0.006 145	0.00 471	1.303 823	0.1924
FIRMSIZE	0.785 528	0.17 497	4.489 409	0.0000
DEBTTOASSET RATIO	1.927 216	0.26 45	7.286 328	0.0000
PRICETOBOK VALUE	- 0.007 788	0.01 992	- 0.390 93	0.6959
<b>Effects Specification</b>				
R <sup>2</sup>				0.6637 6
Adjusted R <sup>2</sup>				0.6151 9

F-stats	13.667 4
Probability (F-stats)	0.0000 0
DW Stats	2.0307 9

Source: Author's Compilation through EViews

Table 5 presents the results of a regression analysis conducted to examine the influence of MVAIC and selected financial control variables on Tobin's Q, a widely recognized proxy for market performance. The analysis reveals that Firm Size ( $\beta = 0.79$ ,  $t = 4.49$ ,  $p < .001$ ) and the Debt-to-Asset Ratio ( $\beta = 1.93$ ,  $t = 7.29$ ,  $p < .001$ ) have statistically significant positive effects on Tobin's Q. These findings suggest that firms with greater asset bases and higher financial leverage tend to receive higher market valuations relative to their book value of assets, potentially reflecting investor confidence in their growth potential or market positioning.

In contrast, MVAIC did not demonstrate a statistical significance in association of Tobin's Q ( $\beta = 0.006$ ,  $t = 1.30$ ,  $p = .192$ ), indicating that overall ICC does not have a direct or robust impact on market performance within this model. Likewise, Price-to-Book Value was not a significant predictor of Tobin's Q ( $p = .696$ ). From the results, it can be inferred that, traditional financial indicators particularly firm size and leverage play a more dominant role in shaping market valuation than aggregated intellectual capital efficiency.

To explore the individual contributions of intellectual capital components, a multiple regression analysis was conducted in Table 6, incorporating CEE, SCE, HCE, ICE and RCE, while controlling for the same financial variables. Among the IC components, CEE displayed a marginally significant positive relationship with Tobin's Q ( $\beta = 0.159$ ,  $t = 1.76$ ,  $p = .078$ ), suggesting that more efficient utilization of capital employed may be associated with improved market valuation. However, this result falls slightly above the conventional threshold for statistical significance ( $p < .05$ ), warranting cautious interpretation.

<b>Table 6: Impact of IC Components on Tobin's Q</b>				
Variables	Coeff.	Std. Err	t-Stat	Probability
Constant	0.232241	0.64843	0.358158	0.7203
CEE	0.159383	0.090327	1.764508	0.0778
SCE	-0.034104	0.03572	-0.95478	0.3398
HCE	0.005455	0.004991	1.093012	0.2745
ICE	-0.052697	0.084678	-0.622322	0.5338
RCE	-0.157036	0.158939	-0.98803	0.3232
FIRMSIZE	0.797265	0.175136	4.552262	0.0000
DEBTTOASSETRATIO	1.961361	0.26516	7.396902	0.0000
PRICETOBOOKVALUE	-0.00815	0.019922	-0.40912	0.6825
<b>Effects Specification</b>				
R <sup>2</sup>				0.664382
Adjusted R <sup>2</sup>				0.615227
F-stats				13.51613
Probability (F-stats)				0.000000
DW Stats				2.036091

Source: Author's Compilation through EViews

The other intellectual capital components SCE, HCE, ICE, and RCE did not exhibit statistically significant relationships with Tobin's Q, with all p-values exceeding 0.27. These results indicate that, individually, these dimensions of intellectual capital may not exert a strong or consistent influence on market-based performance indicators within the sampled firms. Consistent with the *Advances in Consumer Research*

findings in Table 5, the control variables Firm Size ( $\beta = 0.80$ ,  $t = 4.55$ ,  $p < .001$ ) and Debt-to-Asset Ratio ( $\beta = 1.96$ ,  $t = 7.40$ ,  $p < .001$ ) remained significant positive predictors of Tobin's Q, further reinforcing the role of traditional financial characteristics in determining market valuation. Once again, Price-to-Book Value was not statistically significant ( $p = .683$ ).

## FINDINGS

The analysis conducted in this study yielded several notable findings:

- The result reveals MVAIC, as a measure of overall intellectual capital efficiency, exerts a statistically significant positive influence on EP. This indicates that firms that optimize the management of their intellectual capital resources tend to achieve superior economic outcomes.
- Human capital efficiency from among the individual components of IC, demonstrates a statistically significant positive impact on EP, highlighting the critical role of effectively managing human resources, including skills, knowledge, and expertise, in enhancing firm performance.
- CEE shows a statistically significant negative relationship with EP, suggesting potential inefficiencies in utilizing physical and financial capital or possible overinvestment in tangible assets that do not proportionally generate value.
- MVAIC also positively and significantly affects ROA, confirming its contribution to firm profitability. Moreover, both CEE and HCE are positively linked with ROA, underlining the importance of managing tangible and intangible resources efficiently.
- MVAIC does not display a statistically significant effect on Tobin's Q, indicating that overall intellectual capital efficiency may not directly impact market-based performance indicators.
- Similarly, Price-to-Book Value does not emerge as a significant predictor. However, CEE has a marginally significant positive association with

Tobin's Q, suggesting that efficient utilization of capital employed could moderately influence market valuation.

Overall, these findings emphasize the strategic value of managing human and capital resources to improve both financial and economic performance, while also acknowledging the limited direct effect of intellectual capital on market-based metrics such as Tobin's Q.

## SUMMARY & CONCLUSION

This study offers empirical insights into the impact of ICE measured using the MVAIC on the performance of Indian firms. Analyzing data from 324 Nifty indexed companies between 2016–17 and 2023–24, the result reveals intellectual capital disclosures playing a critical role in enhancing accounting-based performance indicators, particularly ROA and EP. Among the components of MVAIC, HCE consistently emerged as the most influential, underscoring the pivotal role of skilled and well-utilized human resources in value creation. CEE showed mixed outcomes—positively affecting ROA but negatively impacting EP indicating inefficiencies in managing tangible assets.

Conversely, Structural, Relational, and Innovation Capital Efficiencies (SCE, RCE, ICE) did not exhibit statistically significant effects on firm performance. Notably, MVAIC did not significantly influence market-based performance (Tobin's Q), suggesting that investors may undervalue intellectual capital in favor of traditional financial indicators.

Overall, the analysis highlights strategic importance of IC especially human capital in driving firm performance. It calls for improved IC disclosure and greater integration of IC into corporate strategy and policymaking to enhance transparency, innovation, and long-term competitiveness in the Indian corporate landscape..

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