



Intellectual capital disclosure and firm performance relationship: evidence from leading Indian firms

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This study analyses the impact of intellectual capital disclosure on the firm's financial performance by developing a comprehensive intellectual capital disclosure index. The study reveals that although intellectual capital disclosure has an insignificant impact on the return on assets, it positively impacts the firm's market capitalization. Among the components of intellectual capital disclosure, Structural capital and Relational capital disclosure positively contribute to the relationship, while Human capital disclosure negatively impacts firm performance. These insights can aid firms in making strategic decisions regarding intellectual capital management and disclosure practices, potentially leading to improved firm performance. The originality of our study lies in the fact that while the literature on this relationship is scarce, with no study in the Indian context, our study provides a realistic conclusion to the intellectual capital disclosure-firm performance relationship and adds value to the current intellectual capital-driven competitive market.

Keywords: capital disclosure, firm performance, relational capital, structure capital, human capital

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Introduction

The unaccounted capital in business due to the traditional accounting system has been attributed to the knowledge aspect, which is the firm's intellectual capital (Abeysekera 2006). Presently, almost 90% of the firms' market value is not reflected in their financial statements due to the failure of the traditional accounting system to account for these value-creating resources (Ocean 2020). The increasing importance of these intangibles in the present knowledge economy has forced many firms and academicians to measure, manage, and report these resources. As a response, many researchers in the field of accounting and corporate governance have tried to measure the extent of Intellectual Capital (IC) disclosures across industries in different parts of the world (Bontis 2003, Joshi et al. 2012, Kamath 2008b). Some companies

invest heavily in IC items like research and Development, skills, training, attitude, relationships, and other knowledge aspects needed to maintain competitive advantage, leadership, and profitability within the industry. Thus, it is important to report these IC items in the annual reports to keep investors well informed about the resources of the firm, which will not only reduce the information asymmetry and its related agency costs but also send a better signal to the market that gets reflected in firm performance and market price. However, it is explored that 78% of the global intangible value remains undisclosed (GIFTTM 2022).

Although there is a plethora of Intellectual Capital disclosure (ICD) research, there is no universally accepted disclosure index. The extant literature on IC has widely accepted three components: Human Capital, Structural Capital, and Relational Capital (Bontis et al. 2000, Vishnu & Gupta 2014). While studies on ICD have considered a list of items within these three components to measure the level of disclosures (Kamath 2008a, Salvi et al. 2020), these items include synonyms which are not clearly explained or defined. The consequential result is inaccurate scores due to the error of principles (omission or commission) by synonymous words and lack of explanation for the items to remove ambiguity. For example, Kamath (2017), in his framework, has used Knowledge Assets, Intellectual assets, intellectual resources, and IC as separate items within structural capital. So, a company can report the same asset with different names in different sections of the annual reports to get multiple scores for the same asset. Other studies (Abdolmohammadi 2005; Bukh et al. 2005) have considered a different IC division having four to ten components that cannot be compared to other studies on ICD and IC performance. After an extensive exploration of the extant literature, we could trace only one empirical study (Li et al. 2008) that defined the IC items for a proper disclosure index. However, this study is UK-based and can hardly be generalized to a developing country like India.

Many studies have related IC efficiency with firm performance (Hamdan 2018, Xu & Li 2022). However, we could trace only three studies regarding the relationship between ICD and firm performance (Orens et al. 2009, Vitolla et al. 2019). Although these studies conclude a significant positive effect of ICD on firm performance, it suffers from many limitations. While the study by Orens *et al.* (2009) focusing on European countries considers only a section of the year (Summer of 2002), Vitolla et al. (2019) have considered a small sample of 45 integrated reports that too for only two years and their analysis reveals the overall ICD, not the individual components. Further, the study by Abdolmohammadi (2005) has become, on the one hand, obsolete as its sample dates back to the previous century and, on the other hand, incomparable as it has used a different classification for the IC components.

Given the aforementioned research gap, our choice of an Indian study setting rests on the interesting fact about the value of intangible assets and its disclosure observed during the post-pandemic period. While the global intangible asset value decreased by almost 20 trillion USD in 2022 due to the apprehended financial recession following the Covid-19 pandemic and the Russia-Ukraine war, during this period, India's intangible asset value rose by 1376 billion USD (the highest increase among all the nations), positioning it at the sixth spot for the total intangible asset value. Over 60 percent of India's asset value is intangible, but over 90 percent of these assets are undisclosed, indicating a lack of transparency and a need for better disclosure practices in India (GIFTTM 2022). In light of the above research problem, we have identified the following two pertinent research questions to be addressed. (1) How to correctly measure the disclosure of IC information? (2) Does ICD influence the firm performance in India?

In this study, we analyzed a sample of 133 NSE-listed firms for five years, from 2015-16 to 2019-20, using the PLS-SEM technique to unearth the effect of ICD and its components on firm performance measures: market capitalization and return on assets. The results reveal that ICD by the Indian firms positively influences their Market Capitalization but has an insignificant impact on their ROA. Among ICD components Relational Capital and Structural capital disclosure positively impact, while Human capital disclosure negatively impacts the firm performance. Our results will guide the management in deciding which IC information to report for increased firm performance and which information must be suppressed

to retain competitive advantage. The results also imply that firms should upgrade their annual reports with a proper framework to report IC information in a structured manner without any ambiguity.

Our study contributes to the literature on ICD and its relationship with financial performance. Firstly, we propose an improved ICD framework that addresses previous limitations, including overlapping effects and a lack of item descriptions. Secondly, we add to the literature by analyzing the relationship between ICD and firm performance, an area neglected so far in the previous studies. Thirdly, we bridge the incomparability gap between IC performance and disclosure by utilizing the same IC components as prior studies on the relationship between IC and firm performance. Lastly, we refine the measurement of ICD by weighting each component based on its effect, providing a more nuanced understanding of the relationship between total ICD and firm performance.

Literature Review and Hypothesis Development

Skandia AFS has broadly defined IC as “the possession of knowledge, applied experience, organizational technology, customer relationships, and professional skills that provide the firm with a competitive edge in the market” (Edvinsson 1997). The literature has widely accepted that IC is composed mainly of three components: human capital (the knowledge, skills, and experience of the employees), structural capital (knowledge in the organizational databases and processes of the firm), and relational capital (relationships with customers and other stakeholders) (Bontis 1998, Mubarik et al. 2022). The efforts to measure the ICD began in the previous century as many researchers tried developing a framework for measuring the ICD. The framework by Sveiby (1997) had 28 items divided into three categories: external structure, internal structure, and employee competence. This was one of the first coding frameworks. Another framework by Petty & Guthrie (2000) had 26 items classified into the same previous three categories. Further, Bontis (2003) had 38 items. However, there was no division of categories in his framework. The framework by Beattie & Thomson (2004) had 128 IC items divided into Human capital (HC), Structural capital (SC), and Relational capital (RC). Li et al. (2008) had 61 items divided into three categories: HC, SC, and RC. This framework explained each item to avoid errors of omission and commission. However, their framework has grouped items at a minimal level and ignored some crucial aspects. E.g. while they considered employee number, age, and diversity as separate items, they have ignored the health and safety measures taken by the company, their replacement ratio, and retirement benefits. Recently, in a theoretical analysis, a comprehensive framework was developed by Singhanian & Panda (2023) in the Indian context, having 16 items in HC, 14 in RC, and 12 in SC. This framework has provided an explanation for each item, thereby removing ambiguity and withstanding the contemporary market requirement. However, we could not trace any empirical study using this framework.

While the literature on IC has focused chiefly on the IT Industry (Bhasin 2011, Joshi et al. 2011) and the Pharmaceutical Industry (Pal & Soriya 2012, Vishnu & Gupta 2014), a few studies on other industries have also been carried out (Kamath 2007). The previous study has found that the ICD of Indian Knowledge-sector firms, particularly in IT companies, is very low (Joshi et al. 2011). However, compared to countries like Australia, Indian companies report more IC information in their annual reports (Joshi et al. 2012). Kamath (2008b) found that IT companies have more disclosures than any other industry among her sample of 30 companies studied for the financial year 2005-06. With an increasing disclosure of IC information, knowing its impact on firm performance is vital. In line with signaling theory (Spence 1973), disclosing more IC information will send a better signal to the market about the companies' competitive advantage due to their IC. The market will comprehend this signal and behave accordingly by offering a higher price than those without the signal. In line with agency theory (Jensen & Meckling 1976), disclosing IC information will reduce the information asymmetry between the management and the stakeholders, thereby reducing agency costs and increasing trustworthiness. This will result in increased performance by the firm. Empirical studies on this relationship are very scarce. We could trace only three studies on this

relationship (Orens et al. 2009, Vitolla et al. 2019), and all three studies found a positive impact on ICD on firm performance. Accordingly, we formulate the following generic and derivative hypotheses by considering the theoretical arguments and the previous empirical evidence from various study settings.

H1. Intellectual capital disclosure increases firm performance

Among ICD components, Human capital consisting of the collective capabilities and knowledge of employees is a valuable and scarce resource, which in line with resource-based theory, can lead to sustainable competitive advantage and in turn, improvement in firm performance. Reporting on human capital is crucial for effective management, allowing informed decisions and the leveraging of employees' abilities for a competitive advantage and increased firm value. Such transparency in annual reports signals trust and accountability, fostering reliability, while in the data-driven environment, it empowers decision-makers to allocate resources more effectively. Accordingly, a positive relationship between human capital disclosure and firm performance is hypothesized.

H1a. Human capital disclosure increases firm performance

Structural capital refers to a firm's infrastructure and intangible assets that enhance the firm's ability to leverage its human capital effectively. By disclosing its structural capital, a firm signals the quality of its internal processes, systems, and knowledge management practices. Disclosing structural capital enhances a firm's transparency and credibility, reducing uncertainty and risk, and subsequently lowering the cost of capital, as evidenced by Mondal and Ghosh (2021). This reduction in the cost of capital, coupled with increased revenue, is expected to positively impact financial performance. Additionally, structural capital disclosure informs stakeholders about the company's intangible assets, intellectual property, patents, and trademarks, signifying its competitive advantage and helping protect these assets. Based on these arguments, the following sub-hypothesis is formulated:

H1b. Structural capital disclosure increases firm performance

Relational capital refers to the firm's relationships with customers, suppliers, and other stakeholders, demonstrating its ability to generate future revenue and secure resources at a lower cost. It was initially a new concept, with a focus on customer capital, previously considered a part of structural capital. Customer capital, representing customer perceptions, is a key part of relational capital. Positive customer perceptions reduce promotional expenses while enhancing pricing opportunities, resulting in higher earnings. Positive relationships with other stakeholders lead to cost savings on inputs. Accordingly, a positive relationship is hypothesized between relational capital disclosure and firm performance.

H1c. Relational capital disclosure increases firm performance

Methodology

Based on the OECD classification, six industries, i.e., three Knowledge-intensive Industries (Information Technology, Pharmaceutical, and Chemical) and three traditional Industries (Food and Agro-based, Metal and Metal products, and Consumer goods), have been chosen for the study. All 151 companies under these six industries appearing in the top 500 NSE-listed companies based on market capitalization as on 31st March 2020 constitute our sample. Eighteen of these 152 companies were dropped due to a lack of consistent information. Thus, the final sample consists of 133 companies representing 94 percent of the total market capitalization of the six industries in NSE. To measure the ICD, content analysis of the annual

reports has been widely used in the literature (Guthrie et al. 2004). This method assigns codes to the qualitative or quantitative data to derive a specific pattern in the disclosure of information in the annual reports. The item codes are assigned in the following manner: 3 if the information is given in the numerical, graphical, or tabular form, 2 if the information is explained in detail, 1 for the simple presence of the information, and 0 for the absence of information. Content analysis requires a taxonomy of themes. For this taxonomy, a comprehensive ICD framework is required which overcomes previous limitations by providing explanation to each item. Therefore, the framework developed by Singhania & Panda (2023) in the Indian context which, provides explanation for all the items, has been used for this study. These items are briefly listed in Table 1.

Table 1. Intellectual Capital Disclosure Framework

<i>Human Capital</i>	<i>Relational Capital</i>	<i>Structural Capital</i>
Employees/Human Resource	Customers	Intellectual Property
Employee's education	Market share	Management Philosophy
Employee's knowledge	Customer satisfaction	Corporate culture/ value/ principles
Employee skills/know-how/ expertise	Customer loyalty	Process
Employee Training	Customer training and awareness	Organizational structure
Employee value	Company's reputation/ image	Research and Development (R&D)
Employee motivation	Brands	Innovation
Employee's commitment	Distribution channels	Knowledge management
Employee's productivity/ efficiency	Suppliers	Information Technology
Team	Public relations	Networking
Remuneration	Business agreements/deal	Infrastructure
Health and Safety	Awards	Intellectual capital
Work environment	Marketing	
Retirement benefits	Customer service	
Employee replacement		
Employee Capabilities		

Source: Singhania & Panda (2023)

Based on the above-mentioned framework, the current study develops an index to capture ICD from the companies' annual reports covering the study period from 2015-16 to 2019-20. The index for disclosure of an IC component is computed using the model below:

$$ICD_{ckt} = \frac{\sum_{i=1}^n X_{ikt}}{N_c}$$

Where c =IC component; k =company; i =item/sub-component; t =time; N_c =Maximum score possible under a component, i.e. 3xNumber of items in each component; X_{ikt} =score of each item i for company k in the period t .

Total ICD is considered a construct measured by the sum of the weight of its components. These weights are assigned with the help of the 'path weighting scheme' of the PLS-SEM algorithm provided by SmartPLS4 by running *Mode B* for the formative measurement model, in accordance with the suggestion by Hair et al. (2021). In mode B, the weights of AC characteristics are estimated using multiple regression, in which the construct (ICD) represents the dependent variable, and its associated indicators (IC

components score) are the multiple independent variables. As a result, regression weights are obtained for the relationship between the indicator and the construct, representing the indicator weights. Firm performance is measured using two parameters: Return on Assets (ROA) as an accounting-based measure and market capitalization (MAC) as a market-based measure (measured as a natural log of market capitalization) of firm performance. Firm-specific characteristics are controlled by considering the firm size (measured by the log of total assets) and Profit Margin (Net profit/ Net sales) as control variables. Partial Least Squares-Structural Equation Modelling (PLS-SEM) in SmartPLS4 developed by Ringle et al. (2022) is used for analyzing the relationship. We have used 10,000 bootstrap samples to test the significance of the models.

Results

Figure 1 presents the PLS-SEM model used to test the relationship between the ICD and firm performance. In this model, the ICD is a construct measured in a formative measurement model by the impact of the components of the ICD, i.e., the Human Capital Index (HCI), Relational Capital Index (RCI), and Structural Capital Index (SCI), on the measures of firm performance, i.e. ROA and MAC. The firm size and profit margin are control variables.

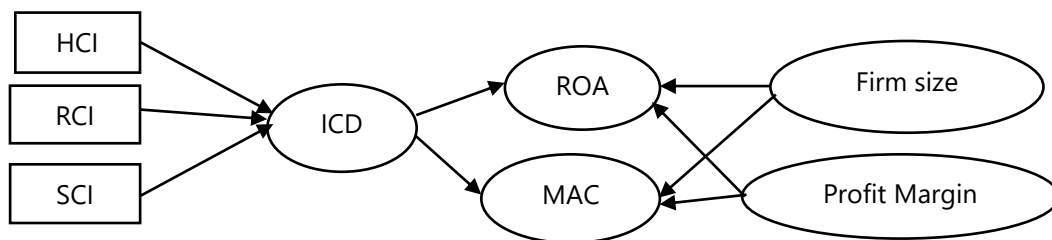


Figure 1. Relationship between ICD and Firm Performance

Source: the authors

To check the model fit, we used the normed fit Index by Bentler & Bonett (1980), which uses the Chi-square value to judge the model fit, and a value above .9 represents an acceptable fit. Further, Standardized Root Mean Square Residual is used where a value less than .10 is considered a good fit. The model fit indicators showed that the model is a good fit with the normed fit Index of .97 and Standardized Root Mean Square Residual of .02. To test for the endogeneity issue among the latent variables, we have used the Gaussian Copula approach. Here, Copulas were created for each endogenous variable and tested for endogeneity. We found that firm size has endogeneity with both the measures of firm performance, while profit margin has endogeneity with ROA only. Therefore, three copulas connecting the endogenous variables with the measures of firm performance are included in the final model to control the endogeneity problem. Further, for reliability and validity, the formative measurement model requires testing for multicollinearity, convergent validity, and the significance of indicator weights (Hair et al. 2021). Variance Inflation Factor (VIF) is used to test multicollinearity. A value of less than five generally indicates no collinearity issue following the extant literature (Gupta & Mahakud 2021, Singhania & Panda 2022). Convergent validity requires redundancy analysis with an alternative reflective model of the same construct with a correlation coefficient of .70 or above (Cheah et al. 2018). Table 2 shows the indicator's weights, significance, VIF values, and redundancy analysis. With significant weights ($p < .05$), VIF values less than five, and a correlation coefficient of redundancy analysis above .70, the indicators are reliable and valid.

Table 2. Reliability and Validity

<i>Indicators</i>	<i>Weights</i>	<i>p values</i>	<i>VIF</i>
<i>HCI</i>	-.22	.03	1.24
<i>RCI</i>	.54	.00	1.28
<i>SCI</i>	.72	.00	1.31
<i>Redundancy analysis (coef.)</i>	.99		

The bootstrapping results in Table 3 show the relationship between ICD and firm performance. The result shows that ICD has a significant positive impact on MAC and an insignificant impact on ROA. Among the control variables, the firm size significantly and positively influences both the measures of firm performance. Profit Margin is unrelated to both the measures of firm performance, while the Gaussian Copula terms of firm size and profit margin (to control endogeneity) have a significant negative impact on firm performance.

Table 3. Path Coefficients

<i>SEM Paths</i>	<i>Coefficients</i>	<i>t values</i>	<i>p values</i>
<i>ICD → MAC</i>	.18	7.20	.00
<i>ICD → ROA</i>	-.03	.95	.34
<i>Firm size → MAC</i>	.54	4.27	.00
<i>Firm size → ROA</i>	.28	1.88	.06
<i>Profit Margin → MAC</i>	-.07	1.25	.21
<i>Profit Margin → ROA</i>	.14	.90	.36
<i>GC (Firm size) → MAC</i>	.25	1.95	.05
<i>GC (Firm size) → ROA</i>	-.51	3.13	.00
<i>GC (Profit Margin) → ROA</i>	.44	3.31	.00

Discussion

The result shows that ICD has a significant positive impact on MAC and an insignificant impact on ROA. This result fails to reject our Hypothesis H_1 . It implies that more disclosure of IC information in annual reports improves the firm's market capitalization, although it does not impact ROA. ICD enhances investors' confidence, improves transparency, and differentiates itself from competitors by establishing its unique value statement. The weights in Table 2 show that RCI (.54) and SCI (.72) have a significant positive weight in this relationship, indicating that more disclosure of RC and SC positively impacts firm performance, while HCI (-.22) has a negative weight, indicating a negative impact on firm performance. Hence, we reject our hypothesis H_{1a} but fail to reject our Hypotheses H_{1b} and H_{1c} . This may be because RC and SC are the firm's owned assets that belong to the firm through its infrastructural developments, environments created within the organization, and its relationship with the external parties. Therefore, disclosing information about the RC and SC of the firm informs the investors about this value-generating asset, increasing the firm's market value. Among RC and SC, while RC is the relationship between the firm and external parties, and it can be sensitive to any negative information about the firm, SC is the firm's internal structure that is more rigidly related to the firm's success. Hence, SC has a higher weight compared to RC.

On the other hand, HC is the employees' capabilities within an organization, which leaves the organization when employees leave. A firm cannot own this capital as it is the innate ability of the employees. Disclosing more information about HC signifies the firm's dependence on its HC. Further, HCD also informs the competitors about the HC of the firm, leading the competitors to acquire the HC through different incentives and perquisites, including the options for moonlighting. Therefore, HCD negatively contributes to ICD in the relationship between ICD and firm performance. The insignificant impact of ICD on ROA may be because, while ICD as a disclosure practice influences the investors' perspective by reducing information asymmetry, it does not influence the operation of the firms.

Conclusion, Implications and Future Research Directions

This study extends the literature on ICD by analyzing its impact on firm performance. Our results from the PLS-SEM model show a positive impact of ICD on MAC and an insignificant impact on ROA. This positive influence is attributed to the reporting of RC and SC, which informs the investors about its inimitable and non-substitutable intangible assets, leading to a competitive advantage. However, HCD negatively influences firm performance as HC leaves the company when employees leave. This result has several implications. It informs the corporate managers that while RC and SC information can be reported in the annual reports to improve firm performance, reporting HC information may have a negative impact on profitability as it informs the competitors about its competitive advantage. Hence, the company should avoid reporting sensitive information about this capital. The findings also signify that firms should strategically decide which IC information to report in annual reports without blindly focusing on transparency such that its value increases without losing competitive advantage.

This study is unique in several ways. Firstly, it employs a new and detailed disclosure framework to measure the ICD in the annual reports, synthesizing the previous disclosure indices and covering the entire IC domain without any error of principle (commission or omission). Secondly, the novelty lies in analyzing the relationship between ICD and firm performance. While we could trace only three studies on this relationship, those studies cannot be compared with IC performance due to a different classification of IC components. Our disclosure framework aligns with the classification used for IC performance and facilitates the comparison of ICD with IC performance. Thirdly, it uses a new methodology to analyze the relationship. While PLS-SEM is relatively new in accounting literature, the software used, i.e. SmartPLS4 by Ringle et al. (2022), is of recent origin and facilitates weighting the components based on their contributions to the relationships.

The study has limitations. The period is limited to 2020 due to the impact of the COVID-19 pandemic, which disrupted the market. Further, as the content analysis is time-consuming, the study covers only six industries. Hence, future studies can consider other industries and make a cross-industry comparison to further understand the relationship in the Indian context and at the global level.

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