

# The impact of intellectual capital on commercial banks' performance: evidence from Bangladesh

Md. Anhar Sharif Mollah and Md. Abdur Rouf

*Department of Business Administration, Daffodil International University,  
Dhaka, Bangladesh*

## Abstract

**Purpose** – Intellectual capital (IC) and financial performance is now a very contemporary issue in the banking sector. The purpose of this study is to investigate empirically the impact of IC on financial performance of all the listed commercial banks of Bangladesh.

**Design/methodology/approach** – Bangladesh Bank database and financial statement of the listed commercial banks of Bangladesh for the period of 2014–2018 have been used to collect data. Value added intellectual coefficient (VAIC<sup>TM</sup>) methods have been used for measuring the performance of banks. VAIC<sup>TM</sup> determined IC and its three major components like structural, human and capital employed.

**Findings** – The results suggest that human capital efficiency (HCE) and capital employed efficiency (CEE) have statistically significant relationships with bank performance, but when VAIC<sup>TM</sup> is divided then structural capital efficiency (SCE) does not have a significant relationship with bank performance.

**Research limitations/implications** – The study uses only listed banks, but it does not include all the commercial banks specially nationalized commercial banks.

**Practical implications** – The findings allowed banks to focus more on human capital (HC) and structural capital, because in the present world, HC is considered one of the key factors for the success in business. This study also provides an awareness on how good IC of the banking companies will bring more assistance to a better life of a society.

**Originality/value** – This is one of the very few studies which examine the impact of IC on bank financial performance in Bangladesh.

**Keywords** Intellectual capital, Bank, ROA, ROE, RG, VAIC<sup>TM</sup>

**Paper type** Research paper

## 1. Introduction

Knowledge and technological advancement are escalating globally in the last couple of decades. Most of the cases, business patterns are changing both in developed and developing economies. Empirical research studies are revealing that manufacturing-based economy is swapping to the knowledge-based economy along with technological intensive and fast-changing nature (Cañibano, 2018; Chowdhury *et al.*, 2019; Hermewan *et al.*, 2020). Consequently, intellectual capital (IC) is acquired as the highest focal point than physical capital in many firms in the modern economy especially in the service industry like banks. As a result, not only banks' value openly depends on IC but also used as an important tool to obtain competitive advantage with



optimum production level (Nawaz and Haniffa, 2017; Rouf and Hossain, 2018; Kamal *et al.*, 2012; El-Bannany, 2012; Madani *et al.*, 2015). Therefore, the obvious expectation of this study is to find the relationship between efficient utilization of IC and its direct influence on banks' performance. For these reasons, the aforementioned relationship constitutes a vital fact of realistic attention among important stakeholders of banks such as top management and shareholders (Isanzu, 2015; Tan *et al.*, 2008; Pulic, 2000).

A sufficient number of studies have stated that IC is playing an augmented domination role to create corporate value addition (Chen *et al.*, 2005; Maji and Goswami, 2016; Al-Musali and Ismail, 2014). However, it is not easy to find the relationship between the IC and bank performance because of lack of universally well accepted measuring techniques of IC, thus every quantitative measure is facing huge challenge to establish a vivid relationship between IC and firm's performance as well as banks' performance (Rouf and Hossain, 2020; Clarke *et al.*, 2011; Zambon, 2004). Accordingly, very few quantitative studies have found whether IC has effects on banks' performance.

In the global context, study on the efficiency of IC and its relationship with bank performance is putting numerous evidences to certain service sectors like banks. In particular, the researchers find very few studies which are related to bank IC and performance in Bangladesh (Mohiuddin *et al.*, 2006) despite the Bangladeshi banking system acquiring notable research interest among international researchers for its dual economic nature (mix of interest and non-interest base). Additionally, like all other developing economies, Bangladesh's banking sector is treated as a vital service-based (or on the other hand, knowledge-based) among all other service sectors for ensuring sustainable economic growth.

This paper is dissimilar from the earlier studies in terms of the following facets. First, this study provides that banks' performance is positively influenced by IC efficiency but still there is no visualization yet in the case of banks of Bangladesh. Second, the inconsistent results in earlier studies, this study provides more justifications that further studies are still needed regarding how to measure IC using capital market or secondary data. Finally, the result of this paper may enrich the existing literature where researchers can think about the scenario of the relationship between IC and bank performance. There are numerous methods used so far to measure actual relation of IC efficiency with banks financial performance, but value added intellectual coefficient (VAIC<sup>TM</sup>) is used for intellectual capital and return on asset (ROA), return on equity (ROE) and banks' growth are used to measure banks' financial performance. This study expects that the result may be beneficial for multiple global stakeholders of the banking sector.

The paper consists of five parts which are as follows; the following section discusses the literature on IC and relationship between IC efficiency with VAIC<sup>TM</sup> and banks' performance. The developments of hypotheses that are to be tested with the proposed model are discussed in Section three and Methodology and empirical has described in the following section i.e. in Section four. In Section 5, the results are summarized, analyzed and some notable conclusions are discussed with logic presented for every stakeholder of banks. The main purpose of this study is to investigate empirically the impact of IC on financial performance of all of the listed commercial banks of Bangladesh. The specific objectives are:

- (1) To examine the level of performance of listed commercial banks' in Bangladesh
- (2) To examine the relationship between the attribute of IC and performance of listed commercial banks in Bangladesh

## 2. Literature review and hypotheses development

There are many researchers conducted on IC around the world which show the association between IC and firm performance. Among these researches, Nawaz and Haniffa (2017) tried to

examine the determinant of IC and its performance based on 64 Islamic financial institutions operating in 18 different countries for the period of 2007–2011. It was found that there is a significant relationship between VAIC<sup>TM</sup> and firm performance based on ROA. Moreover, it was also examined that IC has a positive significant relationship between accounting performance and capital employed efficiency (CEE) and human capital efficiency (HCE) but not with structural capital efficiency (SCE). Additionally, researchers suggested the value of the firm was highly influenced by HCE and CEE. Soewarno and Tjahjadi (2020) asserted to measure IC performance among them VAIC<sup>TM</sup> methodology widely accepted and more used to measure the IC performance, and many researchers prescribed it as the most used method for measuring IC. However, the VAIC<sup>TM</sup> model mostly relies on historical data from financial statements, which may not be appropriate to create value for the firm in the long run (Dzenopoljac *et al.*, 2017). But the VAIC<sup>TM</sup> method is easy to understand and helps stockholders to compare IC results among the Islamic banks Nawaz and Haniffa (2017). Using VAIC<sup>TM</sup> method, there are several research studies which have been studied to find the association between IC and financial performance based on accounting and market in developed and developing countries, especially banking sector and produced mixed results, such as Xu and Liu (2020) in China; Soewarno and Tjahjadi (2020) in Indonesia; Bayraktaroglu *et al.* (2019) in Turkey; Kweh *et al.* (2019) in Malaysian; Mehralian *et al.* (2012) in Iran; Chu *et al.* (2011) in Hong Kong; Ismail and Karem (2011) in Bahrain and Maditinos *et al.* (2011) in Greece and Wang (2011) in Taiwan.

In the other study by Kamal *et al.* (2012) conducted in the banking sector of Malaysia based on 18 commercial banks for the period of 2004–2008, the researchers found a significant relationship between IC and bank performance. Additionally, the results showed a significant impact of IC variables, namely CEE and HCE toward banks' performance. Study also suggested that IC does matter for the value of the firm and should be linked to the firm productivity. In the other study, Mondal and Ghosh (2012) who conducted research based 65 Indian banks for the period of 1999–2008, to examine empirically the association between IC and financial performance. Different researchers in different countries like Ozkan *et al.* (2016), Khalique *et al.* (2015), Isanju (2015), Bontis *et al.* (2015) also found positive relationships.

However, some studies also found that there is an insignificant relationship between IC and firm performance. Dzenopoljac *et al.* (2016) studied Serbian information technology but have not found any conclusive association between IC and firm performance. Ferraro and Veltril (2011) conducted research and found that IC variables do not have significant relation with market value except relational capital. The findings showed that IC and firm performance are varied, but IC has a vital role for competitive advantages. Table 1 shows few previous studies on the impact between IC and firm performance.

### *2.1 Structural capital efficiency and bank performance*

Structural capital is identified as the infrastructure that influences HC to create and use its knowledge (Nadeem *et al.*, 2018). Metaphorically, it is considered the backbone of the organization. Unlike HC, structural capital belongs to the organization and its summation of information system, process, procedure, software, database and so on which directly influence banks' performance (Chowdhury *et al.*, 2019; Hermewan *et al.*, 2020). Huang and Hsuen (2007) said structural capital and relational capital show better performance, while HC is poorest. SCE represents the value-added efficiency of structural capital (Smriti and Das, 2018). Xu and Liu (2020) study 953 manufacturing companies and find that only structural capital had a straight effect on performance and that other dimensions play an indirect role through structural capital. In another study, Mohiuddin *et al.* (2006) studied 17 commercial banks in Bangladesh for the period of 2002–2004. According to their study, HCE is more efficient than the CEE for bank performance in Bangladesh. Structural capital is related

SL	Authors	Sample size and industry sector	Method	Tools of measuring performance	Impact of IC			
					HC	SC	CE	RC
1.	Xu and Liu (2020)	953 manufacturing companies in China	VAIC <sup>TM</sup>	ROA, ROE, ATO	+	+	-	+
2.	Soewarno and Tjahjadi (2020)	114 listed banks in Indonesia	VAIC <sup>TM</sup>	ROA, ROE, ATO and PBV	+	+	+	-
3.	Hermewan <i>et al.</i> (2020)	44 pharmaceutical companies in Indonesia	Using primary data	Based on indicators	-	-	NA	+
4.	Ting <i>et al.</i> (2020)	6408 E-commerce companies	VAIC <sup>TM</sup>	Based on sales growth	+	+	-	NA
5.	Tsai and Muntuc (2020)	44 food companies	VAIC <sup>TM</sup>	ROA and Tobin's Q	-	+	-	NA
6.	Bayraktaroglu <i>et al.</i> (2019)	400 Turkish manufacturing companies	VAIC <sup>TM</sup>	ROA, ROE, ATO and MB	NA	-	+	-
7.	Chowdhury <i>et al.</i> (2019)	23 Pharmaceutical companies in BD	VAIC <sup>TM</sup>	ROE, ROA and MB	-	-	NA	NA
8.	Kweh <i>et al.</i> (2019)	200 listed Malaysian companies	VAIC <sup>TM</sup>	ROA, ROE, ATO	+	-	+	NA
9.	Yao <i>et al.</i> (2019)	111 financial institutions of Pakistan	VAIC <sup>TM</sup> and MVAIC	ROE, NPM and ATO	+	-	NA	-

**Note(s):** NPM = Net Profit Margin; ATO = asset turnover; MVAIC = Modified Value-Added Intellectual Capital

**Table 1.** Summary of previous studies on the impact between IC and company performance

closely to the past and future performances of the company. Thus, the following hypotheses are proposed:

*H1a. The SCE of a bank is positively associated with the ROAs*

*H1b. The SCE of a bank is positively associated with the ROE*

*H1c. The SCE of a bank is positively associated with the revenue growth (RG)*

## 2.2 Human capital efficiency and bank performance

HCE is a major indicator of IC which is a composite of knowledge, skill, experience and abilities of the organization (Sardo *et al.*, 2018; Chowdhury *et al.*, 2019; Hermewan *et al.*, 2020). HC cannot be separated from its owner (Yao *et al.*, 2019) and cannot be controlled and owned by the firm (Wang, 2011). Historically, all the research of IC has been hypothesized as a positive association with business performance. These advantages can be found in the literature review. More recently, organizational efficiency and performance depends more on effective strategic human resources planning (Youndt *et al.*, 1996).

Sardo *et al.* (2018) find that HC establishes and maintains long-term relationships with key stakeholders to achieve capitalization. HCE also has a positive effect on productivity in Indian firms listed in COSPI (Smriti and Das, 2018). Maji and Goswami (2016) use the VAIC<sup>TM</sup> model to analyze 100 listed Indian firms and report that HCE plays a positive role in Indian engineering and steel sectors. Tovstiga and Tulugurova (2007) found that HC is the most important IC component for financial performance. However, there are several studies that did not support this result. However, Bayraktaroglu *et al.* (2019) find that use of HC negatively impacts on financial performance. Additionally, Appuhami (2007) also found an insignificant relationship between HCE and financial performance. Therefore, the following hypotheses are proposed:

- H2a. *The HCE of a bank is positively associated with the ROAs*  
 H2b. *The HCE of a bank is positively associated with the ROE*  
 H2c. *The HCE of a bank is positively associated with the revenue growth (RG)*

### 2.3 Employed capital efficiency and bank performance

Employed capital efficiency (ECE) includes the customer, physical and financial dimensions of IC, and CEE is the value-added efficiency created by employed capital (Smriti and Das, 2018). Hermewan *et al.* (2020) investigated the relationship between IC and financial capital in absence of other variables of IC and found more challenging to specify relationship because capital employed in complementary than casual. Researchers also suggested that financial capital is an important input for the development of IC through the budgeting process. Maji and Goswami (2016) find that ECE has a significant positive effect on both types of companies by comparing the use of IC in traditional and knowledge-based firms. In another study, Kamal *et al.* (2012) described financial capital as tangible capital, also mentioned without tangible capital, IC cannot exist and is not possible to create bank value. Moreover, physical assets play a vital role in improving profitability in BRICS economies, which include China, Russia, South Africa, India and Brazil (Nadeem *et al.*, 2018). Therefore, the following hypotheses are proposed:

- H3a. *The ECE of a bank is positively associated with the ROAs*  
 H3b. *The ECE of a bank is positively associated with the ROE*  
 H3c. *The ECE of a bank is positively associated with the RG.*

## 3. Methodology

### 3.1 Sample and data collection

The sample of the present study consists of 28 commercial banks which are listed in Bangladesh Security and Exchange Commission (BSEC) and is based on secondary data collected from listed banks. Rupali Bank Limited and ICB were excluded from this study because of state owned and foreign banks. The readiness of the annual reports for the financial year 2014–2018.

### 3.2 Measurements of variables

This study employed the VAIC<sup>TM</sup> method of Iazzolino *et al.* (2014) to measure the firm performance. Mathematically, the VAIC<sup>TM</sup> computed as

$$\text{VAIC}^{\text{TM}} = \text{SCE} + \text{HCE} + \text{CEE} \quad (1)$$

where,

- VAIC<sup>TM</sup> = Value added intellectual capital,  
 SCE = Structural capital efficiency for bank 'i'  
 HCE = Human capital efficiency for bank 'i'  
 ECE = Employed capital efficiency for bank 'i'

### 3.3 Variable calculation

3.3.1 *Structural capital efficiency (SCE)*. SCE counted such as strategy organization networks, patents and brand name (Iazzolino *et al.*, 2014) i.e. SCE = SC/VA. Value added is calculated as the difference between total operating income and total operating expenditure of banks.

3.3.2 *Human capital efficiency (HCE)*. According to the [Iazzolino et al. \(2014\)](#), HC is valued by employees' cost both salaries and wages included all the allowances like yearly bonus, pension, gratuity for the permanent employees of respective banks during the study period i.e.  $HCE = VA/HC$ .

3.3.3 *Employed capital efficiency (ECE)*. [Yao et al. \(2019\)](#) assert that IC fails to create its own value, so it must be associated with capital employed. Hence, CE calculated as total asset minus total intangible assets (considered bank's operating software, goodwill and SWIFT license), and CEE defined as value added divided by capital employed i.e.  $CEE = VA/CE$ .

3.3.4 *Value added intellectual capital (VAIC<sup>TM</sup>)*. According to [Clarke et al. \(2011\)](#), calculated VAIC<sup>TM</sup> is the summation of SCE, HCE and ECE i.e.  $VAIC^{TM} = SCE + HCE + ECE$ .

3.3.5 *Dependent variables*. The determinants of bank performance are widely focused in empirical study in the last couple of decades. There is plenty of literature explaining the relationship bank performance and its internal and external recourse which are adequate to establish that effective management of resources has been playing a vital role to achieve expected banks' performance. Likewise, high quality management of bank resources are always considered as one of the vital factors for bank performance, as evidenced by various studies both focused on developed and developing economy ([Xu and Liu \(2020\)](#) in China; [Soewarno and Tjahjadi \(2020\)](#) in Indonesia; [Bayraktaroglu et al. \(2019\)](#) in Turkey; [Kweh et al. \(2019\)](#) in Malaysia). There are numerous studies that have found that people are paying attention to IC and bank performance. Amongst these studies, some are considered ROA, ROE, RG in order to measure banks' performance. In this study, specifically three mostly used performance determinants are defined as follows:

$$\text{Return on assets (ROA)} = \text{Profit before Tax} / \text{Total Assets.}$$

$$\text{Return on equity (ROE)} = \text{Profit before Tax} / \text{Shareholders Equity.}$$

$$\text{Revenue growth (RG)} = (\text{TBR}_t - \text{TBR}_{t-1}) / \text{TBR}_{t-1},$$

where TBR means total bank revenue and calculated as summation of total interest income (profit from investment for noninterest based/Islamic banks), income from commission, brokerage and foreign exchange and others income for each bank.

### 3.4 Empirical model

$$ROA = \alpha + \beta_1 VAIC + \varepsilon \quad (1a)$$

$$ROA = \alpha + \beta_1 SCE + \beta_2 HCE + \beta_3 ECE + \varepsilon \quad (1b)$$

$$ROE = \alpha + \beta_1 VAIC + \varepsilon \quad (2a)$$

$$ROE = \alpha + \beta_1 SCE + \beta_2 HCE + \beta_3 ECE + \varepsilon \quad (2b)$$

$$RG = \alpha + \beta_1 VAIC + \varepsilon \quad (3a)$$

$$RG = \alpha + \beta_1 SCE + \beta_2 HCE + \beta_3 ECE + \varepsilon \quad (3b)$$

## 4. Result and discussion

### 4.1 Descriptive statistics

[Table 2](#) provides descriptive statistics of the dependent and independent variables considered in the study of listed banks operating in Bangladesh, namely ROA, ROE, RRG,

Variables	Mean	Std. Dev.	Min.	Max.
ROA	0.0141408	0.0114738	0.0006000	0.1378000
ROE	0.1374490	0.0634951	0.0019000	0.3590000
RG	0.1040165	0.1707187	-0.8029524	0.7003885
VAIC <sup>TM</sup>	3.2387380	2.09901	-0.768346	24.2220200
SCE	0.5306732	0.235837	-1.253959	0.9569182
HCE	2.6801080	1.9526310	0.4436639	23.2116400
ECE	0.0279571	0.0098052	0.0026170	0.0663635

**Note(s):** ROA = return on assets; ROE = return on equity; RG = revenue growth; VAIC<sup>TM</sup> = value added intellectual capital; SCE = structural capital efficiency; HCE = human capital efficiency; ECE = employed capital efficiency

**Table 2.**  
Descriptive statistics

SEC, HCE and ECE. The results showed that ROA has the mean value of 0.0141408 with the standard deviation of 0.0114738 meaning that the banking companies' ROA has a small variation. The ROE has the mean value of 0.1374490 with the standard deviation of 0.0634951 meaning that the banking companies' ROE has a bigger variation. The RG has the mean value of 0.1040165 with the standard deviation of 0.1707187 meaning that the banking companies' RG has a small variation. In descriptive statistics, all the variables' mean are positives, among the variables, VAIC<sup>TM</sup> shows the highest mean and HCE, SCE and ROE, respectively, but ROA shows the lowest mean amongst variables. Hence, it can be concluded that data are normally distributed and not extreme values displayed (Table 2).

#### 4.2 Correlation matrix

To find the association between dependent variable and independent variables, a correlation analysis matrix is used, and the findings are presented in Table 3. The result of the correlation matrix showed that ROA is positively related to HCE and VAIC<sup>TM</sup> ( $p < 0.05$ , two-tailed) and CEE ( $p < 0.01$ , two-tailed). ROE is positively related to SCE, HCE and VAIC<sup>TM</sup> at the significance level of ( $p < 0.05$ , two-tailed) and CEE VAIC<sup>TM</sup> at the significance level of ( $p < 0.01$ , two-tailed). On the other hand, RG is not of any significance related to SEC, HCE, CEE and VAIC<sup>TM</sup> at 1% or 5% level. Additionally, all performance measures (ROA and ROE) significantly positively correlated with each other, but RG tends to have the weakest correlation with VAIC<sup>TM</sup> terms.

Variables	ROA	ROE	Growth	SCE	HCE	CEE	VAIC <sup>TM</sup>
ROA	1.000						
ROE	0.382*	1.000					
RG	0.008	-0.064	1.000				
SCE	0.193	0.249*	0.147*	1.000			
HCE	0.226*	0.306*	0.021	0.562**	1.000		
ECE	0.486**	0.638**	0.055	0.459*	0.440*	1.000	
VAIC <sup>TM</sup>	0.234*	0.316*	0.036	0.638**	0.495**	0.466**	1.000

\*Correlation is significant at the 0.05 level (two-tailed)

\*\*Correlation is significant at the 0.01 level (two-tailed)

**Table 3.**  
Correlation matrix of  
banks' panel data

**Note(s):** ROA = return on assets; ROE = return on equity; RG = revenue growth; VAIC<sup>TM</sup> = value added intellectual capital; SCE = structural capital efficiency; HCE = human capital efficiency; CEE = capital employed efficiency

#### 4.3 Relationship between intellectual capital efficiency and financial performance

The regression coefficients analysis was employed to determine the effect of HCE, SCE, ECE to the financial performance of listed commercial banks in Bangladesh s' proxied by ROA, ROE and RG ratio on banking companies in the Dhaka Stock Exchange. The results of the hypotheses test are shown in Table 4 as follows:

Table 4 shows the results of regression coefficient for all independent variables and its components, using each performance measure (ROA, ROE and RG) as the dependent variable of listed commercial banks in Bangladesh for the period of 2014–2018. Hence, it indicates that ROA has a positive relationship with HCE and ECE at the 1% level of significance, where hypothesis 2 (H2a) and hypothesis 3(H3a) are accepted, it means that listed commercial banks of Bangladesh strongly utilize their HCE and CEE. This result is consistent with the study Chowdhury *et al.* (2019), Sardo *et al.* (2018); Another financial performance variable is ROE that has a positive relationship with HCE, ECE and VAIC<sup>TM</sup> at the 1% level of significance, where hypothesis 2 (H2b) and hypothesis 3(H3b) are accepted, it means that listed commercial banks of Bangladesh strongly utilize their HCE and CEE. This result is consistent with the studies by Hermewan *et al.* (2020), Smriti and Das (2018), Maji and Goswami (2016).

The result also depicts that the insignificant relationship of SCE with all financial performance indicators is not supported by proposed hypotheses 1 (H1a), (H1b) and (H1c), it means that listed commercial banks of Bangladesh may fail to utilize their SCE. This result is not consistent with prior studies by Bayraktaroglu *et al.* (2019), Appuhami (2007), Chen *et al.* (2005).

Additionally, RG shows a negative relationship with HCE and ECE, where hypothesis 2 (H2c) and hypothesis 3(H3c) are rejected, it means that listed commercial banks of Bangladesh negatively utilize their HCE and CEE (Table 5).

		Coefficients	Std. Error	t-statistic	Sig.
ROA	SCE	-0.0007241	0.0040768	-0.18	0.859
	HCE	0.0004485	0.0004873	3.36	0.001**
	ECE	0.4211017	0.0903009	4.66	0.000**
	VAIC <sup>TM</sup>	0.0012809	0.000382	0.92	0.358
	R-square	0.1536			
	Adjusted R-square	0.1403			
ROE	SCE	-0.0189938	0.0186342	-1.02	0.309
	HCE	0.0023484	0.0022179	1.06	0.041*
	ECE	4.040627	0.4149439	9.74	0.000**
	VAIC <sup>TM</sup>	0.0096387	0.0020174	4.78	0.000**
	R-square	0.4069			
	Adjusted R-square	0.3975			
RG	SCE	0.2307554	0.1550216	1.49	0.138
	HCE	-0.0088656	0.0185279	-0.48	0.633
	ECE	-0.2005556	3.433705	-0.06	0.953
	VAIC <sup>TM</sup>	0.007895	0.0138088	0.57	0.568
	R-square	0.0131			
	Adjusted R-square	0.0023			

**Note(s):** \* $p < 0.05$ , two-tailed, \*\* $p < 0.01$ , two-tailed

ROA = return on assets; ROE = return on equity; RG = revenue growth; VAIC<sup>TM</sup> = value added intellectual capital; SCE = structural capital efficiency; HCE = human capital efficiency; CEE = employed capital efficiency

**Table 4.** Results of regression analysis



**Table 5.**  
Results summary

Model	Indicators	Hypothesis	Relation	Expected sign	Actual outcomes	Decision
ROA	Financial	H1	SEC/Financial	+	-	Rejected
ROE	performance		performance	+	-	Rejected
RG				+	-	Rejected
ROA	Financial	H2	HCE/Financial	+	-	Accepted
ROE	performance		performance	+	+	Accepted
RG				+	-	Rejected
ROA	Financial	H3	ECE/Financial	+	+	Accepted
ROE	Performance		Performance	+	+	Accepted
RG				+	-	Rejected

## 5. Conclusion

IC has become the key resources of value creation especially in the banking sector which is discussed by a plethora of research studies, but the present study reveals that CEE has a great significant role for the financial performance of banks rather than structural and HC. The main purpose of this study is to investigate empirically the impact of IC on financial performance of all of the listed commercial banks of Bangladesh for the period of 2014–2018. In Bangladesh, listed commercial banks have shown a lower level of IC performance compared to the other developed countries. Hence, our finding shows that bank financial performance is largely attributed to HCE and ECE; it means that investment in capital employed ensures relatively higher return compared to structural capital. The study also revealed that HCE and ECE are found to be more significant variables.

The study result also indicates that bank performance depends on other factors like relational capital, bank size, promotional activities which are remaining outside of the study due to the limitation of IC measurement model employed in the study. Another limitation is that the study only considered the listed banks which are 50% of total scheduled banks. This paper will be the good reference for further study on the banking sector of Bangladesh. The research failed to study scheduled banks; thus, further study may cover all the scheduled banks which may provide comprehensive results for IC. Moreover, the future researcher can use other different methods for measuring IC like market-based approach (Tobin's Q ratio); approaches based on financial methods (economic value added – EVA<sup>TM</sup>, market value added - MVA<sup>TM</sup>) and approaches-based scoring methods. The implications of this study are that it helps Bangladesh's banking industry and regulators in identifying the factors affecting the banks' financial performance and take necessary actions to maximize their banks' financial performance.

## References

- Al-Musali, M.A.K. and Ismail, K.N.I.K. (2014), "Intellectual capital and its effect on financial performance of banks: evidence from Saudi Arabia", *Procedia-Social and Behavioral Sciences*, Vol. 164, pp. 201-207.
- Appuhami, B.R. (2007), "The impact of intellectual capital on investors' capital gains on shares: an empirical investigation of Thai banking, finance & insurance sector", *International Management Review*, Vol. 3 No. 2, p. 14.
- Bayraktaroglu, A.E., Calisir, F. and Baskak, M. (2019), "Intellectual capital and firm performance: an extended VAIC model", *Journal of Intellectual Capital*, Vol. 20 No. 3, pp. 406-425.
- 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.
- Cañibano, L. (2018), "Accounting and intangibles", *Revista de Contabilidad*, Vol. 21 No. 1, pp. 1-6.

- 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.
- Chowdhury, L.A.M., Rana, T. and Azim, M.I. (2019), "Intellectual capital efficiency and organizational performance: in the context of the pharmaceutical industry in Bangladesh", *Journal of Intellectual Capital*, Vol. 20 No. 6, pp. 784-806.
- Chu, S.K.W., Chan, K.H. and Wu, W.W. (2011), "Charting intellectual capital performance of the gateway to China", *Journal of Intellectual Capital*, Vol. 12 No. 2, pp. 249-276.
- Clarke, M., Seng, D. and Whiting, R.H. (2011), "Intellectual capital and firm performance in Australia", *Journal of Intellectual Capital*, Vol. 12 No. 2, pp. 505-530.
- Dzenopoljac, V., Janosevic, S. and Bontis, N. (2016), "Intellectual capital and financial performance in the Serbian ICT industry", *Journal of Intellectual Capital*, Vol. 17 No. 2, pp. 373-396.
- 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.
- El-Bannany, M. (2012), "Global financial crisis and the intellectual capital performance of UAE banks", *Journal of Human Resource Costing & Accounting*, Vol. 16 No. 1, pp. 20-36.
- Ferraro, O. and Veltri, S. (2011), "The value relevance of intellectual capital on the firm's market value: an empirical survey on the Italian listed firms", *International Journal of Knowledge-Based Development*, Vol. 2 No. 1, pp. 66-84.
- Hermawan, S., Hariyanto, W. and Biduri, S. (2020), "Intellectual capital, business performance, and competitive advantage: an empirical study for the pharmaceutical companies", *Quality-Access to Success*, Vol. 21 No. 175, pp. 103-106.
- Huang, C.F. and Hsueh, S.L. (2007), "A study on the relationship between intellectual capital and business performance in the engineering consulting industry: a path analysis", *Journal of Civil Engineering and Management*, Vol. 13 No. 4, pp. 265-271.
- Iazzolino, G., Laise, D. and Migliano, G. (2014), "Measuring value creation: VAIC and EVA", *Measuring Business Excellence*, Vol. 18 No. 1, pp. 8-21.
- Isanzu, J.N. (2015), "Impact of intellectual capital on financial performance of banks in Tanzania", *Journal of International Business Research and Marketing*, Vol. 1 No. 1, pp. 16-23.
- Ismail, K. and Kareem, M.A. (2011), "Intellectual capital and financial performance of banks in Bahrain", *Journal of Business Management and Accounting*, Vol. 11 No. 1, pp. 63-77.
- Kamal, M.H.M., Mat, R.C., Rahim, N.A., Husin, N. and Ismail, I. (2012), "Intellectual capital and firm performance of commercial banks in Malaysia", *Asian Economic and Financial Review*, Vol. 2 No. 4, pp. 577-590.
- Khalique, M., Bontis, N., Jamal, A.N.b.S. and Isa, A.M. (2015), "Intellectual capital in small and medium enterprises in Pakistan", *Journal of Intellectual Capital*, Vol. 16 No. 1, pp. 224-238.
- Kweh, Q.L., Ting, I.W.K., Hanh, L.T.M. and Zhang, C. (2019), "Intellectual capital, governmental presence, and firm performance of publicly listed companies in Malaysia", *International Journal of Learning and Intellectual Capital*, Vol. 16 No. 2, pp. 193-211.
- Madani, A.F., Hosseini, K.H.S., Kordnaeij, A. and Isfahani, M.A. (2015), "Intellectual capital: investigating the role of customer citizenship behavior and employee citizenship behavior in banking industry in Iran", *Management and Administrative Science Review*, Vol. 4 No. 4, pp. 736-747.
- 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.
- Maji, S.G. and Goswami, M. (2016), "Intellectual capital and firm performance in emerging economies: the case of India", *Review of International Business and Strategy*, Vol. 26 No. 3, pp. 410-430.
- 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.

- Mohiuddin, M., Najibullah, S. and Shahid, A.I. (2006), "An exploratory study on intellectual capital performance of the commercial banks in Bangladesh", *The Cost and Management*, Vol. 34 No. 6, pp. 40-54.
- Mondal, A. and Ghosh, S.K. (2012), "Intellectual capital and financial performance of Indian banks", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 515-530.
- Nadeem, M., Gan, C. and Nguyen, C. (2018), "The importance of intellectual Capital for firm performance: evidence from Australia", *Australian Accounting Review*, Vol. 28 No. 3, pp. 334-344.
- Nawaz, T. and Haniffa, R. (2017), "Determinants of financial performance of Islamic banks: an intellectual capital perspective", *Journal of Islamic Accounting and Business Research*, Vol. 8 No. 2, pp. 130-142.
- Ozkan, N., Cakan, S. and Kayacan, M. (2016), "Intellectual capital and financial performance: a study of the Turkish Banking Sector", *Borsa Istanbul Review*, Vol. 17 No. 3, pp. 190-198.
- Pulic, A. (2000), "VAIC™—an accounting tool for IC management", *International Journal of Technology Management*, Vol. 20 Nos 5-8, pp. 702-714.
- Rouf, M.A. and Hossain, M.S. (2018), "Ownership distribution and value of the banks in Bangladesh", *International Journal of Managerial and Financial Accounting*, Vol. 10 No. 4, pp. 378-390.
- Rouf, M.A. and Hossain, M.A. (2020), "The effects of board size and board composition on CSR disclosure: a study of Banking Sectors in Bangladesh", *International Journal of Ethics and Systems*, Vol. 37 No. 1, pp. 105-121.
- Sardob, F., Serrasqueiro, Z. and Alvesa, 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 No. 1, pp. 67-74.
- 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.
- Soewarno, N. and Tjahjadi, B. (2020), "Measures that matter: an empirical investigation of intellectual capital and financial performance of banking firms in Indonesia", *Journal of Intellectual Capital*, Vol. 21 No. 6, pp. 1085-1106.
- Tan, H.P., Plowman, D. and Hancock, P. (2008), "The evolving research on intellectual capital", *Journal of Intellectual Capital*, Vol. 9 No. 4, pp. 585-608.
- 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.
- Tovstiga, G. and Tulugurova, E. (2007), "Intellectual capital practices and performance in Russian enterprises", *Journal of Intellectual Capital*, Vol. 8 No. 4, pp. 695-707.
- Tsai, C.H. and Mutuc, E.B. (2020), "Evidence in Asian food industry: intellectual capital, corporate financial performance, and corporate social responsibility", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 2, p. 663.
- Wang, M. (2011), "Measuring intellectual capital and its effect on financial performance: evidence from the capital market in Taiwan", *Frontiers of Business Research in China*, Vol. 5 No. 2, pp. 243-265.
- 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.
- Yao, H.X., Haris, M., Tariq, G., Javaid, H.M. and Khan, M.A.S. (2019), "Intellectual capital, profitability, and productivity: evidence from Pakistani financial institutions", *Sustainability*, Vol. 11 No. 14, p. 3842.
- Youndt, M.A., Snell, S.A., Dean, J.W. Jr. and Lepak, D.P. (1996), "Human resource management, manufacturing strategy, and firm performance", *Academy of Management Journal*, Vol. 39 No. 4, pp. 836-866.
- Zambon, S. (2004), "Intangibles and intellectual capital: an overview of the reporting issues and some measurement models", *The Economic Importance of Intangible Assets*, Vol. 9 No. 3, pp. 153-183.

**Further reading**

- Chan, K.H. (2009), "Impact of intellectual capital on organisational performance: an empirical study of companies in the Hang Seng Index (Part 1)", *The Learning Organization*, Vol. 16 No. 1, pp. 4-21.
- Singla, H.K. (2020), "Does VAIC affect the profitability and value of real estate and infrastructure firms in India? A panel data investigation", *Journal of Intellectual Capital*, Vol. 21 No. 3, pp. 309-331.

**Corresponding author**

Md. Abdur Rouf can be contacted at: [roufnakua@gmail.com](mailto:roufnakua@gmail.com)

---

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgroupublishing.com/licensing/reprints.htm](http://www.emeraldgroupublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)