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

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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 (VAICTM) methods have been used for measuring the performance of banks. VAICTM 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 VAICTM 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, IC 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, VAICTM

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 Hossan, 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 (VAICTM) 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 VAICTM 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 VAICTM 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 VAICTM 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 VAICTM 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 VAICTM method is easy to understand and helps stockholders to compare IC results among the Islamic banks Nawaz and Haniffa (2017). Using VAICTM 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
closely to the past and future performances of the company. Thus, the following hypotheses are proposed:

\[ H1a. \text{The SCE of a bank is positively associated with the ROAs} \]

\[ H1b. \text{The SCE of a bank is positively associated with the ROE} \]

\[ H1c. \text{The SCE of a bank is positively associated with the revenue growth (RG)} \]

### 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). HCE is not separable 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\textsuperscript{TM} 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:

#### Table 1

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

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

85 Intellectual capital and performance
2.3 Employed capital efficiency and bank performance

Employed capital efficiency (ECE) includes the customer, physical and financial dimensions of IC, and ECE 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 the 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 VAICTM method of Iazzolino et al. (2014) to measure the firm performance. Mathematically, the VAICTM computed as

\[
\text{VAICTM} = \text{SCE} + \text{HCE} + \text{CEE}
\]

where,

- \(\text{VAICTM}\) = Value added intellectual capital,
- \(\text{SCE}\) = Structural capital efficiency for bank 'i'
- \(\text{HCE}\) = Human capital efficiency for bank 'i'
- \(\text{ECE}\) = 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 (VAICTM). According to Clarke et al. (2011), calculated VAICTM is the summation of SCE, HCE and ECE i.e. VAICTM = 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:

\[
\text{Return on assets (ROA)} = \frac{\text{Profit before Tax}}{\text{Total Assets}}.
\]
\[
\text{Return on equity (ROE)} = \frac{\text{Profit before Tax}}{\text{Shareholders Equity}}.
\]
\[
\text{Revenue growth (RG)} = \frac{(\text{TBR}_t - \text{TBR}_{t-1})}{\text{TBR}_{t-1}},
\]

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

\[
\text{ROA} = \alpha + \beta_1 \text{VAIC} + \nu \quad (1a)
\]
\[
\text{ROA} = \alpha + \beta_1 \text{SCE} + \beta_2 \text{HCE} + \beta_3 \text{ECE} + \nu \quad (1b)
\]
\[
\text{ROE} = \alpha + \beta_1 \text{VAIC} + \nu \quad (2a)
\]
\[
\text{ROE} = \alpha + \beta_1 \text{SCE} + \beta_2 \text{HCE} + \beta_3 \text{ECE} + \nu \quad (2b)
\]
\[
\text{RG} = \alpha + \beta_1 \text{VAIC} + \nu \quad (3a)
\]
\[
\text{RG} = \alpha + \beta_1 \text{SCE} + \beta_2 \text{HCE} + \beta_3 \text{ECE} + \nu \quad (3b)
\]

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,
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, VAICTM 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 VAICTM (*p < 0.05, two-tailed) and CEE (*p < 0.01, two-tailed). ROE is positively related to SCE, HCE and VAICTM at the significance level of (*p < 0.05, two-tailed) and CEE VAICTM 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 VAICTM 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 VAICTM terms.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ROA</th>
<th>ROE</th>
<th>Growth</th>
<th>SCE</th>
<th>HCE</th>
<th>CEE</th>
<th>VAICTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>0.382*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RG</td>
<td>0.008</td>
<td>-0.064</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCE</td>
<td>0.193</td>
<td>0.249*</td>
<td>0.147*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCE</td>
<td>0.226*</td>
<td>0.306*</td>
<td>0.021</td>
<td>0.562**</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE</td>
<td>0.486**</td>
<td>0.638**</td>
<td>0.055</td>
<td>0.459*</td>
<td>0.440*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>VAICTM</td>
<td>0.234*</td>
<td>0.316*</td>
<td>0.036</td>
<td>0.638**</td>
<td>0.495**</td>
<td>0.466**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (two-tailed)
**Correlation is significant at the 0.01 level (two-tailed)

Note(s): ROA = return on assets; ROE = return on equity; RG = revenue growth; VAICTM = value added intellectual capital; SCE = structural capital efficiency; HCE = human capital efficiency; CEE = capital employed efficiency

Table 2. Descriptive statistics

Table 3. Correlation matrix of banks' panel data
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' 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 VAICTM 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).

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>SCE</td>
<td>-0.0007241</td>
<td>0.0040768</td>
<td>-0.18</td>
</tr>
<tr>
<td></td>
<td>HCE</td>
<td>0.0004485</td>
<td>0.0004873</td>
<td>3.36</td>
</tr>
<tr>
<td></td>
<td>ECE</td>
<td>0.4211017</td>
<td>0.0903009</td>
<td>4.66</td>
</tr>
<tr>
<td></td>
<td>VAICTM</td>
<td>0.0012809</td>
<td>0.000382</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>R-square</td>
<td>0.1536</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjusted R-square</td>
<td>0.1403</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>SCE</td>
<td>-0.018938</td>
<td>0.0186342</td>
<td>-1.02</td>
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<tr>
<td></td>
<td>HCE</td>
<td>0.0023484</td>
<td>0.0022179</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>ECE</td>
<td>4.040627</td>
<td>0.4149439</td>
<td>9.74</td>
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<tr>
<td></td>
<td>VAICTM</td>
<td>0.0096387</td>
<td>0.0020174</td>
<td>4.78</td>
</tr>
<tr>
<td></td>
<td>R-square</td>
<td>0.4069</td>
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<td></td>
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<tr>
<td></td>
<td>Adjusted R-square</td>
<td>0.3975</td>
<td></td>
<td></td>
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<tr>
<td>RG</td>
<td>SCE</td>
<td>0.2307554</td>
<td>0.1550216</td>
<td>1.49</td>
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<tr>
<td></td>
<td>HCE</td>
<td>-0.0088656</td>
<td>0.0183279</td>
<td>-0.48</td>
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<tr>
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<td>ECE</td>
<td>-0.2005556</td>
<td>3.433705</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td>VAICTM</td>
<td>0.007895</td>
<td>0.0138088</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>R-square</td>
<td>0.0131</td>
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<td></td>
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<tr>
<td></td>
<td>Adjusted R-square</td>
<td>0.0023</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note(s): *p < 0.05, two-tailed, **p < 0.01, two-tailed
ROA = return on assets; ROE = return on equity; RG = revenue growth; VAICTM = value added intellectual capital; SCE = structural capital efficiency; HCE = human capital efficiency; CEE = employed capital efficiency

Table 4. Results of regression analysis
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\textsuperscript{TM}; market value added - MVA\textsuperscript{TM}) 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.

<table>
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<th>Model</th>
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<th>Relation</th>
<th>Expected sign</th>
<th>Actual outcomes</th>
<th>Decision</th>
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</tbody>
</table>

Table 5. Results summary

References


Further reading

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