

Print ISSN: 2671-4981 / Online ISSN: 2671-499X  
doi:10.13106/jbees.2019.vol9.no2.5

# Intellectual Capital and Corporate Sustainable Growth: The Indian Evidence

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Received: February 09, 2019. Revised: February 27, 2019. Accepted: April 05, 2019.

## Abstract

**Purpose** - The present study endeavours to investigate the impact of intellectual capital (IC) and its components on corporate sustainable growth in India. In addition, this study aims to find out the most influential component of IC on corporate sustainable growth in India.

**Research design, data, and methodology** - A sample size of top 139 NSE listed non-financial companies over a time period of five years has been used in this monograph. The impact of intellectual capital and its components on corporate sustainable growth has been examined using the longitudinal data analysis technique.

**Results** - The findings of this study bring to light that intellectual capital (IC) as measured by the M-VAIC model demonstrates a significant impact on corporate sustainable growth. Considerably, the results also reveal that almost all the explanatory variables viz. Physical Capital, Relational Capital, Innovation Capital, and Process Capital exercise notable influence in explaining corporate sustainable growth. Moreover, the results demonstrate Innovation Capital (controlling the effect of Physical Capital) represents the most influential component of IC on corporate sustainable growth.

**Conclusions** - The research findings show that in the Indian context, both physical capital, and IC (overall), as well as its components, play a crucial role to explain corporate sustainable growth.

**Keywords:** Intellectual Capital, Components of IC, Corporate Sustainable Growth, Control Variables, Longitudinal Data Analysis, India.

**JEL Classification:** G30, G32.

## 1. Introduction

"Knowledge is the only significant factor of production that is pre-eminent to land, labor, and capital."

~ Peter F Drucker

The transition of the global economy from manufacturing-based to the knowledge-based economy leads to a pioneering business paradigm. In the current era of the knowledge-based economy, the importance of Intellectual Capital (IC) is constantly increasing. Intellectual Capital (IC) represents a group of imperative strategic assets, indispensable for enterprises' growth and ultimate success. In modern days, enterprises consider intellectual Capital (IC) to be the most imperative asset and a strategic weapon for competitiveness. Ding and Li (2010) believes that intellectual resources are indispensable for enterprises to stay

competitive in today's highly dynamic business environment. It enables enterprises to produce sustainable value (Kristandl & Bontis, 2007) and, thus, ensures their long-term sustainability (Edvinsson, 1997).

On the other hand, at present, 'sustainable growth' is the most pressing global issue. The increasing concern about sustainability these days has shifted focus from the model of economic growth to the emerging model of sustainable growth. Gradually, this is becoming an integral part of the agenda of the corporate world too. In today's highly dynamic and competitive world, a mere maximizing of growth would not fetch up the valuable and desired wealth maximization (Ramezani, Soenen, & Jung, 2001). As empirical evidence suggests, value creation maximizes around sustainable growth rate of an organization and decreases sharply, once actual growth exceeds sustainable growth rate (Ataunal, Gürbüz, & Aybars, 2016). Thus, realizing the same, corporations, these days, are increasingly pushing for sustainable growth and integrating the same into their long-term strategic plan. Despite the emerging orientation of corporate growth, the legitimate question of how to achieve

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sustainable growth remains a profound mystery for corporate managers, to date.

Edvinsson (1997) and Chen, Cheng, and Hwang (2005) believe intellectual capital (IC) is crucial for corporate sustainability because it offers enterprises a potential source of sustainable competitive advantage (García de Leaniz & Rodríguez-del-Bosque, 2013) and assists them to attain sustainable growth and competitive lead (Ali & Ali, 2012). Prior study indicates that in emerging economies, intellectual capital and its components act as a key driver of corporate sustainable growth (Xu & Wang, 2018). If so, do IC and its components serve as a catalyst for corporate sustainable growth in India too?

In this comprehensive framework, the present study aims to investigate the impact of intellectual capital and its components on corporate sustainable growth in India. In addition, this study aims to find out the most influential component of IC on corporate sustainable growth in India. In doing so, this study adds several novelties to the extant literature. First, this study provides evidence of the impact of intellectual capital and its components on corporate sustainable growth in India for the first time. Second, the present study introduces the modified/extended version of *VAIC<sup>tm</sup>* into the research model with the intent to provide further insight into the role of IC in corporate sustainable growth. Third, the present study can help Indian corporate managers in understanding the role of IC and its components in establishing a sustainable advantage for companies. Lastly, in today's vibrant and competitive business world managing, corporate growth is a big confrontation for corporate managers, especially in developing countries. To such a degree, this study can help Indian corporate managers in managing the firm's growth and its policies effectively for future benefits.

In accordance with the core objective, the rest of this paper is organized as follows: Second section deals with Literature Review and Hypothesis development. The subsequent section delineates the Research Methodology. Then, Results and Discussions are presented, and the last section concludes the paper.

## 2. Literature Review and Hypothesis Development

### 2.1. Intellectual Capital and Its Components

It is difficult to present a generally accepted definition of IC and even more complicated to propose a commonly adopted typology for it because this concept is still in its emerging phase of development (Mehralian, Rasekh, Akhavan, & Sadeh, 2012). In common parlance, IC represents a storehouse of potential intangible resources that enable an organization to expand profitably. It is the most valuable strategic asset that contributes to a company's

future worth (Smriti & Das, 2017). Kristandl and Bontis (2007) define IC as "a portfolio of strategic firm resources that enables an organization to produce sustainable value." While Bontis (1999) believes that IC is an organizational knowledge and skill which creates a competitive edge for an organization, in sum, intellectual capital represents the collection of knowledge, experience, information, and intellectual property that can be used by a company to generate future benefits (Stewart, 1997).

However, regarding the components of intellectual capital, it is believed that there is no universal classification of the same (Kozak, 2011; Yildiz et al., 2014). Several researchers (Stewart, 1997; Bontis, 1998; Chen, Zhu, & Xie, 2004; Rudez & Mihalic, 2007; Li, Chen, Lui, & Chu, 2016; Orugun & Aduku, 2017) claimed that intellectual capital is comprised of three components - Human Capital, Customer Capital and Structural Capital. While Swart (2005) believed that besides the aforementioned components, Social Capital is also one of the crucial components of IC, Ramezan (2011) extended the view and identified Technological Capital as another crucial component. Khalique, Shaari, Isa, and Ageel (2011) and Hashim, Osman, and Alhabshi (2015) supported the view and introduced Spiritual Capital to the existing catalogue of IC components. Nevertheless, predominantly, the ultimate framework of IC is principally based on three components, namely, Human Capital, Customer Capital, and Structural Capital.

### 2.2. Corporate Sustainable Growth

The term "Sustainable Growth" has a multidisciplinary use and meaning. However, from a financial perspective, sustainable growth implies "an affordable growth that can be sustained profitably for future benefits." The concept of corporate sustainable growth became popularized with the remarkable study of Higgins in the year 1977, where he first proposed the use of sustainable growth rate model in explaining the practical limit for growing firms. The concept of sustainable growth rate elucidates, "what sales growth is consistent with the realities of the company and of the financial marketplace" (Van Horne & Wachowicz, 2015). To be more specific, sustainable growth rate seeks to explain "the utmost annualized growths in the percentage of sales a firm can afford without issuing any further (i.e. new) equity or, altering its financial policies."

### 2.3. Intellectual Capital (IC) and Corporate Sustainable Growth

As stated earlier, IC is essential for sustainability (Chen et al., 2005; Bismat & Tojo, 2008; Smriti & Das, 2017). Ali and Ali (2012) asserted that IC is a foundation of sustainable growth and competitive lead. A numerous number of prior studies (Bontis, 1998, 2000; Pulic, 2000; Li & Wu, 2004; Rudez & Mihalic, 2007; Makki & Lodhi, 2008; Kamath, 2008; Wang, 2008; Ghosh & Mondal, 2009; Ting & Lean, 2009;

Sharabati, Jawad, & Bontis, 2010; Zeghal & Maaloul, 2010; Ahangar, 2011; Basuki & Kusumawardhani, 2012; Ekwe, 2012; Rehman, Rehman, Usman, & Asghar, 2012; Sumedrea, 2013; Aji & Kurniasih, 2015; Arifin, 2016; Mondal, 2016; Nassar, 2018) have confirmed that the firms having higher IC efficiency perform better. On the other hand, few researchers (Firer & Williams, 2003; Shiu, 2006; Tan, Plowman, Hancock, 2007; Maditinos, Chatzoudes, Tsairidis, & Theriou, 2011; Mehralian et al., 2012; Dženopoljac, Janošević, & Bontis, 2016; Avci & Nassar, 2017) found a negative relationship or no relationship between IC and firm's performance.

However, from a corporate sustainable growth perspective, Xu and Wang (2018), found that the impact of IC (overall) on corporate sustainable growth is significant and positive. Thus, we hypothesize:

**H<sub>1</sub>** : Overall IC efficiency must have a positive impact on attaining corporate sustainable growth.

#### 2.4. Physical Capital and Corporate Sustainable Growth

Pulic (2004) asserts that it is crucial to consider financial and physical resources into account to gain a broad picture of the efficiency of value creating resources. Prior evidence (Firer & Williams, 2003; Najibullah, 2005; Gan & Saleh, 2008; Chan, 2009b; Yu, Ng, Wong, Chu, & Chan, 2010; Calisir, Gumussoy, Bayraktaroglu, & Deniz, 2010; Chu, Chan, & Wu, 2011; Clarke, Seng, & Whiting, 2011; Dadashinasab, Sofian, Asgari, & Abbasi, 2012; Basuki & Kusumawardhani, 2012; Xu & Wang, 2018) suggests physical capital has a strong positive linkage with the firm's performance. However, a few believe (Chan, 2009; Ahangar, 2011; Nassar, 2018) physical capital has negative or no relationship with the firm's performance.

Nevertheless, as regards corporate sustainable growth, empirical evidence (Xu & Wang, 2018) suggests physical capital exercises a significant positive influence on corporate sustainable growth. Thus, we hypothesize:

**H<sub>2</sub>** : Capital Employed Efficiency (CEE) must have a positive impact on attaining corporate sustainable growth.

#### 2.5. Human Capital (HC) and Corporate Sustainable Growth

Human Capital (HC) is the most crucial dimension in IC since it becomes the source of all innovations and strategic renewal within the organization (Bontis, 1999). Human Capital (HC) represents the competencies, tacit experiences and overall knowledge-base of individuals in an organization (Bontis & Serenko, 2009). While Lynn (1998) argues that HC is the raw intelligence, skills, and expertise of the human actors in the organization, prior empirical evidence

(Chen, Lin, & Chang, 2006; Zhang, Nai-Ping, & Yu-Sheng, 2006; Calisir et al., 2010; Khaliq et al., 2011; Clarke et al., 2011; Fatoki, 2011; Maditinos et al., 2011; Basuki & Kusumawardhani, 2012; Sumedrea, 2013; Orugan & Aduku, 2017; Nassar, 2018) suggests that the firms with higher human capital efficiency displayed a superior financial or overall business performance. In other words, the efficient utilization of human capital brings in superior financial or overall business performance. On the contrary, few researchers (Tseng & Goo, 2005; Yu et al., 2010) found that HCE has a negative influence on the firm's performance. However, in terms of revenue growth, Chen et al. (2006) and Diez, Ochoa, Prieto, and Santidrian (2010) found a significant positive impact of HCE on the firm's revenue growth. Acknowledging the same, Xu and Wang (2018) claimed that HCE significantly influences corporate sustainable growth. Thus, we hypothesize:

**H<sub>3</sub>** : Human Capital Efficiency (HCE) must have a positive impact on attaining corporate sustainable growth.

#### 2.6. Relational/Customer Capital (RC) and Corporate Sustainable Growth

Relational capital (RC) means external links with suppliers and customers of the organization, which allows it to buy and sell goods and services in an efficient and effective manner (Sumedrea, 2013). To be more specific, it represents the ability of an organization to interact with its potential external stakeholders. Marti (2001) argues that relational capital represents the ability of an organization to interact positively with business community members to motivate the potential for wealth creation by enhancing human and structural capital. Prior evidence (Tseng & Goo, 2005; Fatoki, 2011; Khaliq et al., 2011; Basuki & Kusumawardhani, 2012; Hashim et al., 2015; Orugan & Aduku, 2017; Xu & Wang, 2018) suggests relational capital has a positive influence on the firm's financial or business performance. Moreover, the study of Xu and Wang (2018) reveal relational capital exercises a significant positive influence on corporate sustainable growth as well. Thus, we hypothesize:

**H<sub>4</sub>** : Relational Capital Efficiency (RCE) must have a positive impact on attaining corporate sustainable growth.

#### 2.7. Innovation Capital (InC) and Corporate Sustainable Growth

Innovation capital (InC) refers to the ability of the company to innovate in terms of new products, technology and distributive channels (Nadeem, 2016). According to Lumpkin and Dess (1996), innovation capital represents "the tendency of a firm to engage in and support new ideas, novelty, experimentation and creative processes that may

result in new products, services or technological processes.” Sullivan (1998) believes innovation capital is the core component of IC that provides a competitive advantage and brings in success for organizations (Tohidi & Jabbari, 2012). Prior researches (Chen et al., 2005; Tseng & Goo, 2005; Basuki & Kusumawardhani, 2012) acknowledged the same and claimed that innovation capital plays a significant role in uplifting financial or business performance. On the contrary, Xu and Wang (2018) believe that R&D expenditures curtail down current profits and results in contemporaneous and inferior financial performance.

Nevertheless, in today’s cut-throat competitive business world, innovation capital is an important factor of sustainable growth for organizations (Kwan & Chiu, 2015). Thus, we hypothesize:

**H<sub>5</sub>** : Innovation Capital Efficiency (InCE) must have a positive impact on attaining corporate sustainable growth.

### 2.8. Process Capital (PC) and Corporate Sustainable Growth

Process capital is the capability a firm develops to generate lasting value with investments in process management (Shang & Liao, 2006). Empirical evidence (Basuki & Kusumawardhani, 2012) suggests that process capital efficiency (PCE) exercises a significant positive influence on a firm’s profitability.

Likewise, it is expected, process capital efficiency would display a significant positive association with corporate sustainable growth as well. Thus, we hypothesize:

**H<sub>6</sub>** : Process Capital Efficiency (PCE) must have a positive impact on attaining corporate sustainable growth.

## 3. Research Methodology

### 3.1. Database

Primarily, a sample of top 200 NSE listed companies has been drawn out of the target population based on their market capitalization. The above selection has been made in an anticipation of capturing the view of best blue-chip companies along with the mid-cap companies in India. Of the selected sample, 139 non-financial companies have been considered as an ultimate sample size on the basis of purposive sampling. Banks and other financial companies, due to their divergent nature of the operation and capital structure, have been left out of the ultimate sample size. In addition, a few non-financial companies, due to unavailability of data or of encountering an improper financial year, failed to be the part of ultimate sample size. The required financial data of the selected companies have been collected exclusively from Capitaline Database over a time period of

five years, i.e., from 2011-12 to 2015-16. The present study has been conducted based on the consistently arranged data as per financial years.

### 3.2. Research Variables

- 1) Dependent Variable – Corporate Sustainable Growth is the dependent variable in the present study. There are a number of ways through which we can measure corporate sustainable growth. However, amongst those, Sustainable Growth Rate (SGR) Model of Van Horne and Higgins is widely accepted and used in the prior studies (Xu & Wang, 2018). In the current study, we have used Van Horne’s SGR model as there is no significant difference between these two models (Fonseka, Ramos, & Tian, 2012).

$$\text{Sustainable Growth Rate (SGR)} = \frac{b \left( \frac{NP}{Eq} \right)}{1 - \left[ b \left( \frac{NP}{Eq} \right) \right]}$$

[Van Horne & Wachowicz (2015, p.192)]

Or,

$$= \frac{ROEXb}{1 - (ROEXb)}$$

[Ross et al. (2012, pp.104-106)]

Where, ROE (Return on Equity) =  $\frac{\text{Net Profit}}{\text{Total Equity}}$

$$b \text{ (Retention Ratio)} = \frac{PAT - \text{Current Year Dividend}}{PAT}$$

- 2) Independent Variables – In the present study, M-VAIC (i.e. proxy of IC) and its modified/extended five components – CEE, HCE, RCE, InCE, and PCE - are used as independent variables. M-VAIC model is an extended version of Pulic’s (1998) *VAIC<sup>TM</sup>* model, developed by Nazari and Harremans (2007). This model was built based on the foundation laid in the scheme of Skandia Navigator. It is believed that M-VAIC model provides further insight into the role of IC in organizational performance (Nazari & Harremans, 2007; Basuki & Kusumawardhani, 2012; Kamath, 2017). Thus, with the intent to capture the impact of IC and its components more precisely on corporate sustainable growth, we have used Nazari’s and Harremans’s (2007) M-VAIC model in this study. The procedure of calculating M-VAIC and its components is outlined below:

Step 1. At the outset, VA is to be calculated  
 VA = OP + D + A + C (Chu et al., 2011; Nikmah & Irsyahma, 2016; Mondal, 2016; Kamath, 2017; Xu & Wang, 2018) ..... (1) Eq.

Where VA is the net value added by a particular firm during t period; OP is Operating Profit during t period; D is Depreciation written off during t period; A is Amortization written off during t period; C is Employee Benefit Expenses during t period

Step 2. Calculate CEE

$$CEE = VA / CE \dots\dots\dots (2) \text{ Eq.}$$

Where CEE is Capital Employed Efficiency; CE is Capital Employed by a particular firm at the end of t period (i.e. Total Assets minus Current Liabilities)

Step 3. Calculate HCE

$$HCE = VA / C \dots\dots\dots (3) \text{ Eq.}$$

Where HCE is Human Capital Efficiency; C is Employee Benefit Expenses during t period

Step 4. Calculate RCE

$$RCE = M\&S / VA \dots\dots\dots (4) \text{ Eq.}$$

Where RCE is Relational or, Customer Capital Efficiency; M & S is Marketing and Selling Expenses during t period

Step 5. Calculate InCE

$$\text{InCE} = \text{R\&D} / \text{VA} \dots\dots\dots (5) \text{ Eq.}$$

Where, InCE is Innovation Capital Efficiency; R&D is Research and Development Expenses during t period

Step 6. Calculate PCE

$$PCE = SCE - RCE - \text{InCE} \dots\dots\dots (6) \text{ Eq.}$$

Where PCE is Process Capital Efficiency; SCE is the Structural Capital Efficiency (i.e. SC / VA; where SC = VA – C)

Step 7. Calculate M-VAIC

$$\text{M-VAIC} = \text{CEE} + \text{HCE} + \text{RCE} + \text{InCE} + \text{PCE} \dots\dots (7) \text{ Eq.}$$

3) Control Variables – In the present study, Leverage (LEV), as measured by debt to equity ratio, Firm's Size (FS), measured as the natural logarithm of firm's total assets during period t, and Age of the firm (AGE), measured as number of completed financial years during period t from the date of Incorporation, are considered as control variables. The selection of the above control variables [except Age of the firm (AGE)] are in line with the previous study conducted by Xu and Wang (2018). Furthermore, Age of the firm has been controlled in this study on the assumption that it may exhibit a positive relationship with corporate sustainable growth because of the learning and experience curve effect. Learning and experience curve effect enables firms to enjoy economies of scale and brings in cost competitive advantage.

### 3.3. Research Method

This study applies two regression models. Model 1 examines the overall impact of intellectual capital (IC) efficiency on corporate sustainable growth after controlling the profound effect of Leverage (LEV), Firm's Size (FS), and Age of the firm (AGE). Model 2 examines the impact of the IC components viz. Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), Relational Capital Efficiency (RCE), Innovation Capital Efficiency (InCE), and Process Capital Efficiency (PCE) on corporate sustainable growth after controlling the profound effect of Leverage (LEV), Firm's Size (FS), and Age of the firm (AGE).

The models are represented as follows:

$$CSG_{it} = \beta_1 + \beta_2 MVAIC_{it} + \beta_3 LEV_{it} + \beta_4 FS_{it} + \beta_5 AGE_{it} + \mu_{it}$$

Model (1)

$$CSG_{it} = \beta_1 + \beta_2 CEE_{it} + \beta_3 HCE_{it} + \beta_4 RCE_{it} + \beta_5 InCE_{it}$$

$$+ \beta_6 PCE_{it} + \beta_7 LEV_{it} + \beta_8 FS_{it} + \beta_9 AGE_{it} + \mu_{it}$$

Model (2)

Where i (i.e. company) = 1, 2, 3, 4, 5.....139 and t (i.e. time) = 1, 2, 3, 4, 5.

This study consists of 139 companies, and the period is 5 years. Since this study has the characteristic of both cross-sectional and time-series, longitudinal / panel data analysis has to be employed. For the empirical analysis, three options are available:

(i) Pooled OLS model; (ii) The fixed effects least squares dummy variable (LSDV) model; (iii) The random effects model (REM)

Now, to select the appropriate model from the above, the following steps have been considered:

Step 1: Selection between Model (i) and Model (iii): Breusch Pagan Test LM Test

The null hypothesis in the Breusch Pagan Test LM Test represents, the variance across entities is Zero. This highlights that there are no random/panel effects. Now, if the computed value of LM is insignificant, then  $H_0$  will be accepted, and the pooled OLS regression model should be applied. But if the computed value of LM is significant, then  $H_0$  will be rejected, and there will be random effects.

Step 2: Selection of fixed effects or random effects: Hausman Test

To decide between fixed or random effects, we have to run a Hausman Test, where, the null hypothesis represents there are no fixed effects. Now, if the H statistics is significant, then  $H_0$  is rejected, and fixed effect model is retained and vice-versa.

### 4. Results and Discussions

Table 1 presents descriptive statistics of the selected variables employed in this study. The mean value of CSG is 0.096, indicating that on an average, Indian non-financial companies have a low sustainable growth capability. The mean value of M-VAIC is 8.224 with a maximum of 151.446 and a minimum of -23.242. The negative M-VAIC value suggest that the investments in processing IC are comparatively on a higher note than its contribution in the process of firm's value creation. The mean value of HCE, i.e., 7.165, is higher as compared to the other components of IC, which suggests amongst the IC components that HCE is the driving force of value creation. It is worth noting that out of the IC components, the mean value of InCE is at the low level, i.e., -0.025, which suggest InCE fails to contribute in process of firm's value creation. The mean value of LEV is 0.515, which indicates that the Indian non-financial companies have a low-gearred capital structure. In addition, the mean values of FS and AGE are 9.116 and 41.122, which indicate that on an average, the Indian non-financial companies are well-established matured companies.

**Table 1:** Descriptive Statistics

Statistic	No. of obs.	Min.	Max.	Mean	Std. Dev.
CSG	695	-12.852	2.269	0.096	0.574
M-VAIC	695	-23.242	151.446	8.224	12.940
CCE	695	-11.991	4.473	0.351	0.591
HCE	695	-23.888	150.346	7.165	12.834
RCE	695	-1.987	13.855	0.210	0.586
InCE	695	-64.625	14.609	-0.025	2.527
PCE	695	-31.028	81.132	0.523	3.390
LEV	695	-24.318	79.973	0.515	3.393
FS	695	1.332	13.005	9.116	1.448
AGE	695	2.000	167.000	41.122	26.248

Source: Author's own tabulation using XL STAT software

Table 2 presents Pearson's correlation analysis, which highlights the relationship between the dependent variable and explanatory variables employed in this study. The correlation shows that CSG is positively correlated with M-VAIC, CCE, HCE, InCE, FS, and AGE. However, CSG is negatively linked with RCE, PCE, and LEV. Further, the result demonstrates that the correlation amongst all the explanatory variables is minimal, i.e., below 0.80. This offer evidence that no multi-co linearity problem exists amongst the explanatory variables employed in the present study.

**Table 2:** Correlation Matrix (Pearson)

Variables	CSG	M-VAIC	CCE	HCE	RCE	InCE	PCE	LEV	FS	AGE
CSG	1									
M-VAIC	0.077	1								
CCE	0.721	0.000	1							
HCE	0.037	0.997	-0.041	1						
RCE	-0.169	-0.133	0.021	-0.087	1					
InCE	0.079	-0.035	0.052	0.010	0.010	1				
PCE	-0.004	0.094	-0.060	0.033	-0.364	-0.929	1			
LEV	-0.027	-0.047	-0.071	-0.049	-0.077	-0.014	0.042	1		
FS	0.075	0.118	-0.141	0.127	-0.070	0.074	-0.050	0.059	1	
AGE	0.059	-0.176	0.053	-0.177	0.047	0.033	-0.042	-0.017	0.169	1

Source: Author's own tabulation using XL STAT software.

**Table 3:** Breusch and Pagan Lagrangian multiplier test for random effects

	Model 1		Model 2	
	Var	sd = sqrt(Var)	Var	sd = sqrt(Var)
CSG	0.3300	0.5745	0.3300	0.5745
e	0.2938	0.5420	0.0888	0.2980
u	0.0244	0.1563	0	0
chibar2(01)	5.28*		0.00	

Notes: p<0.05\*\*, p<0.01\*

Source: Author's own tabulation using STATA software.

**Table 4:** Hausman Test

	Model 1				Model 2			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E
M-VAIC					0.01370	0.0040	0.0096	0.0035
LEV					-0.0020	-0.0046	0.0025	0.0040
FS					0.3510	0.0267	0.3244	0.0750
AGE					-0.0239	0.0014	-0.0253	0.0171
chi2(4)								

Notes: p<0.05\*\*, p<0.01\*

Source: Author's own tabulation using STATA software.

Table 3 presents the results of Breusch and Pagan Lagrangian multiplier test (BP test) for Model 1 and Model 2. This test assists to determine which model amongst the Pooled OLS and REM represent the best-fitted model for the models developed. The result for Model 1 shows that the LM statistic is 5.28 and is significant at 1% level. Accordingly,  $H_0$  is rejected and the result of REM (as shown in Table 5) could be accepted for Model 1. However, there is a need to run FEM and carry conduct further tests. On the other hand, the result for Model 2 shows that the LM statistic is 0.00 and is insignificant. Accordingly, we failed to reject  $H_0$ , and the result of Pooled OLS Model (as shown in Table 5) is to be considered a good fit for Model 2 since there are no sign of random effects in the said model.

Table 4 presents the result of Hausman Test for Model 2. This test enables researchers to determine whether to keep FEM or REM as a preferred model for the models developed. The result for Model 2 shows  $\chi^2(4)$  is 25.64 and is significant at 1% level. Accordingly,  $H_0$  is rejected, and it can be asserted that the FEM is the best-fitted model for the underlying model as developed.

Table 5 presents the regression results of the two underlying models employed in this study. In Model 1, the coefficient of M-VAIC is positive and significant ( $\beta = 0.01370$ ;  $t = 3.45$ ), suggesting that the firms having higher IC (overall efficiency are more competent to attain sustainable growth. Thus, this result is consistent with the findings of Xu and Wang (2018).

In Model 2, the first explanatory variable, Capital Employed Efficiency (CEE), demonstrates a significant positive influence on corporate sustainable growth. Thus, this result is consistent with the findings of Xu and Wang (2018). Furthermore, the results demonstrate that CEE has a greater explanatory power than those of the other explanatory variables, shown by its larger coefficient value (0.7326). This suggests, in the Indian context, that physical capital is the key driver of corporate sustainable growth. In contrast, Human Capital Efficiency (HCE) is proven not to be significantly influential over corporate sustainable growth. This result contradicts the finding of Xu and Wang (2018), who stated that human capital contributes significantly to corporate sustainable growth. The logical reasoning behind this phenomenon is that the non-financial companies in India possibly dictate a trade-off between tangible assets and human capital in seeking to attain sustainable growth. While Relational Capital Efficiency (RCE) exhibits a significant positive association with corporate sustainable growth, it implies that an efficient management of marketing and selling expenditures makes a firm more competent to attain sustainable growth. This result is consistent with the findings of Xu and Wang (2018). Likewise, Innovation Capital Efficiency (InCE) as well demonstrates a significant positive influence on corporate sustainable growth. It implies that a continuous and well-planned allocation of funds in research & development activities is a pre-requisite for the firms to

attain corporate sustainable growth. This result is consistent with the findings of Basuki and Kusumawardhani (2012) yet contradicts the research by Xu and Wang (2018) that fails to explore any significant linkage between InCE and corporate sustainable growth. Moreover, it's worth noting, controlling the effect of physical capital, InCE has a greater explanatory power than those of the other IC components, shown by its larger coefficient value (0.2557). This suggests that amongst the components of IC, innovation capital is the most influential component on corporate sustainable growth in India. The last explanatory variable, Process Capital Efficiency (PCE), also exhibits a significant positive influence on corporate sustainable growth in India. It implies that an efficient management of process capital makes the firms more competent to attain sustainable growth. This result is consistent with the findings of Basuki and Kusumawardhani (2012).

**Table 5:** Regression Results

Variables	Model 1		Model 2	
	REM	FEM	REM	OLS
Constant	-0.2366 (-1.5)	-2.2352* (-3.26)	-0.9394* (-9.26)	-0.9394* (-9.26)
M-VAIC	0.0041** (2.14)	0.0137* (3.45)		
CCE			0.7326* (30.62)	0.7326* (30.62)
HCE			0.0007 (0.66)	0.0007 (0.66)
RCE			0.2433* (2.93)	0.2433* (2.93)
InCE			0.2557* (5.27)	0.2557* (5.27)
PCE			0.2008* (5.16)	0.2008* (5.16)
LEV	-0.0046 (-0.70)	-0.0020 (-0.27)	0.0002 (0.04)	0.0002 (0.04)
FS	0.0267 (1.53)	(4.55)	(6.83)	(6.83)
AGE	0.0014 (1.44)	-0.0239 (-1.39)	-0.0001 (-0.25)	-0.0001 (-0.25)
$R^2$	0.0147	0.0003	0.5989	0.5989
Adj. $R^2$				0.5942
F		8.32*		128.03*
Wald $\chi^2$	10.57**		1024.21*	
N	695	695	695	695

Notes:  $p < 0.05^{**}$ ,  $p < 0.01^*$ , Figures in the parenthesis represents t-value or z-value (REM)

Source: Author's own tabulation using STATA software

In sum, the findings suggest that besides physical capital, IC and its components -innovation capital, relational capital and, process capital – contribute significantly to corporate sustainable growth in India. In addition, it's worth noting that  $R^2$  value (0.5989) in Model 2 is higher as compared to the  $R^2$  value of Model 1 (0.0003), suggesting that individual

components of IC contributes immensely towards corporate sustainable growth than IC as a whole. This result is also consistent with the findings of Xu and Wang (2018). In terms of control variables, both Model 1 and Model 2 exhibit that the firm's size (FS) has a notable positive influence on corporate sustainable growth. This result is consistent with the findings of Xu and Wang (2018), suggesting that the bigger and resourceful firms are, the more capable they are to attain sustainable growth than the smaller and mid-cap firms. However, we failed to find any significant association of leverage (LEV) and firm's age with corporate sustainable growth.

## 5. Conclusion

The present study aimed to investigate the impact of intellectual capital and its components on corporate sustainable growth in India. In addition, this study aimed to find out the most influential component of IC on corporate sustainable growth in India. The findings of this study bring to light that intellectual capital (IC) as measured by M-VAIC model demonstrates a significant positive impact on corporate sustainable growth. Considerably, the results also reveal that almost all the explanatory variables - Physical Capital, Relational Capital (RC), Innovation Capital (InC), and Process Capital (PC) – exercise positive influence in explaining sustainable growth of the non-financial companies. However, no significant linkage could be established between the Human Capital (HC) and Corporate Sustainable Growth. Moreover, the findings of this study demonstrate that Physical Capital as well as the Innovation Capital (after controlling the effect of physical capital) exhibits a strong positive influence on corporate sustainable growth.

The research findings offer evidence that in the Indian context, both Physical Capital, and IC (overall), as well as its components, play a crucial role in the way to corporate sustainable growth. Additionally, Physical Capital is found to be the key driver of corporate sustainable growth in India. However, it is worth noting that amongst the components of IC, Innovation Capital (controlling the effect of physical capital) represents the most influential factor in corporate sustainable growth of India. Putting the results together, it can, therefore, be asserted that IC and its components, indeed, serve as a catalyst for corporate sustainable growth in India.

This study contributes to the extant literature on intellectual capital and corporate sustainable growth by revealing the impact of intellectual capital and its components on corporate sustainable growth in India. Further, as demonstrated, in the Indian context IC and its components play a crucial role to explain corporate sustainable growth besides physical capital; therefore, this study would be valuable for Indian corporate managers in justifying their investments in IC resources. Additionally, as

stated earlier, in today's vibrant and competitive business world, managing, corporate growth is a big confrontation for corporate managers, especially in developing countries. To such a degree, this study provides Indian corporate managers a mantra that if IC resources are employed and utilized efficiently, the firm's growth and its policies can be managed effectively for future benefits.

This study present sample scope of future research for the academicians, economists, corporate managers, and scholars as well. The present study can be further extended by taking into consideration the other models of IC and Corporate sustainable growth or by expanding the sample size, the period of the study, and the control variables. Additionally, further studies can be carried out to investigate the relationship between Corporate Sustainable Growth and other dimensions such as Green Accounting, Forensic Accounting, Earning Management, Dividend policy, and Country's political state of affairs, Inflation, and Tax Policy, among others.

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