Research article

Assessing intellectual capital performance of banks during COVID-19: Evidence from China and Pakistan

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Abstract: Using quarterly data from 2019Q1 to 2020Q3, this study aims to examine the impact of COVID-19 on intellectual capital (IC) performance of banks operating in China and Pakistan. Based on the data of 34 Chinese and 41 Pakistani banks, this study applies the fixed effect method to examine this relationship, and the value added intellectual coefficient (VAIC) model is used to measure IC performance. The study shows a negative but insignificant influence of COVID-19 on IC performance of the banking sector in both countries. Likewise, the findings exhibit that IC components show resilience against COVID-19 and are slightly influenced by this crisis. The results are also consistent in robustness check. The cross-country comparison suggests that the performance of IC components in the Pakistani banking sector is higher compared to China. This is the first study that examines the impact of COVID-19 on IC performance of banks, and it might provide insights regarding the influence of crises such as COVID-19 on IC performance of banks in emerging economies.

1. Introduction

The emergence of the 2019 coronavirus disease (COVID-19) has disrupted the global financial and economic markets. In December 2019, COVID-19 was detected in Wuhan, Hubei province, China, and quickly spread to over 213 states, including Pakistan (Waris et al., 2020; Zhou et al., 2020). Alon et al. (2020) offered a chronology of important events that occurred during the early stages of the COVID-19 outbreak. According to the World Health Organization (WHO), COVID-19 spreads from one person to another when an infected person coughs or sneezes.[1] Many governments have implemented travel restrictions, lockdowns, shelter-in-place orders and social distancing in an attempt to slow down the enormous pace of COVID-19 contamination, resulting in significant global interruption in manufacturing, supply networks, and the input-output of goods and services (Alon, 2020; Rana et al., 2022). These worldwide upheavals have sent adverse economic ripples around the world, wreaking havoc on financial markets in both developed and emerging countries.

On February 26, 2020, the first case of COVID-19 was confirmed in Pakistan. Due to the arrival of pilgrims from Iran, the number of confirmed cases quickly increased since March 15, 2020. During March 15–25, 2020, the cases jumped from 53 to 1078.[2] Since then, the number of cases in various regions rapidly increased day by day. As of September 30, 2020, a total of 312,806 confirmed cases have been reported in Pakistan, out of which 6,484 people died.[3] The government of Pakistan (GOP) has taken all preventive measures to combat COVID-19 to ensure the state's commitments to its citizens (Waris et al., 2020). On March 30, 2020, the government announced a fiscal stimulus package of Rs. 1.2 trillion and grant of Rs. 100 billion for COVID-19 emergency relief fund.[4] To control the spread of virus, the GOP implemented the "National Action Plan" for preparedness and response to COVID-19. COVID-19 wreaked havoc on Pakistan and surrounding countries such as China, which is the epicenter of COVID-19. The pandemic has had an overall negative impact on the Chinese stock market, which cannot be justified by actual losses (Sun et al., 2021). The COVID-19 outbreak is expected to have a significant impact on global gross domestic product (GDP) growth (World Economic, 2020). As a result of COVID-19, global GDP is expected to be reduced by 2.3 percent to 4.8 percent.[5] Furthermore, it is estimated that the current pandemic might cause the decrease of global foreign direct investment by 5 percent to 15 percent.[6]

The resource-based theory suggests that various internal and external resources of an enterprise are condensed into its unique core competitiveness, including intangible and tangible resources. Intellectual capital (IC) has the characteristics of intangibility and creates firm value, which can be regarded as an effective strategic resource. It conforms to the three major characteristics of resources emphasized in the resource-based theory. In a knowledge-oriented economy, although tangible resources are the foundation of firms, firms view IC as a revenue generator and a vital source of information indicating corporate capabilities (Rehman et al., 2019; Sardo & Serrasqueiro, 2021). IC

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[1] Please visit https://www.who.int/health-topics/coronavirus#tab=tab_1

[2] Please visit https://www.dawn.com/news/1543683

[3] Please visit https://covid.gov.pk/stats/pakistan

[4] Please visit https://home.kpmg/xx/en/home/insights/2020/04/pakistan-government-and-institution-measures-in-response-to-covid.html

[5] Please visit https://www.adb.org/publications/asian-development-outlook-2020-innovation-asia

[6] Please visit https://unctad.org/press-material/impact-coronavirus-outbreak-global-fdi

enables the company to gain a better understanding of the overall state of its divisions and maximize the value from its intangible assets. This sort of capital can be used to establish human capital (HC) capabilities or for the establishment, preparation and retention of employees (Dashtbayaz et al., 2020). Furthermore, it can help to establish a strong bond with customers, and that is why companies with effective IC management surpass their competitors in the market (Zanele, 2004). The banking industry in Pakistan remains resilient during the COVID-19 shock, reflecting that the majority of banks have excellent capital and liquidity positions. The country's fiscal and external accounts have improved as a result of monetary and exchange rate policy and fiscal consolidation. In this study, we find that the impact of COVID-19 on IC is negative but insignificant in the context of both the Chinese and Pakistani banking industries. In China, it is because the lockdown was around four months and applied on infected areas. In the context of Pakistan, the government implemented smart and micro lockdown in the infected areas, and the banks in Pakistan continued working throughout the pandemic period with half or full staff. Due to this, the impact of COVID-19 on HC remains insignificant.

HC, internal capital and external capital of companies create skills, strategies, corporate value and some intangible assets of firms. IC is the sum of all the products (Eddine et al., 2015). Now, because of COVID-19, IC is widely concerned with companies and academics (Xu et al., 2022). The early influence of COVID-19 on the financial system has been reported in a number of recent studies. These studies have reported that Latin American mutual funds with higher HC performed well (Mirza et al., 2020) and that COVID-19 significantly influenced global banking stability (Elnahass et al., 2021) and negatively affected stock performance (Al-Awadhi et al., 2020; Harjoto & Rossi, 2023; Mazur et al., 2021; Sun et al., 2021). The contributions of our study are listed as follows. First, this study stands as the first study to explain the impact of COVID-19 on IC performance of the banking industry during the pandemic period in two emerging countries, which extends the extant IC literature. In general, the crisis resulted in high unemployment, home foreclosure, and considerable drop in business investment and consumer expenditure (Reinhart & Rogoff, 2009). However, when the crisis turned violent the banking sector was badly affected (Cecchetti, 2009). Second, our findings could help banks improve IC performance by effectively allocating IC resources in the times of crisis.

The remainder of the paper is structured are as follows. Section 2 explains the literature of IC performance based on different crisis, and Section 3 illustrates our data and methodology. Results are presented in Section 4, and Section 5 discusses the results. Finally, Section 6 concludes the paper.

2. Literature review

2.1. IC definition and dimensions

IC is defined as the sum of intangible organizational knowledge resources, which is considered a vital source of organizational performance (Bontis et al., 2018; Inkinen, 2015). The encoded technical skills of employees, organizational procedures and stakeholder relationship are encapsulated by IC. In previous literature, it is widely agreed that IC contains three distinct constructs, namely HC, structural capital (SC) and relational capital (RC) (Ahmed et al., 2020; Attar et al., 2019; Bontis, 1998; Rehman et al., 2019; Subramaniam & Youndt, 2005; Xu and Li, 2019). Mouritsen (1998) claimed that IC is about broader organizational strategic knowledge and is specific to a firm, which allows one to adapt to changing condition on a continuous basis.

HC refers to the ingenuity of employees in an organization. It includes expertise, education, skills, knowledge, capabilities, morality, commitments and creativity (Diaz-Fernandez et al., 2017; Mubarik et al., 2020; Serenko & Bontis, 2016; Sullivan, 2000). According to Keenan and Aggestam (2001), HC can be developed through corporate governance methods such as training and education. SC deals with organizational processes, systems, procedures, structures and infrastructures. Innovative capital including hardware and software systems, culture, patents, copyrights and trademarks are also included in SC (Ahmed et al., 2020; Bayraktaroglu et al., 2019; Guthrie & Petty, 2000; Sardo & Serrasqueiro, 2018). RC is defined as organizational external relationships, associations and links with suppliers and consumers and staff inter-relationship, which is capable of influencing organizational well-being and performance (Meles et al., 2016). According to Edvinsson (2013), one of the most important perceptions of modern knowledge economy is in relational or network dimension of IC.

2.2. The impact of COVID-19 on financial markets

In a knowledge-oriented economy, an effective use of IC can enhance the firm's IC performance and maintain a good relationship with outside markets (Rehman et al., 2021). During COVID-19, the literature that examines the impact of global pandemics on financial markets is growing rapidly. Barro et al. (2020) stated that the Spanish flu in 1918 has a significant negative impact on stock market returns. Baker et al. (2020) found that compared to other pandemic outbreaks (e.g. the H5N1 avian flu, the SARS epidemic, H1N1, and MERS) that have existed since the early 1900s, the COVID-19 pandemic caused an enormous rise in US stock market volatility. Another study examined the effect of the COVID-19 pandemic on China's GDP based on regular amount of train passengers during the spring festival of 2020 and showed that China's economy reduced by RMB 4.8 trillion in the first quarter of 2020, with annual GDP growth forecast to fall by about 4.78 percent in 2020. Sergi et al. (2021) found that the effects of COVID-19 in emerging and developing countries are exacerbated by the deterioration of economic variables. COVID-19 has different effects on global stock markets during growing infection periods than during stable infection periods (Harjoto et al., 2020). Corbet et al. (2020) examined the impact of COVID-19 on Shenzhen and Shanghai stock exchanges and found that COVID-19 has a strong impact on the volatility of the Chinese stock market. Using the quarterly data from 1,090 banks of 116 countries, Elnahass et al. (2021) found that COVID-19 had a negative effect on several economies and it negatively impacted various financial indicators in the global banking sector. Harjoto and Rossi (2023) stated that COVID-19 had a greater impact on emerging markets as compared to developed markets. During COVID-19, all dimensions of IC significantly influence supply chain resilience (Mubarik et al., 2021). Mirza et al. (2020) concluded that funds with higher HC efficiency performed significantly better compared to those with lower HC efficiency. Like the impact of COVID-19, a study by El-Bannany (2012) examined the impact of the global financial crisis on IC performance and showed that the financial crisis had a significant impact on IC performance of UAE banks over the period of 2004 to 2010.

3. Methodology

3.1 Data

Using quarterly data from 2019Q1 to 2020Q3, the present study focuses on the banking industry in China and Pakistan, aiming to explore the impact of COVID-19 on the performance of IC and its components. Banks with missing data and special treatment (ST) banks are excluded from our sample. The sample includes 34 Chinese and 41 Pakistani banks over the period of 2019Q1–2020Q3, which provides a total of 505 bank-year observations, out of which 222 are from Chinese banks and 283 are from Pakistani banks. The data of Chinese banks are obtained from the CSMAR database, and the data of Pakistani banks are obtained from quarterly financial statements.

3.2. Variables

3.2.1. IC measurement

The following study uses the value added intellectual coefficient (VAIC) model to measure IC performance of banks. The VAIC model, which is based on the principle of value added, is the accumulation of both tangible and intangible assets (Pulic, 2000). VAIC has three components: capital employed efficiency (CEE), human capital efficiency (HCE), structural capital efficiency (SCE). The VAIC model and its components can be calculated by using the following equations:

$$VAIC = CEE + HCE + SCE \tag{1}$$

$$CEE = VA/CE \tag{2}$$

$$HCE = VA/HC \tag{3}$$

$$SCE = SC/VA \tag{4}$$

$$SC = VA - HC \tag{5}$$

where *CE* refers to the bank's physical and financial resources, which is measured as the book value of total assets minus total liabilities. *HC* refers to the total amount invested on the knowledge of workers, measured by the value added on total salaries and wages paid. *SC* refers to the ability of usage of financial and physical resources, which equals the difference between *VA* and total salaries and wages paid on banks.

Thus, the *VA* can be calculated as:

$$VA = OUT - IN \tag{6}$$

where *VA* is the difference between *OUT*, i.e., total revenues, and *IN*, i.e., total expenses, including direct and operating costs. However, as guided by the literature (Bontis et al., 2015; Haris et al., 2019; Maji & Goswami, 2016; Nadeem et al., 2017; Pulic, 2000; Smriti & Das, 2018), the VA can further be calculated from the financial statements using Equation (7).

$$VA = OP + PC + D + A \tag{7}$$

where *OP* represents operating profit; *PC* means personnel cost (salaries, wages, and other benefits); *D* is the depreciation; *A* is the amortization.

3.2.2. Independent variable

This study aims to examine the influence of COVID-19 on IC performance of Chinese and Pakistani banking industry. Therefore, COVID-19 is treated as a dummy variable. The value 1 is assigned to the COVID-19 period (2020Q1–2020Q3), and 0 is defined as the pre-COVID-19 period.

3.2.3. Control variables

To account for the effect of bank characteristics, this study uses three main control variables, which include bank size (SIZE) measured by the natural logarithm of total assets of listed banks, leverage (LEV) that is equal to total liabilities total assets, and ownership (OWN) that equals 1 for government-owned banks and 0 otherwise. The list of all variables along with their notation and description is shown in Table 1.

Table 1. Variable description.

Variable	Notation	Description
Value added intellectual coefficient	VAIC	See Equation (1)
Capital employed efficiency	CEE	See Equation (2)
Human capital efficiency	HCE	See Equation (3)
Structural capital efficiency	SCE	See Equation (4)
COVID-19 crisis	COVID	Dummy variable that takes 1 in the COVID-19 period, 0 otherwise
Bank size	SIZE	Natural logarithm of total assets of listed banks
Leverage	LEV	The ratio of total liabilities to total assets
Ownership	OWN	Dummy variable that takes 1 for government-owned banks, 0 otherwise

3.3. Models

To evaluate the impact of COVID-19 on IC performance, we propose Models (1)–(4) (Equations (8)–(11)) that explain the association between them. Model (1) tests the impact of COVID-19 on IC performance, while Models (2)–(4) test the COVID-19's impact on IC components. The fixed effect method with robust standard errors is used to account for heteroskedasticity and autocorrelation problems.

$$VAIC_{i,t} = \beta_0 + \beta_1 COVID_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 OWN_{i,t} + \varepsilon_{i,t} \qquad (8)$$

$$CEE_{i,t} = \beta_0 + \beta_1 COVID_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 OWN_{i,t} + \varepsilon_{i,t} \qquad (9)$$

$$HCE_{i,t} = \beta_0 + \beta_1 COVID_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 OWN_{i,t} + \varepsilon_{i,t} \qquad (10)$$

$$SCE_{i,t} = \beta_0 + \beta_1 COVID_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 OWN_{i,t} + \varepsilon_{i,t} \qquad (11)$$

where *i* represents the individual bank, *t* represents the year, *β* stands for the presumed parameter and *ε* is the error term.

4. Results

4.1. Descriptive statistics

The results of descriptive statistics of Chinese and Pakistani banks are summarized in Table 2. The average VAIC of both Chinese and Pakistani banks is 3.8502 before the COVID-19 pandemic and decreases to 3.7224 during COVID-19, reporting a decline by 0.1278 because of the outbreak of COVID-19. Among the three components of VAIC, the mean value of CEE is 0.1779 before COVID-19, which decreases to 0.1633, reporting a decline by 0.0146. Similarly, the mean value of SCE is 0.8785 before COVID-19, which decreases to 0.5842, reporting a decline by 0.2943. However, HCE is the only IC resource which is influenced positively by COVID-19. The mean value of HCE is 2.7938 before COVID-19 and 2.9750 during COVID-19, respectively, reporting an increase by 0.1812. Overall, the descriptive statistics indicate that IC performance of both Chinese and Pakistani banks was negatively influenced by the COVID-19.

Table 2. Descriptive statistics of full sample.

Variable	Before COVID−19				During COVID−19			
	Mean	Max	Min	SD	Mean	Max	Min	SD
VAIC	3.8502	47.6954	−0.7569	3.5773	3.7224	18.7938	−3.8361	2.3356
CEE	0.1779	0.7756	−1.2898	0.1870	0.1633	3.0941	−0.0231	0.3226
HCE	2.7938	18.6071	−4.4225	2.3436	2.9750	17.6910	−0.8215	2.0872
SCE	0.8785	47.7187	−1.8663	2.9334	0.5842	7.8675	−4.0596	0.6707
SIZE	22.3492	31.0463	13.6074	5.3571	22.7710	31.1417	12.0895	5.3068
LEV	0.9757	12.4144	0.0560	0.9975	0.8857	4.8060S	0.0245	0.3141
OWN	0.2148	1	0	0.4114	0.2081	1	0	0.4070

4.2. Findings

The results regarding the impact of COVID-19 on IC performance of the Chinese and Pakistani banking industries are reported in Tables 3 and 4. The findings are based on the ordinary least squares (OLS) method, and by applying the Hausman specification test, the fixed effect method is found to be the appropriate method. Table 3 shows the results regarding the impact of COVID-19 on IC performance (measured by the VAIC model) of Chinese and Pakistani banks during the period from 2019Q1 to 2020Q3. The F values suggest that all models are well-fitted. The results in the full sample examine the association between the COVID-19 crisis and IC performance of two emerging Asian countries (China and Pakistan). The results report a negative but insignificant coefficient of COVID-19 ($\beta = -0.188$, $t = -0.695$), which reveals that both Chinese and Pakistani banks experienced lower IC performance during the COVID period than before the COVID-19 pandemic. However, the influence of COVID-19 on IC performance of banks in both countries is found to be insignificant. This suggests that the VAIC values of banks in both economies resist the negative shocks of COVID-19.

The Chinese sample shows the impact of COVID-19 on the VAIC of Chinese banks. The results also report the negative but insignificant coefficient of COVID ($\beta = -0.172$, $t = -0.535$). The insignificance of COVID's coefficient indicates that, although the VAIC of Chinese banks during the COVID-19 period was lower than in the pre-COVID-19 period, the impact of COVID is insignificant. This suggests that IC performance of Chinese banks was not significantly influenced by the COVID-19.

The Pakistani sample presents the impact of COVID-19 on IC performance of Pakistani banks. Similarly, the results of the Pakistani sample report the negative but insignificant coefficient of COVID, which indicates that Pakistani banks experienced lower IC performance during the COVID-19 period.

Table 3. Empirical results of Model (1).

Variable	Full sample	China	Pakistan
COVID	−0.188	−0.172	−0.200
	(−0.695)	(−0.535)	(−0.513)
SIZE	0.139***	0.024	0.168**
	(5.524)	(0.244)	(2.213)
LEV	−0.023	−15.354***	0.052
	(−0.135)	(−2.903)	(0.282)
OWN	0.028	2.163***	−1.605***
	(0.086)	(5.261)	(−3.415)
Constant	0.756	17.588***	0.479
	(1.216)	(4.530)	(0.334)
N	505	222	283
R^2	0.050	0.160	0.049
F	7.700***	11.548***	4.648***

Notes: ** $p < 0.05$, *** $p < 0.01$. t-values are in parentheses.

Table 4 presents the relationship between COVID-19 and VAIC components (CEE, HCE, and SCE) during the period of 2019Q1–2020Q3. The results of the full sample report the negative but insignificant coefficients of COVID for CEE ($\beta = -0.011$, $t = -0.587$) and SCE ($\beta = -0.289$, $t = -1.421$) and the positive but insignificant coefficient of COVID for HCE ($\beta = 0.111$, $t = 0.590$). This suggests that COVID-19 is not found to be the most influential factor for IC performance of Chinese and Pakistani banks.

The results of the Chinese sample report the negative and significant coefficients of COVID for CEE ($\beta = -0.033$, $t = -5.196$) and SCE ($\beta = -0.078$, $t = -1.891$), while the coefficient of COVID is negative but insignificant for HCE ($\beta = -0.062$, $t = -0.191$). This indicates that Chinese banks experienced lower CEE and SCE during the COVID-19 period than in the pre-COVID-19 period.

The results of the Pakistani sample show the positive but insignificant coefficients of COVID for CEE ($\beta = 0.006$, $t = 0.208$) and HCE ($\beta = 0.248$, $t = 1.347$), while the negative but insignificant coefficient for SCE ($\beta = -0.454$, $t = -1.248$), which suggests that VAIC components of Pakistani banks were not influenced by the COVID-19 crisis.

Table 4. Empirical results of Models (2)–(4).

Variable	Full sample			China			Pakistan		
	Model (2)	Model (3)	Model (4)	Model (2)	Model (3)	Model (4)	Model (2)	Model (3)	Model (4)
COVID	−0.011	0.111	−0.289	−0.033***	−0.062	−0.078*	0.006	0.248	−0.454
	(−0.587)	(0.590)	(−1.421)	(−5.196)	(−0.191)	(−1.891)	(0.208)	(1.347)	(−1.248)
SIZE	−0.007***	0.145***	0.001	0.000	0.006	0.019	0.018***	0.111***	0.039
	(−3.911)	(8.243)	(0.064)	(−0.210)	(0.060)	(1.474)	(2.953)	(3.092)	(0.551)
LEV	0.016	−0.117	0.077	0.486***	−10.129*	−5.711***	0.018	−0.047	0.081
	(1.406)	(−0.966)	(0.590)	(4.718)	(−1.912)	(−8.441)	(1.201)	(−0.532)	(0.467)
OWN	−0.061***	0.261	−0.172	0.004	2.206***	−0.046	−0.097**	−1.218***	−0.290
	(−2.751)	(1.141)	(−0.697)	(0.460)	(5.355)	(−0.875)	(−2.577)	(−5.484)	(−0.661)
Constant	0.324***	−0.381	0.813*	−0.311***	12.402***	5.477***	−0.105	0.362	0.222
	(7.708)	(−0.881)	(1.744)	(−4.113)	(3.192)	(11.038)	(−0.917)	(0.533)	(0.165)
N	505	505	505	222	222	222	283	283	283
R^2	0.040	0.118	0.002	0.199	0.137	0.294	0.048	0.133	0.005
F	6.282***	17.806***	0.724*	14.720***	9.735***	23.989***	4.540***	11.802***	0.649*

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. t-values are in parentheses.

4.3. Robustness check

In robustness check, we replace the measurement of IC from the VAIC model to the Modified VAIC (MVAIC) model, which is the most advanced measure of IC and used by many influential studies (Nimtrakoon, 2015; Sardo & Serrasqueiro, 2017; Soetanto & Liem, 2019; Vidyarthi, 2019; Xu & Wang, 2019; Yao et al., 2019). The findings of Table 5 are based on the fixed effect method and report the impact of COVID-19 on the MVAIC of Chinese and Pakistani banks. The results of the full sample show the insignificant coefficient of COVID for MVAIC ($\beta = 0.173$, $t = 0.566$) of both Chinese and Pakistani banks. Similarly, the findings of the other samples report the insignificant coefficients of COVID for the MVAIC of Chinese banks ($\beta = -0.172$, $t = -0.535$) and Pakistani banks ($\beta = 0.450$, $t = 0.959$), respectively. The findings regarding the relationship between the COVID-19 and MVAIC in Table 5 are similar to the findings regarding the relationship between the COVID-19 and VAIC reported in Table 3. Therefore, our conclusions are robust.

Table 5. Empirical results of the impact of COVID-19 on MVAIC.

Variable	Full sample	China	Pakistan
COVID	0.173	−0.172	0.450
	(0.566)	(−0.535)	(0.959)
SIZE	0.171***	0.024	0.191**
	(6.011)	(0.244)	(2.089)
LEV	0.031	−15.354***	0.112
	(0.160)	(−2.903)	(0.500)
OWN	0.296	2.163***	−1.116*
	(0.795)	(5.261)	(−1.972)
Constant	−0.435	17.568***	−0.744
	(−0.620)	(4.530)	(−0.430)
N	505	222	283
R^2	0.062	0.160	0.022
F	9.330***	11.548***	2.588**

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. t-values are in parentheses.

5. Discussion

The purpose of this study is to examine the impact of COVID-19 on IC performance of Chinese and Pakistani banks over the period of 2019Q1–2020Q3. The findings suggest that COVID-19 is found to be insignificantly related to IC performance of Chinese and Pakistani banks. Even though we split the full sample into Chinese banks and Pakistani banks, we still find similar results. This is consistent with Xu et al. (2022) who argued that IC improves bank profitability in the era of COVID-19. The insignificant influence could be because of the fact that banks in both countries continued operating. Both countries have performed extraordinary work in controlling the outbreak of COVID-19. One the one hand, China has implemented the strongest prevention measures such as full lockdowns, travel bans and shutdown of business and educational activities, and these measures have successfully controlled the spread of COVID-19 within three months of its outbreak. On the other hand, the Pakistani government has also taken the outbreak of COVID-19 seriously and started implementing measures to control its spread. However, considering the economic situation, the Pakistani government has come up with a smart lockdown policy (such as reducing the number of working hours with 50 percent of employees, staff rotation and online educational activities), which supports banks to continue their operations. In addition, both countries have responded to this crisis in the form of monetary and fiscal policies including tax reduction, credit support, loan restructuring, and reduction in policy rate. In China, there was a very short lockdown in Wuhan city and other affected areas, and IC performance was not influenced by the outbreak of COVID-19. China's digital skills are important to cope smoothly with the pandemic and quickly respond to change through digital infrastructure capabilities, limited branch services, online customer operations and digital business transformation.[7] In the first half of 2020, Chinese banks showed good growth resilience. The commercial banks in China generated 1.7356 trillion yuan with an average growth rate of 4.3

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[7] Please see https://www.thebanker.com/World/Chinese-Banks-Response-During-COVID-19

percent, while the revenue of overseas banks fluctuated due to the COVID-19 crisis.[8] In the Chinese context, IC components such as HC are not affected by COVID-19, while physical and structural capitals are significantly and negatively influenced. This might be explained by the fact that the pandemic outbreak jolted the financial markets.

In Pakistan, the first case of COVID-19 was reported in February 2020. Since then, the economic activities have been brought to a halt, and most areas have been put into a partial lockdown, which causes disruption in the production and services sectors. The GOP provided a stimulus package worth 1.25 trillion rupees for fiscal measures such as tax breaks and concessions to the industry.[9] The pandemic in Pakistan was less severe compared to other countries around the globe despite setbacks in nearly every other sector, and the banking sector's performance in 2020 seems to have been satisfactory.[10] Demirgüç-Kunt et al. (2020) found that the performance of the banking sector around the globe is under stress. Because of proactive measures of the Pakistani Government and state bank of Pakistan, the banking sector's performance resisted the shocks consistently during the pandemic period. That is the reason why IC performance is not impacted significantly by COVID-19. Specially, HC performs well compared to physical assets and SC because the employees in the banking sector continued working either physically or remotely. Alnassafi (2022) also concluded that all of the IC components played an essential role in executing crisis management during COVID-19.

6.   Conclusions

The main objective of this study is to investigate whether COVID-19 had a significant impact on IC and its components in Chinese and Pakistani banks. The study is based on the period of 2019Q1–2020Q3, where COVID-19 is considered as a dummy variable. The fixed effect method is applied to analyze the relationship between the COVID-19 pandemic and IC performance. The findings reveal that COVID-19 had a negative but insignificant effect on IC. In robustness check, the results remain unchanged. Our study makes a significant contribution to the relationship between COVID-19 and IC because there was no previous research investigating the impact of COVID-19 on IC performance. In addition, our findings could help banks improve IC performance by effectively allocating IC resources in times of crisis.

There are some practical implications for banks. First, this study suggests that better management of IC resources minimizes the impact of negative shocks caused by crises like the COVID-19 pandemic. Therefore, for ensuring sustained banking performance, the importance of IC should be taken into consideration when managers and policy makers make upcoming strategic policies. Second, banks in both countries should pay attention to HC investment by establishing a reasonable working mechanism during crisis and exploring the deep needs of customers. Finally, during times of crisis, banks in China and Pakistan should optimize organizational structure, management systems and incentive mechanisms and attach importance to SC in order to improve management efficiency, thus stimulating bank profitability.

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[8] Please   see   https://www2.deloitte.com/cn/en/pages/financial-services/articles/review-and-outlook-of-china-banking-industry-semi-annual-analysis-of-2020.html

[9] Please see https://issi.org.pk/issue-brief-on-impact-of-covid-19-on-economy-of-pakistan/

[10] Please see https://www.thenews.com.pk/tns/detail/756983-covid-19-fails-to-rock-banking-sector

There are some limitations that should be addressed. First, future research could be carried out in other developed or developing countries to further analyze the impact of COVID-19 on banks' IC performance in the globe. Second, we only consider two elements of IC, and future research could introduce more IC elements such as innovative capital and process capital to accurately assess IC performance.

Use of AI tools declaration

The authors declare that Artificial Intelligence (AI) tools haven't been used in the creation of this article.

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Conflicts of interest

The authors declare no conflicts of interest.

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