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Nexus between intellectual capital and business performance: evidence from India

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Abstract

Purpose – The prime intention of this study is to examine the influence of intellectual capital (IC) on the financial performance of Indian companies listed on Standard and Poor Bombay Stock Exchange Sensitive Index (BSE SENSEX).

Design/methodology/approach – The study employs the data of 30 most significant and most prominent companies of India listed on BSE SENSEX for 10 years from 2009–2010 to 2018–2019. Value Added Intellectual Coefficient (VAIC^{TM}) methodology developed by Pulic (2000) was employed for measuring the efficiency of the IC.

Findings – The efficiency of IC is substantially and positively associated with the financial performance of the Indian companies as measured by return on assets (ROA), market-to-book (MB) ratio and return on equity (ROE). Amongst the three dimensions of VAIC, capital employed efficiency (CEE) was the most vital element in contributing to the firm financial performance, followed by human capital efficiency (HCE). Structural capital efficiency (SCE) only helps in enhancing the ROA of Indian firms.

Research limitations/implications – The study results are only restricted to the 30 companies of India listed on S&P BSE SENSEX Index. Thus generalization of the result needs especial caution.

Originality/value – The study fills the void in the current literature of IC and business performance and extends the understanding of their relationship by providing empirical evidence.

Keywords VAIC, Capital employed efficiency, Human capital efficiency, Structural capital efficiency, Financial performance, Intellectual capital

Paper type Research paper

1. Introduction

In the era of production, physical assets used to be the main factors of production, but with the advancement in the technology, the main factors of production shifted from tangible assets to the intangible assets. These intangible assets include the employee's competency and experience, their problem-solving ability, research and development (R&D), systems and databases, relation with the various stakeholders, etc. It is known as intellectual capital (IC). It does not appear on the conventional financial statement, but it is extravagant for the firms' performance (Akpinar and Akdemir, 1996). The organisation can easily accomplish a competitive advantage through the effective leveraging of their IC (Bismuth and Tojo, 2008;

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Chen *et al.*, 2005). In other words, if an organisation wants to flourish in the contemporaneous technological era, then the knowledge and experience of its employees should be focussed along with their infrastructure and relationship with various stakeholders. IC and knowledge management plays a paramount role in the business organisation of today's globalised world (Wiig, 1997).

An IC is a useful tool in escalating the future growth of the company. However, the conventional financial statement failed to record the bulk of these IC, because employees' knowledge and skill, expertise and innovation, relation with the stakeholders, systems and databases, etc. are very tough to quantify. In addition, the traditional accounting reporting system records mainly tangible assets, while it ignores the majority of the intangible assets, except for goodwill, concessions, licences, etc., which contributes substantially in the production and value creation of an organisation. Also, some researchers believe that the evaluation of the real financial performance of the organisation cannot be possible with conventional measures of business performance (Bontis, 2001; Edvinsson and Malone, 1997; Sveiby, 2001). Therefore, it tempted the academicians and researchers to develop new tools and techniques for measuring the firm's IC so that a rational decision can be taken by the stakeholders (Pulic, 1998). Given all these drawbacks and limitations of the traditional financial reporting system, Pulic (1998, 2000) proposed a model to measure these intangible assets, named Value Added Intellectual Coefficient^{TM} (VAIC^{TM}) model.

Many organisations in the developed countries now find it feasible to measure and report their IC as they now recognise its importance in the process of value creation to the firm. Howbeit, merely limited research studies have been conducted in this area in emerging economies like India. According to Smriti and Das (2018) and Vishnu and Gupta (2014), IC measurement and reporting are at the stage of infancy in the developing economy like India. Many previous studies (Al-Musali and Ku Ismail, 2016; Ghosh and Mondal, 2009; Kamath, 2008; Mehralian *et al.*, 2012; Pulic, 1998; Weqar *et al.*, 2021) had attempted to explore a liaison amidst the IC and corporate financial performance. The objective of the current study is to examine the link between the IC and its dimensions and firms' financial performance. The contemporary research extends the existing research by empirically examining the above link in the Indian context by taking a sample of 30 largest, financially sound and most actively traded stocks on the Bombay Stock Exchange (BSE) of India by applying the VAIC^{TM} model. The novelty of the study lies in its data set of 30 firms listed on BSE, as these 30 firms are associated with 19 different sectors of the Indian economy, thus giving a more accurate representation of the whole economy.

The study employed the fixed effect regression model for examining the effect of IC on the firm financial performance and found that IC plays a vital role in augmenting the performance of the Indian companies. The result also shows that human capital and physical capital are the most significant elements of VAIC for the improvement of firms' financial performance. The study results provide an insight to the managers that a good campaign should be organised within an organisation to create awareness about the importance of IC amongst their employees and managers. Moreover, the policymakers should give due consideration to an IC and its dimensions in their upcoming policies, and IC disclosure should be made mandatory for the company in their financial statement.

The remaining chunk of the paper is organised as follows: Section 2 gives an overview of S&P BSE SENSEX followed by the literature review, research objectives and hypotheses development in Section 3. Section 4 encompasses sample size, data collection, variables and their proxy measures, and regression models. Moreover, Section 5 shows the results of the analysis, which includes the descriptive statistics, correlation matrix and regression results. Further, discussion and contribution of the study are presented in Section 6 while the last section, i.e. Section 7 concludes the study.

2. S&P BSE SENSEX: an overview

Standard and Poor Bombay Stock Exchange Sensitive Index (S&P BSE SENSEX) is the first stock exchange of Asia. It is the gauge of the Indian market that measures the financial performance of the 30 largest and financially sound organisations (LLC, 2018). It is a bunch of 30 most-liquid and most actively traded companies (Exchange, 2020). In August 2018, the total market capitalisation was reported at a lifetime high at ₹15,656,944 crore (Sonavane and Sultana, 2018). The S&P BSE SENSEX represents nearly about 40% of the equity market in India in terms of total market capitalisation on 31 March 2018 (LLC, 2018). These 30 companies are the big giants, and the majority of them shows their presence in the international market.

3. Literature review

3.1 Understanding the term IC and its taxonomy

There are various terms which are used interchangeably for IC such as – intangible, intangible resources, intangible assets, knowledge assets, intangible goods (Bismuth and Tojo, 2008; Chen *et al.*, 2005). Many researchers and authors have given their definition, but still, there has been no universal definition of IC. According to Andriessen (2004), IC is the packaged useful knowledge. Peng, Pike and Roos (2007) opined that IC is the aggregate knowledge of its members and the practical translation of this knowledge into brands, trademarks and processes. Stewart (1997) believed IC as something that cannot be touched, although it slowly makes you rich.

Numerous authors and researchers have classified IC in two to five parts. However, the common IC taxonomy was given by Edvinsson and Malone (1997) into three dimensions as "human capital, internal (structural capital) and external (relational) capital". Another renowned classification of IC is given by Saint-Onge (1996) as "human capital, structural capital and customer capital".

Human capital (HC) is deliberated to be the utmost significant asset of intangible nature. It includes the knowledge and skill of an employee, their problem-solving abilities, their innovations and experiences, etc. HC is a mixture of genetic inheritance, education and experience, attitude and talent of an employee in an organisation (Weqar *et al.*, 2021). *Structural capital (SC)* is that fragment of IC which remains in the organisation when the employees go home. It acts as a support for the HC of the firm (Ghosh and Mondal, 2009). It involves non-physical components such as databases, organisation charts and systems, patents and models, processes, cultures, business strategies and data processes (Akpinar and Akdemir, 1996). *Customer capital (CC)/relational capital (RC)* includes the relationship of the organisation with the customers, shareholders, suppliers, government, financial institution and society (Roos and Roos, 1997). It acts as a link between the organisation and various stakeholders.

3.2 IC and financial performance

IC helps in attaining competitive edge and value addition to the enterprise, which directly and indirectly enhances its financial performance (Weqar *et al.*, 2020). Though, for the above purpose, physical and financial resources are also required (Pulic, 2000), as IC alone is reluctant to create value to the organisation. Pulic (2000) supported the view of Wernerfelt's (1984) resource-based (RB) theory that in order to attain competitive edge and value addition, all types of resources (tangible and non-tangible) are the prerequisites. By following the RB theory of Wernerfelt (1984), a significant link amid IC and firm performance are expected. The explored literature employed the VAIC^{TM} methodology to scrutinise the effect of IC on the organisations' financial performance. Nevertheless, some studies in the literature also used the primary survey to check the same.

For instance, Chen *et al.* (2005) founded that IC, human capital efficiency (HCE) and capital employed efficiency (CEE) are positively related to all the financial performance indicators of

the Taiwanese firms. Sardo *et al.* (2018) conducted a study on Portuguese small and medium enterprises (SMEs) hotels and showed that all three dimensions of IC are positively associated with its profitability. A noticeable study on the non-listed Italian companies was conducted by Ginesti *et al.* (2018) for examining the effect of IC on firms' reputation and financial performance. They proved that HC is positively associated with the reputation of the Italian firms, and the other two components are linked significantly with its financial performance.

The study conducted by Kamath (2008) had found that HC was the most significant element in the Indian pharmaceutical industry, and the firm performance was not affected by its IC. Ghosh and Mondal (2009) showed that IC has a significant positive effect on profitability and an insignificant impact on productivity and market valuation (market-to-book (MB) value) of the Indian software and pharmaceutical industry. Smriti and Das (2018) had conducted a study on 710 Indian listed firms and found that IC, structural capital efficiency (SCE) and CEE are positively associated with the majority of the financial performance indicator, while HCE only helps in boosting the firms' assets turnover (ATO).

A prominent study on South African firms by Firer and Williams (2003) showed that SCE is only significant for profitability, while CEE enhances its MB. Conversely, Kamath (2008) had found no substantial effect of HCE, SCE and CEE on the financial performance of the Indian pharmaceutical industry. Another critical study had been conducted by Mehralian *et al.* (2012) on Iranian pharmaceutical industry and reported that only CEE has a positive connection with return on assets (ROA), while the investors under-valued the firm having high VAIC. Using the sample of Bangladeshi textile firms, Afroz *et al.* (2018) concluded that HCE is insignificant for all the financial performance indicator while CEE showed a very high definite link with these indicators. Similarly, Bontis *et al.* (2015) proved that CEE plays a substantial role in augmenting the performance of the Serbian hotel industry than HC and SC.

Clarke *et al.* (2011) established a significant positive link of HCE and IC with the entire indicators of the financial performance of the Australian firms. A study on Serbian MNCs showed that HCE and CEE have a significant positive effect on its ROA, return on equity (ROE) and ATO (Komnenic and Pokrajčić, 2012). Using 5749 US commercial banks, Meles *et al.* (2016) demonstrated that HCE and IC are significantly and positively associated with return on average assets and return on average equity. Conversely, Dzenopoljac *et al.* (2017) and Xu and Liu (2020) reported that CEE is the most influential asset in enhancing the financial performance of the firms of Korea and the Kingdom of Saudi Arabia, respectively. Weqar and Haque (2020b) confirmed that IC plays a significant role in improving the profitability, productivity and market value of the Indian public sector companies.

Maditinos *et al.* (2011) conducted their study on 96 Greek companies and reported that SCE, CEE and VAIC have an inconsequential impact on MB, ROA, ROE and growth revenues (GR). However, only HCE shows a significant positive effect on MB and ROE. Conversely, Joshi *et al.* (2013) proved that CEE is the most significant element in enhancing the ROA of the Australian financial firms while HCE, SCE and VAIC are insignificant towards it. A study on banks of six Gulf Cooperation Council (GCC) countries was performed by Al-Musali and Ku Ismail (2016). They showed that VAIC positively influences their profitability (ROA and ROE). Likewise, Mohammed and Irbo (2018) concluded that VAIC and all its component help in improving ROA of the Ethiopian banks. Nadeem *et al.* (2019) had applied the adjusted-VAIC model in five developing and five developed nations of the globe and reported that HCE, innovation capital efficiency (INVCE) and CEE have a strong positive influence on firms' ROA and ROE of the majority of the nation.

The prevailing research on IC concludes that IC helps in enhancing and improving the financial performance of the business organisation by creating value-addition and achieving competitive advantage. However, this link needs to be validated in the different sectors of the various economies of the world, as the economic, social, technological, political and financial conditions differ from country-to-country. Moreover, the literature on IC is very limited in

India as it is still in the embryonic stage (Smriti and Das, 2018). Furthermore, in the Indian context, the majority of the studies is based on the banking and pharmaceutical industry, which gives the holistic view of that particular sector only. As far as the authors' knowledge, no single study had been yet conducted in India that gives a complete overview of the Indian economy. Therefore, in this backdrop, the present study has been undertaken by taking a sample of firms from 19 different sectors of Indian economy.

3.3 Research objectives

In this knowledge era, where the technology dominates the production of goods and services, the role and prominence of IC and the knowledge management should be recognised effectively. Since the traditional measure of financial performance fails in reporting and measuring these IC, therefore, there is an utmost need to measure it, so that its effect can be examined on the firms' financial performance. Therefore in this backdrop, subsequent are the objectives of the present study:

(1) To quantify the IC efficiency of 30 firms listed on the S&P BSE SENSEX.

(2) To discover the liaison amidst IC and the firms' financial performance.

(3) To scrutinise the effect of each component of IC on the firms' financial performance.

3.4 Hypotheses development

For the first objective, no hypothesis is needed as it involves only measuring the efficiency of an IC. For the second objective, we propose the following hypothesis:

H1. VAIC^{TM} positively influences firms' financial performance.

The rationale of the hypothesis mentioned above is to examine the link concerning VAIC and the traditional measures of the firms' financial performance measured by ROA, MB and ROE. VAIC^{TM} here denotes the total IC efficiency of a firm. The detailed explanation of these variables is given in Section 4.2.

For the third objective of the study, three hypotheses are proposed to find out the connexion between the individual constituents of IC efficiency and the financial performance of a firm. The three components of VAIC are "capital employed efficiency (CEE), human capital efficiency (HCE) and structural capital efficiency (SCE)". Therefore, the hypotheses are:

H1a. CEE positively influences firms' financial performance.

H1b. HCE positively influences firms' financial performance.

H1c. SCE positively influences firms' financial performance.

4. Research methodology

4.1 Sample size and data collection

The sample size of this study encompasses 30 companies which together constitutes the S&P BSE SENSEX of India. The data were extracted from the "Prowess" database, which is maintained by the "Centre for Monitoring Indian Economy (CMIE)". The period of the study is 10 years and it ranges from 2009–2010 to 2018–2019. The reason for taking these 30 companies are as follows: firstly, these 30 companies are prominent companies representing nearly 40% of the equity market in India in terms of market capitalisation as on 31 March 2018 (LLC, 2018). Secondly, these 30 companies of BSE SENSEX act as a representative of the Indian market as it includes the firm from around 19 sectors of the Indian market. Through

these companies, we can get a clear understanding of the IC performance of Indian companies. Since these are the prominent Indian companies, therefore there are no missing data. Hence the final sample is of 30 companies for 10 years (300 observations). The sample distribution based on the industry/sector is given in Table 1.

4.2 Variables and their proxy measures

4.2.1 Dependent variables. In line with the previous research studies on IC, three indicators of financial performance are employed – ROA (Firer and Williams, 2003; Kamath, 2008; Mehralian *et al.*, 2012; Scafarto *et al.*, 2016; Weqar and Haque, 2020a), MB ratio (Ghosh and Mondal, 2009; Kamath, 2008; Mehralian *et al.*, 2012; Weqar and Haque, 2020b) and ROE (Bontis *et al.*, 2013; Chen *et al.*, 2005; Komnenic and Pokrajčić, 2012; Xu and Liu, 2020). These are further explained as under:

(1) *Return on assets (ROA):* It measures the profit earned by the company concerning the amount invested in their total assets. ROA is calculated as:

$$\text{ROA} = \text{Net Income}/\text{Average Total Assets}$$

(2) *Market to book (MB) ratio:* It indicates how much firms' book value exceeds its market value. It is computed as:

$$\text{MB} = \text{Market Capitalization}/\text{Total Assets}$$

(3) *Return on squity (ROE):* It measures the profitability of the firm to its equity. It reveals how much profit is earned by a business organisation in comparison to the total amount of its equity. It is calculated as:

$$\text{ROE} = \text{Net Income}/\text{Average Net Worth}$$

4.2.2 Independent variables. Pulic (2000) VAIC^{TM} methodology is employed for quantifying the firm's IC and is treated as an independent variable in the study. According to Pulic (2000),

S.No.	Industry/Sector	Number of firms	% of total firms
1	2/3 Wheelers	2	6.67
2	Banks	6	20.00
3	Cars and utility vehicles	2	6.67
4	Cement and cement products	1	3.33
5	Cigarettes and tobacco products	1	3.33
6	Construction and engineering	1	3.33
7	Electric utilities	2	6.67
8	Exploration and production	1	3.33
9	Finance (including NBFCs)	1	3.33
10	Furniture, furnishing, paints	1	3.33
11	Housing finance	1	3.33
12	Integrated oil and gas	1	3.33
13	Iron and steel	1	3.33
14	IT consulting and software	4	13.33
15	Other apparels and accessories	1	3.33
16	Packaged foods	1	3.34
17	Personal products	1	3.34
18	Pharmaceuticals	1	3.34
19	Telecom services	1	3.34
	Total	30	100.00

Source(s): BSE's website (https://www.bseindia.com/sensex/code/16/)

Table 1. Sample composition of the firms based on industry/sector

to create value-addition, the firm needs physical and financial capital along with the IC, as IC alone can not add value to the firm. VAIC^{TM} is the summation of three constituents: "capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE)". Algebraically,

$$VAIC^{TM} = CEE + HCE + SCE$$

The higher the VAIC of the company better will be its IC performance. Furthermore, for calculating the components of VAIC, firstly, the firms' total value-added (VA) is to be calculated. The calculation of VA is shown in the following algebraic equation, as shown below:

$$VA = D + A + OP + EC \text{ (Pulic, 2000)}$$

Where,

D = Depreciation; A = Amortisation; OP = Operating profit; EC = Employee cost

After calculating the VA, the subsequent phase is to calculate the efficiency of the specific mechanisms of VAIC, i.e. CEE, HCE and SCE.

According to Pulic (2000), CEE is the ratio of VA and capital employed (CE). CEE indicates the addition in the value-creation of the firm by using one monetary unit of its CE. Algebraically

$$CEE = VA/CE$$

Where,

CEE = Capital employed efficiency; VA = Value added for firm; CE = Capital employed

HCE is the ratio of VA and HC (Pulic, 2000). HCE shows the amount added in the value-creation of the firm by employing one monetary unit on HC. "Total salary and wage cost" are taken as a proxy variable for HC (Ghosh and Mondal, 2009; Pulic, 2000, 2004). Algebraically

$$HCE = VA/HC$$

Where,

HCE = Human capital efficiency; VA = Value added for the firm; HC = Human capital (total salary and wage cost of the firm)

Now, for the calculation of SCE, first, we have to calculate SC. According to Pulic (2000), SC is calculated by subtracting HC from VA. He also argues that HC and SC are inversely proportional to each other in the process of value creation. Therefore,

$$SC = VA - HC$$

SCE is the representation of the value-addition by employing one monetary unit in the structural capital of the firm. SCE is the ratio of SC and VA. Algebraically

$$SCE = SC/VA$$

Where,

SC = Structural capital of the firm; VA = Value added for the firm; HC = Human capital (total salary and wage cost of the firm); SCE = Structural capital employed

Moreover, few researchers had criticized the VAIC model. For instance, Stahle *et al.* (2011) opined that VAIC has nothing to do with the firm's IC; instead, it measures the efficiency of labour and capital of the firm. Likewise, this model also ignores the synergy effect that occurs amongst the tangible and intangible assets of the firm (Dzenopoljac *et al.*, 2017). Also, it does not consider the firm's relational and innovation capital (Xu and Liu, 2020).

Despite these criticisms, VAIC has gained popularity amongst the researchers for IC calculation because of the following reasons – first, it is an efficacious and easily applicable model for gauging IC, and to make inter-firm and also intra-firm comparison (Smriti and Das, 2018). Second, the model is widely used just because of its simplicity and easy availability of the data (Dzenopoljac *et al.*, 2017). Third, it is based on audited published financial reports of the company making it more acceptable (Bontis, 1998; Pulic, 2000). Last, Weqar *et al.* (2020) argue that VAIC is the most appropriate technique for measuring IC performance of the business organisation.

Therefore, this study employs the VAIC methodology in line with a large number of IC literature (Afroz *et al.*, 2018; Bontis *et al.*, 2015; Ginesti *et al.*, 2018; Meles *et al.*, 2016; Riahi-Belkaoui, 2003; Singh *et al.*, 2016; Smriti and Das, 2018; Ting *et al.*, 2020; Weqar *et al.*, 2021; Xu and Li, 2019).

4.2.3 Control variables. Two control variables are also incorporated into the study. These variables are as follows:

(1) *Size:* Firm size is ascertained by the natural log of total market capitalisation. It controls the effect of size on the creation of wealth through economies of scale, bargaining power and monopoly (Ghosh and Mondal, 2009; Kamath, 2008; Riahi-Belkaoui, 2003). Algebraically

$$\text{Size} = \text{Log}(\text{Market Capitalisation})$$

(2) *Physical capital (PC) intensity: PC* is employed in the study to control the effect of fixed assets on organisational performance because the underlying postulation here is that fixed assets positively affect the firms' financial performance. It is measured by dividing the net fixed assets with the total assets of the company (Pal and Soriya, 2012; Smriti and Das, 2018; Weqar *et al.*, 2021). Algebraically

$$\text{PC} = \text{Net Fixed Assets}/\text{Total Assets}$$

4.3 Regression models

Six regression models have been formulated to measure the impact of IC efficiency (VAIC) and its components (CEE, HCE and SCE) on the financial performance (ROA, MB and ROE) of the Indian companies.

Models 1, 3 and 5 explore the link between VAIC and business performance of the Indian firms. Models 1, 3 and 5 are used to test the hypothesis H1.

$$\textit{Model 1}: \text{ROA}_{it} = \alpha + \beta_1 \text{VAIC}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{PC}_{it} + \varepsilon_{it}$$

$$\textit{Model 3}: \text{MB}_{it} = \alpha + \beta_1 \text{VAIC}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{PC}_{it} + \varepsilon_{it}$$

$$\textit{Model 5}: \text{ROE}_{it} = \alpha + \beta_1 \text{VAIC}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{PC}_{it} + \varepsilon_{it}$$

Models 2, 4 and 6 examine the association between the components of VAIC and the financial performance of the Indian firms. Models 2, 4 and 6 are used to assess the hypotheses H1a, H1b and H1c.

$$\textit{Model 2}: \text{ROA}_{it} = \alpha + \beta_1 \text{CEE}_{it} + \beta_2 \text{HCE}_{it} + \beta_3 \text{SCE}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{PC}_{it} + \varepsilon_{it}$$

$$\textit{Model 4}: \text{MB}_{it} = \alpha + \beta_1 \text{CEE}_{it} + \beta_2 \text{HCE}_{it} + \beta_3 \text{SCE}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{PC}_{it} + \varepsilon_{it}$$

$$\textit{Model 6}: \text{ROE}_{it} = \alpha + \beta_1 \text{CEE}_{it} + \beta_2 \text{HCE}_{it} + \beta_3 \text{SCE}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{PC}_{it} + \varepsilon_{it}$$

Here, ROA_{it}, MB_{it} and ROE_{it} is the return on assets, market-to-book ratio and return on equity for the firm i at time t, respectively; α is the constant; β_1 to β_5 is the slope of the independent variable and control variable; e_{it} is the error term; VAIC_{it}, CEE_{it}, HCE_{it}, and SCE_{it} is value

added intellectual coefficient, capital employed efficiency, human capital efficiency and structural capital efficiency for the firm i at time t, respectively; $Size_{it}$ and PC_{it} is the size and physical capital intensity for the firm i at time t, respectively.

5. Research results

5.1 Descriptive statistics

The descriptive statistics of the dependent, independent and control variables are shown in Table 2. The mean value of ROA is 10.89, indicating that, on average, Indian firms are earning a profit at the rate of 10.89%. The maximum value of MB is 20.13, representing that a company is valued 20 times more than its actual book value. Table 2 also shows that amongst the three components of VAIC, HCE is the major contributor (Smriti and Das, 2018).

5.2 Correlation analysis

To know the relation between the variables and its strength, the authors performed the correlation analysis in the study. Table 3 shows the correlation matrix of the study variables. Here CEE shows a significant positive correlation with ROA, MB and ROE of the Indian firms while HCE is substantial only for ROA and MB but in the negative direction. Moreover, SCE is significantly negatively associated only with MB of the Indian firms. The highest coefficient of correlation is noticed between VAIC and HCE, i.e. 0.996, but it will not create the problem of multicollinearity as these two variables are not used simultaneously in the same model.

5.3 Regression analysis

5.3.1 Diagnostic test. Since our data-set encompasses numerous observations per business organisation, therefore the effect of unobserved heterogeneity due to business level is a worry. Thus, this paper engages a fixed-effect model to obtain company-specific features (Baltagi, 2005). Furthermore, the authors examined the problem of multicollinearity in the data by employing the variance inflation factor (VIF). The authors found that there is no problem of multicollinearity in the data as the value of VIF is below the threshold level of 10 (untabulated). Gujarati and Porter (2010), state that the VIF above the value 10 possesses the problem of multicollinearity in the data. Additionally, the Breusch–Pagan/Cook–Weisberg test was performed for examining the problem of heteroscedasticity, while the Wooldridge

Variables	Observation	Mean	SD	Minimum	Maximum
Dependent variables					
ROA	300	0.1089	0.0982	−0.2339	0.3678
MB	300	2.9075	3.2813	0.0646	20.1300
ROE	300	0.2471	0.2121	−0.3722	1.3000
Independent variables					
CEE	300	0.4297	0.4134	0.0118	2.5988
HCE	300	5.6768	4.9100	0.2890	31.6639
SCE	300	0.7194	0.2546	−2.4601	0.9684
VAIC	300	6.8260	4.9288	−2.1592	32.6734
Control variables					
Size	300	4.9606	0.4194	3.0665	5.9365
PC	300	0.1967	0.1795	0.0012	0.6673

Table 2.
Descriptive statistics

Note(s): SD stands for standard deviation
Source(s): Authors' compilation

	ROA	MB	ROE	CEE	HCE	SCE	VAIC	Size	PC
ROA	1								
MB	0.734**	1							
ROE	0.790**	0.675**	1						
CEE	0.855**	0.757**	0.860**	1					
HCE	−0.184**	−0.192**	−0.079	−0.296**	1				
SCE	−0.055	−0.140*	0.067	−0.183**	0.475**	1			
VAIC	−0.114*	−0.135*	−0.003	−0.220**	0.996**	0.510**	1		
Size	0.046	0.089	−0.118*	0.013	0.176**	−0.006	0.176**	1	
PC	0.149**	0.149**	0.059	0.083	0.144*	0.231**	0.162**	0.044	1

Note(s): ** and * indicate significant at 1 and 5% level, respectively
Source: Authors' compilation

Table 3.
Correlation matrix

test examined the problem of autocorrelation. The results of these two test are presented in Table 4, which shows that the values are significant, indicating the presence of heteroscedasticity and autocorrelation amongst the residuals. Therefore, the data were analysed through fixed-effect regression analysis.

5.3.2 Regression results. To get an in-depth understanding of the relation between the VAIC and the firm financial performance, a fixed-effect panel data regression analysis was performed by the authors. Table 5 shows that in all the models of ROA, MB and ROE, the value of adjusted R^2 upsurges when VAIC is apportioned into its three dimensions, i.e. CEE, HCE and SCE (Clarke *et al.*, 2011; Ginesti *et al.*, 2018). Now the authors will adopt the policy of general to specific. So first, we will measure the effect of VAIC on the firm performance, then we will segregate VAIC into its three constituents, for examining its impact on the financial performance of the business organisation. In Table 5, VAIC is significantly and positively associated with ROA, MB and ROE. Amongst the three constituents of VAIC, CEE is the most vital component, as it has a strong positive influence on ROA, MB and ROE of the Indian firms at 1% significance level. Furthermore, HCE shows a significant positive liaison with ROA, ROE and MB at 1, 5 and 10% level of significance, respectively. Likewise, SCE positively enhances the ROA of the Indian firms but has an insignificant effect on its MB and ROE.

6. Discussion and contribution

6.1 Discussion of findings

The empirical results of the fixed-effect regression analysis efficaciously establish a substantial affiliation of IC efficiency and its component with ROA, MB and ROE of the Indian firms. The results of the models 1, 3 and 5 show that VAIC is positively associated with the firms' financial performance, indicating that IC plays a vital role in enhancing and augmenting the profitability and market value of the firms in the developing countries (Sardo and Serrasqueiro, 2017; Smriti and Das, 2018). The empirical results of this study are consistent with the findings of Nimtrakoon (2015), Al-Musali and Ku Ismail (2016) and

Tests	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Breusch–Pagan/Cook–Weisberg test	6.42**	116.16***	22.31***	78.89***	5.56**	43.74***
Wooldridge test	50.98***	19.20***	27.29***	20.76***	33.18***	64.68***

Note(s): *** and ** indicate significant at 1 and 5% level, respectively
Source(s): Authors' compilation

Table 4.
Heteroskedasticity and serial correlation in residuals

Table 5.
Regression results

	Model 1 (ROA)	Model 2 (ROA)	Model 3 (MB)	Model 4 (MB)	Model 5 (ROE)	Model 6 (ROE)
Constant	0.076* (0.042)	−0.042 (0.038)	−6.478*** (1.371)	−7.416*** (1.440)	0.634*** (0.122)	0.167** (0.084)
VAIC	0.009*** (0.001)		0.118*** (0.042)		0.018*** (0.003)	
CEE		0.122*** (0.012)		1.052** (0.463)		0.526*** (0.027)
HCE		0.006*** (0.001)		0.090* (0.047)		0.007** (0.002)
SCE		0.039*** (0.009)		0.276 (0.371)		0.029 (0.021)
Size	−0.004 (0.008)	0.008 (0.007)	1.734*** (0.262)	1.843*** (0.266)	−0.098*** (0.023)	−0.042*** (0.015)
PC	−0.063* (0.037)	−0.037 (0.032)	−0.142 (1.221)	0.070 (1.220)	−0.107 (0.108)	0.009 (0.071)
Adjusted R^2	0.191	0.408	0.154	0.168	0.146	0.634
F-statistics	21.01***	36.61***	16.25***	10.72***	15.30***	91.86***

Note(s): ***, ** and * indicate significant at 1, 5 and 10% level, respectively
Source(s): Authors' compilation

Ginesti *et al.* (2018) and thus leads to the acceptance of hypothesis H1. The findings of this study also validate the RB theory given by Wernerfelt (1984) in the Indian context, which states that possession of strategic resources offers an opportunity to an organisation in accomplishing the competitive advantage over its competitors.

Amongst the components of VAIC, CEE shows a significant positive association with ROA, MB and ROE of the Indian firms and thus the hypothesis H1a is accepted. This indicates that physical and financial capital plays a crucial role in driving-up the financial performance of Indian companies. The finding is in line with the results of Chen *et al.* (2005) and Nadeem *et al.* (2017) who also report that physical and financial assets (tangible assets) enhance the firms' performance.

Regarding the influence of HCE on the financial performance of the Indian firms, the result establishes a substantial positive liaison amid HCE and ROA, MB and ROE of the organisation. Thus, hypothesis H1b is accepted. This demonstrates that a firm with a higher value of HC can generate more profit, and valued higher in the market than its rivals. The results of this study are supported by the findings of Komnenic and Pokrajčić (2012), Afroz *et al.* (2018) and Xu and Liu (2020) who show that an efficient HC of an organisation improves the financial performance of the business organisation.

Results of models 2, 4 and 6 also show that SCE is positively linked with ROA while remaining insignificant for MB and ROE of the Indian firms. It leads to the partial acceptance of H1c. The analysis indicates that Indian firms are utilising their internal resources like their process, patents, systems, databases, relationship with the stakeholder, etc., in the generation of its profitability only. The outcome favours the result of Firer and Williams (2003) and Dzenopoljac *et al.* (2017). They also report that SCE is insignificant for MB while showing a positive relationship with the ROA of the business organisation of South Africa and the Arab region, respectively.

6.2 Contribution to the study

The current paper has contributed to the knowledge of IC in many ways. Firstly, it has added knowledge to the existing work on IC. According to the regression results, IC efficiency was found to have a significant and positive association with the traditional indicators of organisational financial performance. However, the individual components of IC efficiency (VAIC) which include CEE, HCE and SCE proved to be a better modelling tool than cumulative IC. Nevertheless, these results cannot be generalised because of the stochastic nature of IC.

The human capabilities and capacities vary from person to person and so do IC from organisation to organisation, which makes result unfit for being called universal and uniform. Two control factors have also been incorporated into the study – firm size (size) and physical capital (PC) intensity. Out of two, size affects the financial performance of the business organisation (MB and ROE only) which implies that in designing the research model for investigating the financial performance of a firm, this factor needs to be either controlled or taken as the central research parameter.

There is a peculiar inclination of investors and companies towards investing in the physical assets, and human resource development is not paid as much attention as it deserves. One apparent reason is that physical assets can be transferred in and out of the territory within no time; however, IC takes time to grow. Today's economy is a knowledge-based economy and mere relying on physical assets can prove disastrous for the performance of the company in the long run. Therefore, attention is required from both the government and management to fill this policy gap.

Education and awareness about the importance of IC must be raised, and this can be possible only with the joint contribution of the local business leaders, academicians, government officials and other stakeholders. To raise the significance of IC usage in the

business organisation, it must be made mandatory to disclose their IC in the annual reports of the company.

7. Conclusion

Based on the fixed-effect panel data regression results deliberated in the prior segments, it can be said that the effect of IC on the traditional measures of the financial performance of the companies comprising S&P BSE Index is positive and significant. The study and sample surveyed have been able to provide a definite and conclusive association between IC efficiency and organisational performance. The authors have applied Pulic (2000) VAIC^{TM} methodology for quantifying and measuring the efficiency of the IC of the firm. Amongst the VAIC constituents, the efficiency of physical capital (CEE) and human capital (CEE) were the most significant contributors to the firms' financial performance. These findings suggest that the companies fascinated in attaining higher ROA, higher market value and a higher ROE, should escalate their responsiveness towards employees' knowledge, talent, experience, skill and attitude along with their tangible assets. These results are consistent with the vast body of literature that considers IC as a strategic asset for achieving the competitive advantage and generating vale-addition to the business organisation (Chen *et al.*, 2005; Clarke *et al.*, 2011; Edvinsson and Malone, 1997; Ghosh and Maji, 2015; Smriti and Das, 2018).

The study will prove a noble cradle of references for the forthcoming studies on IC, especially in the Indian context. However, the study is not fully exhaustive. It carries certain limitations as well. Firstly, the period taken for the research is only 10 years, which if increased, can give better and fair results. Secondly, the data of only 30 companies have been utilized for the analysis purpose, which most probably are the big giants of their respective industries. Hence the result cannot be generalised to all the firms. Finally, the present study measures financial performance by taking into consideration only its three indicators; therefore, in future, other variables of financial performance should also be included. Further studies can be conducted on the companies listed in different stock exchanges of India and other Asian countries with advanced statistical tools and techniques.

References

Afroz, L., Rana, T., Akter, M. and Hoque, M. (2018), "Impact of intellectual capital on financial performance: evidence from the Bangladeshi textile sector", *Journal of Accounting and Organizational Change*, Vol. 14 No. 4, pp. 429-454, doi: 10.1108/JAOC-11-2017-0109.

Akpinar, A.T. and Akdemir, A. (1996), "Intellectual capital", *Innovation*, pp. 332-340, doi: 10.1007/978-1-349-14494-5.

Al-Musali, M.A. and Ku Ismail, K.N.I. (2016), "Cross-country comparison of intellectual capital performance and its impact on financial performance of commercial banks in GCC countries", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 9 No. 4, pp. 512-531, doi: 10.1108/IMEFM-03-2015-0029.

Andriessen, D. (2004), "IC valuation and measurement: classifying the state of the art", *Journal of Intellectual Capital*, Vol. 5 No. 2, pp. 230-242, doi: 10.1108/14691930410533669.

Baltagi, B.H. (2005), "Econometric analysis of panel data".

Bismuth, A. and Tojo, Y. (2008), "Creating value from intellectual assets", *Journal of Intellectual Capital*, Vol. 9 No. 2, pp. 228-245, doi: 10.1108/14691930810870319.

Bontis, N. (1998), "Intellectual capital: an exploratory study that develops measure and models", *Management Decision*, Vol. 2 No. 36, pp. 63-76, doi: 10.1108/00251749810204142.

Bontis, N. (2001), "Assessing knowledge assets: a review of the models used to measure intellectual capital", *International Journal of Management Reviews*, Vol. 3 No. 1, pp. 41-60, doi: 10.1111/1468-2370.00053.

Bontis, N., Janoševic, S. and Dzenopoljac, V. (2013), "Intellectual capital and corporate performance of Serbian banks", *Actual Problems of Economics*, Vol. 4 No. 142, pp. 287-299, available at: http://nbuv.gov.ua/UJRN/ape_2013_4_34.

Bontis, N., Janosevic, S. and Dzenopoljac, V. (2015), "Intellectual capital in Serbia's hotel industry", *International Journal of Contemporary Hospitality Management*, Vol. 27 No. 6, pp. 1365-1384, doi: 10.1108/IJCHM-12-2013-0541.

Chen, M.C., Cheng, S.J. and Hwang, Y. (2005), "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 6 No. 2, pp. 159-176, doi: 10.1108/14691930510592771.

Clarke, M., Seng, D. and Whiting, R.H. (2011), "Intellectual capital and firm performance in Australia", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 505-530, doi: 10.1108/14691931111181706.

Dzenopoljac, V., Yaacoub, C., Elkanj, N. and Bontis, N. (2017), "Impact of intellectual capital on corporate performance: evidence from the Arab region", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 884-903, doi: 10.1108/JIC-01-2017-0014.

Edvinsson, L. and Malone, M.S. (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, HarperCollins, New York.

Exchange, B.S. (2020), "S&P BSE sensex", available at: https://www.bseindia.com/markets/Derivatives/DeriReports/FAQs.aspx.

Firer, S. and Williams, M.S. (2003), "Intellectual capital and traditional measures of corporate performance", *Journal of Intellectual Capital*, Vol. 4 No. 3, pp. 348-360, doi: 10.1108/14691930310487806.

Ghosh, S. and Mondal, A. (2009), "Indian software and pharmaceutical sector IC and financial performance", *Journal of Intellectual Capital*, Vol. 10 No. 3, pp. 369-388, doi: 10.1108/14691930910977798.

Ghosh, S.K. and Maji, S.G. (2015), "Empirical validity of value added intellectual coefficient model in Indian knowledge-based sector", *Global Business Review*, Vol. 16 No. 6, pp. 947-962, doi: 10.1177/0972150915597597.

Ginesti, G., Caldarelli, A. and Zampella, A. (2018), "Exploring the impact of intellectual capital on company reputation and performance", *Journal of Intellectual Capital*, Vol. 19 No. 5, pp. 915-934, doi: 10.1108/JIC-01-2018-0012.

Gujarati, D.N. and Porter, D.C. (2010), *Basic Econometrics*, 5th ed., McGraw-Hill/Irwin, New York.

Joshi, M., Cahill, D., Sidhu, J. and Kansal, M. (2013), "Intellectual capital and financial performance: an evaluation of the Australian financial sector", *Journal of Intellectual Capital*, Vol. 14 No. 2, pp. 264-285, doi: 10.1108/14691931311323887.

Kamath, G.B. (2008), "Intellectual capital and corporate performance in Indian pharmaceutical industry", *Journal of Intellectual Capital*, Vol. 9 No. 4, pp. 684-704, doi: 10.1108/14691930810913221.

Komnenic, B. and Pokrajčić, D. (2012), "Intellectual capital and corporate performance of MNCs in Serbia", *Journal of Intellectual Capital*, Vol. 13 No. 1, pp. 106-119, doi: 10.1108/14691931211196231.

LLC, S.D.J.I. (2018), "S&PBSE SENSEX the gauge of the Indian market", available at: https://us.spindices.com/indices/equity/sp-bse-sensex.

Maditinos, D., Chatzoudes, D., Tsairidis, C. and Theriou, G. (2011), "The impact of intellectual capital on firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 12 No. 1, pp. 132-151, doi: 10.1108/14691931111097944.

Mehralian, G., Rajabzadeh, A., Sadeh, M.R. and Rasekh, H.R. (2012), "Intellectual capital and corporate performance in Iranian pharmaceutical industry", *Journal of Intellectual Capital*, Vol. 13 No. 1, pp. 138-158, doi: 10.1108/14691931211196259.

Meles, A., Porzio, C., Sampagnaro, G. and Verdoliva, V. (2016), "The impact of intellectual capital efficiency on commercial bank performance: evidence from the US", *Journal of Multinational Financial Management*, Vol. 36, pp. 64-74, doi: 10.1016/j.mulfin.2016.04.003.

Mohammed, A.A. and Irbo, M.M. (2018), "Intellectual capital and firm performance nexus: evidence from Ethiopian private commercial banks", *International Journal of Learning and Intellectual Capital*, Vol. 15 No. 3, pp. 189-203, doi: 10.1504/IJLIC.2018.094717.

Nadeem, M., Gan, C. and Nguyen, C. (2017), "Does intellectual capital efficiency improve firm performance in BRICS economies? A dynamic panel estimation", *Measuring Business Excellence*, Vol. 21 No. 1, pp. 65-85, doi: 10.1108/MBE-12-2015-0055.

Nadeem, M., Dumay, J. and Massaro, M. (2019), "If you can measure it, you can manage it: a case of intellectual capital", *Australian Accounting Review*, Vol. 29 No. 2, pp. 395-407, doi: 10.1111/auar.12227.

Nimtrakoon, S. (2015), "The relationship between intellectual capital, firms' market value and financial performance Empirical evidence from the ASEAN", *Journal of Intellectual Capital*, Vol. 16 No. 3, pp. 587-618, doi: 10.1108/JIC-09-2014-0104.

Pal, K. and Soriya, S. (2012), "IC performance of Indian pharmaceutical and textile industry", *Journal of Intellectual Capital*, Vol. 13 No. 1, pp. 120-137, doi: 10.1108/14691931211196240.

Peng, T.A., Pike, S. and Roos, G. (2007), "Intellectual capital and performance indicators: Taiwanese healthcare sector", *Journal of Intellectual Capital*, Vol. 8 No. 3, pp. 538-556, doi: 10.1108/14691930710774902.

Pulic, A. (1998), "Measuring the performance of intellectual potential in the knowledge economy", *The 2nd World Congress on the Management of Intellectual Capital*, pp. 1-20, available at: https://www.semanticscholar.org/paper/Measuring-the-performance-of-intellectual-potential-Pulic/708bebbe69caebcd281c5e18425cc645cee9816d?p2df.

Pulic, A. (2000), "Vaictm – an accounting tool for intellectual capital management", *International Journal of Technology Management*, Vol. 20 No. 5, pp. 149-155, doi: 10.1504/IJTM.2000.002891.

Pulic, A. (2004), "Intellectual capital – does it create or destroy value?", *Measuring Business Excellence*, Vol. 8 No. 1, pp. 62-68, doi: 10.1108/13683040410524757.

Riahi-Belkaoui, A. (2003), "Intellectual capital and firm performance of US multinational firms a study of the resource-based and stakeholder views", *Journal of Intellectual Capital*, Vol. 4 No. 2, pp. 215-226, doi: 10.1108/14691930310472839.

Roos, G. and Roos, J. (1997), "Measuring your company's intellectual performance", *Long Range Planning*, Vol. 30 No. 3, pp. 413-426, doi: 10.1016/S0024-6301(97)90260-0.

Saint-Onge, H. (1996), "Tacit knowledge the key to the strategic alignment of intellectual capital", *Strategy and Leadership*, Vol. 24 No. 2, pp. 10-16, doi: 10.1108/eb054547.

Sardo, F. and Serrasqueiro, Z. (2017), "A European empirical study of the relationship between firms' intellectual capital, financial performance and market value", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 771-788, doi: 10.1108/JIC-10-2016-0105.

Sardo, F., Serrasqueiro, Z. and Alves, H. (2018), "On the relationship between intellectual capital and financial performance: a panel data analysis on SME hotels", *International Journal of Hospitality Management*, Vol. 75, September, pp. 67-74, doi: 10.1016/j.ijhm.2018.03.001.

Scafarto, V., Ricci, F. and Scafarto, F. (2016), "Intellectual capital and firm performance in the global agribusiness industry: the moderating role of human capital", *Journal of Intellectual Capital*, Vol. 17 No. 3, pp. 530-552, doi: 10.1108/JIC-11-2015-0096.

Singh, S., Sidhu, J., Joshi, M. and Kansal, M. (2016), "Measuring intellectual capital performance of Indian banks: a public and private sector comparison", *Managerial Finance*, Vol. 42 No. 7, pp. 635-655, doi: 10.1108/MF-08-2014-0211.

Smriti, N. and Das, N. (2018), "The impact of intellectual capital on firm performance: a study of Indian firms listed in COSPI", *Journal of Intellectual Capital*, Vol. 19 No. 5, pp. 935-964, doi: 10.1108/JIC-11-2017-0156.

Sonavane, R.N. and Sultana, N. (2018), "BSE market cap at record high, but risks remain", available at: https://www.livemint.com/Money/DrAGWPt9h7IdTMUDXrp4IO/BSE-market-cap-hits-record-high-as-Sensex-scales-new-peak.html.

Stahle, P., Stahle, S. and Aho, S. (2011), "Value added intellectual coefficient (VAIC): a critical analysis", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 531-551, doi: 10.1108/14691931111181715.

Stewart, T.A. (1997), *Intellectual Capital: The New Wealth of Organizations*, Nicholas Brealey Publishing, New York.

Sveiby, K.E. (2001), "Methods for measuring intangible assets", Www.Sveiby.Com, April, available at: https://www.sveiby.com/files/pdf/intangiblemethods.pdf, pp. 1-10.

Ting, I.W.K., Ren, C., Chen, F.-C. and Kweh, Q.L. (2020), "Interpreting the dynamic performance effect of intellectual capital through a value-added-based perspective", *Journal of Intellectual Capital*, Vol. 21 No. 3, pp. 381-401, doi: 10.1108/JIC-05-2019-0098.

Vishnu, S. and Gupta, V.K. (2014), "Intellectual capital and performance of pharmaceutical firms in India", *Journal of Intellectual Capital*, Vol. 15 No. 1, pp. 83-99, doi: 10.1108/JIC-04-2013-0049.

Weqar, F. and Haque, S.M.I. (2020a), "Does intellectual capital predict the financial performance of the Indian textile industry?", *International Journal of Advanced Research*, Vol. 8 No. 3, pp. 756-767, doi: 10.21474/IJAR01/9059.

Weqar, F. and Haque, S.M.I. (2020b), "Intellectual capital and corporate financial performance in India's central public sector enterprises", *International Journal of Learning and Intellectual Capital*, Vol. 17 No. 1, pp. 77-97, doi: 10.1504/IJLIC.2020.105323.

Weqar, F., Khan, A.M. and Haque, S.M.I. (2020), "Exploring the effect of intellectual capital on financial performance: a study of Indian banks", *Measuring Business Excellence*, Vol. 24 No. 4, pp. 511-529, doi: 10.1108/MBE-12-2019-0118.

Weqar, F., Khan, A.M., Raushan, M.A. and Haque, S.M.I. (2021), "Measuring the impact of intellectual capital on the financial performance of the finance sector of India", *Journal of the Knowledge Economy*, doi: 10.1007/s13132-020-00654-0.

Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5 No. 2, pp. 171-180, doi: 10.1002/smj.4250050207.

Wiig, K.M. (1997), "Integrating intellectual capital and knowledge management", *Long Range Planning*, Vol. 30 No. 3, pp. 399-405, doi: 10.1016/S0024-6301(97)90256-9.

Xu, J. and Li, J. (2019), "The impact of intellectual capital on SMEs' performance in China: empirical evidence from non-high-tech vs. high-tech SMEs", *Journal of Intellectual Capital*, Vol. 20 No. 4, pp. 488-509, doi: 10.1108/JIC-04-2018-0074.

Xu, J. and Liu, F. (2020), "The impact of intellectual capital on firm performance: a modified and extended VAIC model", *Journal of Competitiveness*, Vol. 12 No. 1, pp. 161-176, doi: 10.7441/joc.2010.01.10.

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