

## **The Impact of Intellectual Capital Formation and Knowledge Economy on Banking Performance: A Case Study of GCC's Conventional and Islamic Banks**

### **Abstract**

**Purpose:** This paper aims to evaluate the impact of intellectual capital in terms of human capital, structural capital, and capital employed on the financial performance of Islamic and conventional banks in the GCC countries.

**Design/methodology/approach:** Along with the measurement discussion, the empirical analysis examines the relationship between intellectual capital measured through VAIC and the financial performance of banks in the GCC states by conducting a panel of six GCC countries, including 24 Islamic banks and 32 conventional banks covering 2012-2020 period.

**Findings:** This paper shows that while Islamic banks have similar VAIC, HCE, and CEE results to conventional banks, Islamic banks have lagged behind conventional banks regarding the impact of structural capital on financial performance. It is argued that this is in contradiction with Islamic ontology and epistemology, which essentialises intellectual capital formation.

**Originality:** This study conducts a comparative examination of the intellectual capital performance and its impact on financial performance by using interaction variables to capture any differences between Islamic banks and conventional banks in the GCC countries. The paper also considers the knowledge economy impact as a novelty, which is prominent for the GCC countries. In addition, Islamic ontology's essentialisation of knowledge and its articulation in the form of intellectual capital within modern understanding is widely discussed, as part of originality. Lastly, the findings are located within Islamic ontology and epistemology.

**Practical Implications:** Islamic banks should promote research and development for their intellectual capital at the product, operational and institutional levels, since Islamic banking is considered an alternative financing method, incorporating a new form of knowledge-based institutions inspired by capitalist institutions.

**Keywords:** Intellectual capital; VAIC; Financial performance; Islamic banks; the GCC

## 1. Introduction

With the emergence and essentialisation of the knowledge economy and hence innovative nature of organisations, 'intellectual capital' has been increasingly considered a term to explain a knowledge-based economy, which is characterised by knowledge, skills, good relationships, and technological proficiency in terms of human capital and structural capital (Ismail and Karem, 2011). The notion of intellectual capital has attracted some attention over the years, which necessitated the development of measures to evaluate the impact of intellectual capital on organisations. As part of such developments, several empirical studies emerged about intellectual development concerning different economic sectors through developing various frames and measures (e.g. Al-Musali and Ismail, 2016; Bhatia and Mehrotra, 2016; Damayanti and Budiyanawati, 2014; Kamath, 2007; Khaliq *et al.*, 2013; Li *et al.*, 2008; Mavridis and Kyrmizoglou, 2005; Mubaraq and Haji, 2014; Nawaz and Haniffa, 2017). Since banking sector is knowledge-based, intellectual capital has played an increasingly important role in promoting innovation. (Ismail and Karem, 2011).

The measurement of intellectual capital performance has been subject to debate searching for the most appropriate methods. In the literature, the most commonly used method is the Value Added Intellectual Coefficient (VAIC) (Pulic, 1998, 2000, 2004), which relates to financial statements categorised as human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE). Therefore, the VAIC model has been applied to the banking sector for assessing their financial data to evaluate intellectual capital performance and its impact on financial performance. The measurement of intellectual capital efficiency in banks has become more of an issue in the modern banking system due to the increased use of innovation, human capital, and technology. This study utilises the VAIC model in measuring intellectual capital efficiency is framed through the intellectual capital terminology and its pillars, such as HCE, SCE, and CEE supported by the VAIC model.

This paper, hence, aims to examine the impact of intellectual capital performance on the financial performance of both conventional and Islamic banks in the Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates). The selection of the GCC countries as a case is significant because these countries have a

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national vision that focuses on the knowledge economy and intellectual capital<sup>1</sup>, and they have the largest share in the global distribution of Islamic finance. The empirical analysis examines the nexus between the intellectual capital formation of the sampled Islamic and conventional banks and their financial performance through panel data econometric modelling. In addition, this paper provides a discursive rationale for the essentialisation of intellectual capital and knowledge development within the Islamic cognitive system.

The significance of this paper stems from conducting a comparative examination of intellectual capital performance and its impact on financial performance both in conventional and Islamic banks in the GCC countries. Despite Islamic ontology's essentialisation of knowledge and its articulation in the form of intellectual capital within modern understanding (*see* section 2), this paper argues that Islamic banks have lagged behind conventional banks in terms of intellectual capital performance, in particular in structural capital formation, which contradicts the expectation and consequences aimed by Islamic ontology and epistemology.

As for the organisation and the contents of this paper, following the introduction, Section 2 presents an Islamic normative understanding on knowledge creation, and human capital is articulated by shedding light on the modern banking system and its perspective on intellectual capital. Section 3 presents a review of empirical studies on the theme and develops the hypotheses. While research methodology and data is placed in Section 4, empirical analysis is detailed in Section 5. A general discussion and practical implication are presented in Section 6. Lastly, Section 7 offers a conclusion.

## **2. Essentialising Islamic Intellectual Capital Formation through Islamic Ontology and Epistemology**

Considering the importance attached to knowledge with a particular reference to development, the essential nature of knowledge acquisition has been demonstrated by the first verse revealed in forming the *Qur'an*, which commences with the word '*iqra*' or 'read'. This implies that human beings are expected to obtain knowledge to develop society and discover the universe, as stated in many verses in *Qur'an* (*see* for example 13:11). Therefore, to develop themselves

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<sup>1</sup> For more details, *see*: Economic Development Board of Bahrain (2008); Ministry of Foreign Affairs State of Kuwait (2018); Supreme Council for Planning of Oman (2016); General Secretariat For Development Planning (2008); Kingdom of Saudi Arabia Vision 2030 (2018); UAE Vision (2021).

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and society, individuals need to attain the knowledge to reach perfection through the 'becoming' process essentialised by Islamic methodology (Asutay & Zaman, 2009).

As to the vital question as to why human beings are responsible for developing society within such an ontological position, the *umran* paradigm can explain this, which is frequently referred to in the *Qur'an* with regards to the development of society, civilisation, and habitat. Malkawi (2013) states that *umran* constitutes the material aspect of development within a moral frame of society, which provides the necessary structure for building and developing human capital and economic and social paradigms (Malkawi, 2013: 127). Therefore, good governance shaped by justice within Islam normative world aims for individual, social, economic, and political development of the society in line with the substantive morality of Islam.

Human capital development is essential for human beings to increase their abilities and capabilities in fulfilling the duties expected of them, including and importantly, to be connected with and help others. Thus, socialisation in the form of beneficence or *ihsan* (Abdullah, 2012, pp. 66-67) is considered to be the highest quality a person could reach. Such a quality requires developing (*imar*) the world (Chapra, 2000) with the mastery of knowledge and skills in the context of the duties and responsibilities entrusted to human beings as the "representative of God for the prosperity of society and also for the management of the whole universe" (Thaib, 2013, p. 14).

According to Islam, hence, people need to have skills and knowledge by improving themselves to attain salvation or *falah* so that the development of their society and the world through beneficence or *ihsan* can be possible. Improvement of individual qualities at an intellectual and spiritual level, as suggested by *tazkiyah*, means considering social and community-based interest above self-interest (Thaib, 2013, p. 14). To secure this aim, human beings need to acquire the necessary knowledge levels and institute such knowledge within the individual and societal level to place it where they work.

It can, therefore, be summarised that within the Islamic normative world, knowledge is considered more important than any type of wealth and property, which can be developed through innovation and research. Thus, knowledge whereby innovation is essentialised by Islam for the development of individuals, organisations and societies. The emergence of Islamic finance and banking is a clear articulation of the Islamic cognitive system in the modern world, as the objective function of these institutions and the *Shari'ah* compliance of their

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operations and financing is determined by Islamic knowledge articulated through hermeneutic studies. It is therefore expected that Islamic banks and financial institutions should be at the forefront of producing intellectual capital to attain Islamic expectations.

### **3. Literature Review and Hypothesis**

#### **3.1. Empirical Literature Survey**

The available empirical studies reveal that intellectual capital plays a significant role in enhancing organisations' business and financial performance. A quick survey of the existing literature shows a very broad emerging literature on intellectual capital, including various case studies across countries and sectors, ranging from pharmaceutical industries to the financial sector. However, it is important to state that each case study has its own measurement method. For instance, while industrial case studies have mostly focussed on survey analysis, the financial sector based studies have utilised the VAIC model developed by Pulic (1998, 2000, 2004). In addition to the different measurement techniques, the components of intellectual capital may vary from case to case. However, the studies following the VAIC model have commonly similar hypotheses.

A large body of empirical studies exist on the intellectual capital performance of banks, financial institutions, and firms by using the VAIC model (e.g. Ovechkin *et al.*, 2021; Buallay *et al.*, 2020; Ousama *et al.*, 2020; Buallay, 2019; Nawaz and Haniffa, 2017; Al-Musali and Ismail, 2016; Sharma and Mani, 2012; Muhammad and Ismail, 2009; Ting and Lean, 2009; Kamath, 2007; do Rosário Cabrita and Vaz, 2005; Goh, 2005; Mavridis and Kyrmizoglou, 2005; Mohiuddin, 2006; Pulic, 2004). In addition, there has been a growing literature on intellectual capital performance through disclosure analysis (e.g. Tumwebaze *et al.*, 2021; Mamun and Aktar, 2020; Belal *et al.*, 2019; Kamath, 2017; Sharma and Dharni, 2017; Bhatia and Mehrotra, 2016; Maaloul and Zeghal, 2015; Damayanti and Budiyanawati, 2014; Mubaraq and Haji, 2014; Soon Yau *et al.*, 2009; Li *et al.*, 2008). However, this paper focuses more on analysing actual data than the data produced by the disclosure method.

By shifting the focus to the studies related to Islamic banks and conventional banks, in a recent study, Ousama *et al.* (2020) examine the intellectual capital and financial performance in the Islamic banking industry from the GCC countries for the years of 2021-2013, and 2014. They found that human capital and capital employed by Islamic banks have a significant impact on their financial performance, but structural capital is insignificant. Buallay *et al.* (2020) examine

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the efficiency of GCC banks in terms of intellectual capital by comparing Islamic banks and conventional banks for the period of 2012-2016. They found that intellectual capital efficiency is positively related to financial and market performance. Similarly, Buallay (2019) investigated the impact of intellectual capital on Islamic and conventional banks' financial and market performances by constituting a different model. It is found that IC is positively significant for the financial and market performances in Islamic banks, whereas IC is positively significant for the operational and financial performances in conventional banks.

Nawaz and Haniffa (2017) examined the impact of intellectual capital on the financial performance of 64 Islamic financial institutions in 18 countries spanning from 2007 to 2011 through the VAIC model. The results reveal a significant relationship between intellectual capital measured by the VAIC model and the financial performance of sample countries. According to analysis, each component of VAIC, such as the efficiency of capital employed and human capital, has a significant positive relationship with financial performance, while the paper could not locate a significant relationship between SCE and the financial performance of sampled financial institutions. Therefore, Nawaz and Haniffa (2017) suggest that the value creation capability of Islamic financial institutions highly considers HCE and CEE.

In investigating the relationship between intellectual capital measured by the VAIC model and the financial performance of banks measured by ROA and ROE in the GCC countries from 2008 to 2010 through cross-country analysis, Al-Musali and Ismail (2016) show that intellectual capital performance of the sampled banks in the GCC demonstrate a positive significant relationship with the financial performance of banks. According to the result of each indicator of VAIC, there is a significant positive relationship between HCE and financial performance in Bahrain, Oman, and Saudi Arabia, but a negative relationship in Kuwait. However, for Qatar, they could not find any relationship between HCE and ROE, while it has a significant relationship with ROA. According to SCE, the study located a significant relationship with financial performance only in Kuwait, Qatar and the UAE. In addition, Al-Musali and Ismail (2016) found a significant relationship between efficiency of capital employed and banks' ROE in Kuwait, Oman, and UAE and significant associations with ROA in Oman, Qatar, Saudi Arabia, and UAE, only.

In general, it can be seen that the banking sector has an important place in intellectual capital literature, demonstrating how success in intellectual capital is related to financial success. Additionally, when considering each component, the impact of HCE and CEE is more

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significant than other components, and SCE has a negative impact or is not significant. As mentioned above, a limited number of studies have examined Islamic banks in the GCC countries on intellectual capital field,. To our knowledge, Buallay *et al.* (2020) are the only study to compare both Islamic and conventional banks in the GCC countries in one model. Nevertheless, our study differs from other studies in some ways. First, Islamic banks' intellectual capital was developed through discussions of Islamic ontology and epistemology within the main argument that Islamic institutions should focus more on intellectual capital according to their ontological emergence. In addition, interaction variables have been added to each model to capture the differences between Islamic and conventional banks. As part of the analysis of GCC economies, KEI was included in the model as a variable indicating the role of the knowledge economy at the macro or country level on the financial performance of the banking sector. This is a novel approach, and none of the studies on the subject matter has considered including country-level knowledge economy indicators such as KEI. By including this variable, we assume that national knowledge economy performance directly impacts the firm level intellectual capital creation. Furthermore, this paper examines the years 2012-2020 in the sample period, allowing us to use both random and fixed-effect models to analyse the larger panel of 495 observations than the other studies. Therefore, this study can be considered a contribution to the literature.

### **3.2. Hypothesis Development**

As empirical literature survey in the preceding section demonstrates, the relationship between the VAIC and the financial performance of banks for either conventional or Islamic or both is empirically explored by several studies through different samples. By referring to those empirical papers, hypotheses development is presented as follow:

*VAIC and financial performance:* In the light of the existing studies, intellectual capital, which includes human, structural sources and their efficient use, provides a competitive advantage to firms and organisations, such as banks (e.g. Al-Musali and Ismail, 2014; Reed *et al.*, 2006; Sharma and Dharni, 2017; Zeghal and Maaloul, 2010). As these studies concluded, it is expected that the VAIC performance as a total of its constituting indicators, positively affect the financial performance of banks (e.g., Al-Musali and Ismail, 2016; do Rosário Cabrita and Vaz, 2005; Mavridis and Kyrmizoglou, 2005; Muhammad and Ismail, 2009). Consequently, the following hypothesis is developed:

*H<sub>1</sub>: There is a significant positive relationship between VAIC and its interaction variables and the financial performance of banks in GCC countries.*

In addition to the level of VAIC in total, it is important to impress that each indicator of VAIC can differ in explaining its impact on a bank's financial performance. Therefore, testing and evaluating each component of VAIC, including human capital, structural capital and capital employed, could present more realistic results regarding the intellectual capital performance of banks and its impact on the financial performance of the sampled banks. In this sense, the following hypotheses are considered to be tested for the impact of each of the constituting indicators on financial performance in the GCC banks.

*Human Capital and Financial Performance:* Human capital is the primary source for firms, organisations, and banks to manage an efficient economic and financial performance (Alipour, 2012; Puntillo, 2009). A more qualified and efficient human source can contribute to the increase of value-added efficiency and the improvement of performance in an organisation (Rehman *et al.*, 2011) through producing new ideas, methods, and techniques (Berg, 1970). Due to the contribution of human resources on productive, profitable, and high-value elements for the organisation, such as banks in this study, the expectation is that the level of human capital affects the financial performance of banks as a positive outcome (e.g. Goh, 2005; Mavridis and Kyrmizoglou, 2005; Mohiuddin *et al.*, 2006; Nawaz and Haniffa, 2017; Ting and Lean, 2009). Therefore, the following hypothesis is developed for this study:

*H<sub>1a</sub>: There is a significant positive relationship between HCE and its interaction variables and the financial performance of banks in GCC countries.*

*Structural Capital and Financial Performance:* Although structural capital does not directly relate to intangible assets, it is a significant indicator of intellectual capital by providing an environment that helps create new knowledge and promote employees to learn this new knowledge (Florin *et al.*, 2003). This helps create an added value to the organisation through copyrights, patents, databases, software, brands, rules and policies, which are non-human assets, but being structural capital, they are formed by knowledge and human capital. Therefore, an organisation requires structural capital to keep up with changes in technology and economy that affect the performance of an organisation or a firm, for example, banks in this study. In this respect, as identified by Youndt, Subramaniam, and Snell (2004) and Nawaz and Haniffa (2017), structural capital can be associated with financial performance.

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Accounting for the results of previous studies, the prediction is that the level of structural capital has a positive impact on financial performance in banks (e.g. Alipour, 2012; Bontis, 1998; Calabrese *et al.*, 2013; Mehralian *et al.*, 2013; Nawaz and Haniffa, 2017; Rehman *et al.*, 2011; Watson and Stanworth, 2006). Therefore, the following hypothesis is constructed:

*H<sub>1b</sub>: There is a significant positive relationship between SCE and its interaction variables and the financial performance of banks in GCC countries.*

*Capital Employed and Financial Performance:* Intellectual capital has been associated with financial capital, which is articulated as being linked to human-centred and non-human centred assets. Capital employed is related to the amount of capital, which helps to generate income and value based on both current and fixed assets (Zin *et al.*, 2014). This kind of capital can be associated with relationships between organisations and firms, including banks, as in this study, and external factors, such as customers and suppliers. Therefore, it is expected that such a relationship can affect the value of banks in terms of brand, image, reputation *etc.* (Shamsudin and Yian, 2013). Moreover, well-organised capital employed increases the image and reputation of banks among customers and external partners, which, in turn, affects the financial performance of banks. From this perspective, the expectation is that capital employed positively impacts banks' financial performance (Nawaz and Haniffa, 2017; Ting and Lean, 2009). Therefore, the following hypothesis is developed:

*H<sub>1c</sub>: There is a significant positive relationship between CEE and its interaction variables and the financial performance of banks in the GCC countries*

Based on the hypotheses developed, the following section identifies the relevant empirical framework and method.

## **4. Methodology and Data**

### **4.1. Methodology**

In cross country studies with time-series data, panel data analysis is often preferred, as it is argued that it prevents bias in data analysis (Greene, 2012; Hsiao, 2007). By applying the Hausman test, we could choose from random-effects models and fixed-effects models to examine the effect of the VAIC's, HCE's, SCE's, and CEE's on ROA & ROE as the financial

performance of each of the GCC countries' banks. The following equation provides the basis for the models examined in this study.

$$Y_{i,t} = \alpha_0 + \beta_1 X_{i,t} + \beta_2 X_{i,t} DB_{i,t} + \sum_{a=1}^n \gamma_a C_{i,t} + \varepsilon_{i,t} (\nu_i) \quad (1)$$

Regarding the dependent variables,  $Y_{i,t}$  represents *ROA* and *ROE* as the financial performance of bank  $i$  at time  $t$ .  $X_{i,t}$  represents that *VAIC*, *HCE*, *SCE*, and *CEE* are the four main independent variables of bank  $i$  at time  $t$ , and each of them will be included in the equation separately.  $X_{i,t} DB_{i,t}$  represents the *interaction variables* of main independent variables to identify differences between Islamic banks and conventional banks.  $C_{i,t}$  are control variables, such as *Size*, *Risk\_Level*, *KEI*, *GDP* and *Age* for bank  $i$  at time  $t$ .  $\varepsilon_{i,t}$  is an error term representing the residual as a whole, where the residual is the combination of cross-sectional and time-series analysis. Accordingly, this study provides 26 possible equations to be estimated after combining the dependent variables with the main independent variables and interaction variables.

The fixed-effects models are based on the assumption that errors of specific entities and dependent variables are correlated. Consequently, it eliminates the influence of the time-invariant characteristics (Stock and Watson, 2015). However, as a result of random effects, the probability of an observation being random is represented by  $\nu_i$ , the individual residual.

#### 4.2. Data Collection and Variable Definition

Financial variables, such as *ROE*, *ROA*, total assets, and risk level, were assembled from Fitch Connect. In addition, the data for bank age were gathered from their websites and annual reports. As explained below, the World Bank provides *KEI* until specific years, and therefore necessary data were collected for the indicators to calculate *KEI* until 2020. In addition, *GDP* data were obtained from the World Bank. Variables, data sources, and the period are depicted in the Appendix, Table A1.

The sample in this research consists of 24 Islamic banks and 32 conventional banks from the GCC countries from 2012 to 2020. The first Islamic bank in Oman was established in 2012. Omani Islamic bank data, therefore, could only go back to 2014 since this is the earliest available *ROA* and *ROE* data provided for the sector. The distribution of the sampled Islamic and conventional banks concerning the country of origin and the period were listed in the Appendix, Table A2.

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*Dependent Variable:*

*ROA:* It refers to the ability of assets to generate profits.

*ROE:* It measures a bank's profitability in relation to its equity.

*Independent Variables:*

VAIC is constituted by three elements: HCE, SCE, and CEE, as taken from the literature stated in the previous section.

$$VAIC = HCE + SCE + CEE \quad (2)$$

In this model Value Added (VA) is the key indicator to calculate the other indicators in the model.

$$VA = OUTPUT - INPUT \quad (3)$$

where:

*Output* = Total income

*Input* = Operating expenses (excluding personal costs)

Other variables are measured as:

$$HCE = \frac{VA}{\text{Human capital (staff expenses)}} \quad (4)$$

$$SCE = \frac{\text{Structural capital (balance between equities and long-term liabilities)}}{VA} \quad (5)$$

$$CEE = \frac{VA}{\text{Capital employed (balance between current assets and current liabilities)}} \quad (6)$$

*Control variables:*

*Size:* Total Asset Growth

*Risk Level:* Net Loans to Total Assets

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*KEI*: To provide novelty, Knowledge Economy Index (KEI) is included among the independent variables in this study to capture the impact of the nationwide KEI performance on individual banks' intellectual capital. The KEI was released by the World Bank for 1995, 2000, and 2012 through the Knowledge Assessment Methodology (KAM) model. Therefore, the World Bank's statistical methodology in measuring the pillars of the knowledge economy was utilised to complete the data for 2012-2020. In addition, Principal Component Analysis (PCA) is used to produce a single index for the knowledge economy through the application of sub-indices. PCA enables to get efficient data and results rather than taking the average of the data.

*GDP*: Gross Domestic Product (per capita) Growth

*Age*: If a bank has been operating for between 0 and 3 years, it is scored as 0 and is referred to as an emerging bank. When the operation years are between 4 and 7 years, the score is 1, and the bank is classified as a young bank. Banks with an 8 to 20 years' operating history receive a score of 2, which are classified as middle-aged. If the bank has been operating for more than 20 years, it is scored as 3 and is considered mature.

## 5. Empirical Tests

According to the summary statistics provided in Table 1 in preparing for the regression analysis, ROA and ROE as the dependent variable generate profit for sampled banks with a mean value of 1.25 and 9.96, respectively. On the other hand, VAIC scored a mean value of 8.9, suggesting that the sampled banks are efficient in generating value. The mean values of interaction variables for Islamic and conventional banks for VAIC are 3.70 and 5.28, respectively. As for VAIC's pillars, namely HCE, SCE, and CEE scored means values of 7.70, 0.87 and 0.41, respectively. This result shows that among the pillars associated with the VAIC performance, the value of HCE is generally the main driver for the value of VAIC. Regarding interaction variables for Islamic banks, the mean values of HCE<sub>IB</sub>, SCE<sub>IB</sub>, and CEE<sub>IB</sub> are 3.15, 3.37, and 0.17, respectively. As for interaction variables for conventional banks, the mean values of HCE<sub>CB</sub>, SCE<sub>CB</sub>, and CEE<sub>CB</sub> are 4.55, 0.49, and 0.23, respectively. Table 1 also presents mean values for Size, Risk Level, KEI, GDP, and Age statistics as control variables, which show that the sampled banks are moderately efficient in producing the value with mean values of 0.98, 92.83, 1.61, and -1.25, respectively.

**Table 1. Descriptive statistics**

Variable	Obs	Mean	Std. Dev.	Min.	Max.
ROA	495	1.259	1.083	-10.46	3.36
ROE	495	9.962	9.210	-122.14	26.89
VAIC	495	8.987	3.420	-5.31	25.23
VAICxIB	495	3.706	5.126	-5.31	25.23
VAICxCB	495	5.281	4.964	0	20.76
HCE	495	7.703	3.325	-5.36	23.91
HCExIB	495	3.150	4.544	-5.36	23.91
HCExCB	495	4.552	4.376	0	19.37
SCE	495	0.873	0.691	-0.16	16.06
SCExIB	495	0.379	0.819	-0.16	16.06
SCExCB	495	0.494	0.426	0	0.95
CEE	495	0.410	0.142	-1.13	0.86
CEExIB	495	0.176	0.241	-1.13	0.86
CEExCB	495	0.234	0.211	0	0.65
Size	495	0.984	0.142	-0.58	1.49
Risk_Level	495	92.834	83.634	34.05	901.63
KEI	495	1.618	0.976	0.26	3.84
GDP	495	-1.252	3.852	-17.488	4.507
Age	495	2.688	0.569	0	3

As the correlation matrix in Table 2 shows, there is a moderate relationship between VAIC & its pillars and ROA & ROE except for SCE, as SCE's relation is negative and weaker than the other components. In addition, while there is also a moderate relationship between interaction variables for conventional banks and ROA & ROE, Islamic interaction variables have a weaker relationship. The relationship between control variables and ROA & ROE is moderate, except for Risk Level & KEI, which are weaker than the other variables. A negative relationship exists between the Risk Level and ROA & ROE, and the coefficients are on the low side. It can be concluded that none of the variables has a high correlation with ROA & ROE.

**Table 2. Correlation Matrix**

Variable	ROA	ROE	VAIC	VAICxIB	VAICxCB	HCE	HCExIB	HCExCB	SCE	SCExIB	SCExCB	CEE	CEExIB	CEExCB	Size	Risk_Level	KEI	GDP	Age
ROA	1.0000																		
ROE	—	1.0000																	
VAIC	0.4790	0.4610	1.0000																
VAICxIB	0.0894	0.0884	—	1.0000															
VAICxCB	0.2377	0.2263	—	—	1.0000														
HCE	0.5122	0.4546	—	—	—	1.0000													
HCExIB	0.1447	0.1137	—	—	—	—	1.0000												
HCExCB	0.2390	0.2274	—	—	—	—	—	1.0000											
SCE	-0.1946	-0.0283	—	—	—	-0.0127	—	—	1.0000										
SCExIB	-0.2652	-0.1173	—	—	—	—	—	—	—	1.0000									
SCExCB	0.1941	0.1794	—	—	—	—	—	—	—	—	1.0000								
CEE	0.4828	0.5883	—	—	—	0.2308	—	—	-0.1014	—	—	1.0000							
CEExIB	0.0725	0.1323	—	—	—	—	—	—	—	—	—	—	1.0000						
CEExCB	0.2429	0.2457	—	—	—	—	—	—	—	—	—	—	—	1.0000					
Size	0.0551	0.1226	-0.0871	0.0773	-0.1398	-0.0842	0.0721	-0.1388	-0.0162	0.0603	-0.1422	-0.0459	0.0806	-0.1232	1.0000				
Risk_Level	-0.0306	-0.0480	0.1524	0.2155	-0.1175	0.1368	0.2112	-0.1154	0.1399	0.1811	-0.1213	-0.2091	-0.0126	-0.1268	0.0158	1.0000			
KEI	0.0335	0.0137	0.0110	0.0630	-0.0575	0.0188	0.0656	-0.0538	-0.0374	0.0101	-0.0799	0.0031	0.0668	-0.0744	-0.1460	-0.0350	1.0000		
GDP	0.1835	0.1497	-0.0554	-0.0239	-0.0135	-0.0527	-0.0245	-0.0146	-0.0391	-0.0212	-0.0226	0.0876	0.0248	0.0307	0.0551	0.0254	0.2057	1.0000	
Age	0.2410	0.1671	0.1518	-0.2238	0.3357	0.1784	-0.1851	0.3278	-0.1661	-0.3314	0.3674	0.2808	-0.1437	0.3540	-0.2625	-0.1710	0.1426	0.0011	1.0000

Based on the regression results in Table 3, the VAIC and its components explain ROA as the financial performance of GCC banks, which is consistent with the literature (Nawaz and Haniffa, 2017; Al-Musali and Ismail, 2016; Ousama *et al.*, 2020; Buallay *et al.*, 2020). As shown in Model 1a, VAIC is statistically significant at 1 % and has a positive relationship with ROA. Models 1b and 1c, which show interaction variables for Islamic and conventional banks, are equally important. In model 2a, where the VAIC components are considered together, HCE, SCE and CEE variables are all statistically significant at 1%, but only SCE has a negative effect.

According to model 3, where each component is examined separately, the HCE variable and the interaction variables created for Islamic and conventional banks are statistically significant at a 1% level and have a positive impact. HCE is a significant variable for the intellectual capital analysis, as seen in the literature (Nawaz and Haniffa, 2017; Ovechkin *et al.*, 2021; Ousama *et al.*, 2020). This can be explained by GCC countries' policies for knowledge-based economies place a high emphasis on human capital development.

Based on Model 4, SCE is statistically significant at a 5% level for all banks and has a negative impact. For Islamic banks, the interaction variable is statistically significant and negative at a 1% level, whereas conventional banks have a positive effect at the 1% level. However, this result shows that SCE is not mainly significant for the financial performance in the literature (Nawaz and Haniffa, 2017; Ousama *et al.*, 2020). The study's main argument is based herein. The emergence of Islamic banking is based on the logic of conventional banking, so they tend to neglect the authenticity of the Islamic moral economy in their operation. The CEEE, CEE<sub>IB</sub>, and CEE<sub>CB</sub> variables in Model 5 have positive impacts at a 1% level and are statistically significant, similar to the literature (Nawaz and Haniffa, 2017; Ousama *et al.*, 2020). It should be noted that the Islamic interaction variable has a negative effect, while the conventional interaction variable has a positive impact. Due to operational differences between these two types of banks, some of the results might be different.

As for control variables, as shown in Table 3, the size variable has a positive and statistically significant impact for all models, as expected. However, Risk\_Level only has a significant and positive impact when all VAIC pillars are considered together. In addition, GDP and Age also have a significant and positive impact, as expected. Despite this, the KEI is not significant, which is understandable since the GCC countries are in transition to the knowledge economy, and its effects will become apparent over time.

**Table 3. Regression results (ROA)**

ROA	Model 1a	Model 1b	Model 1c	Model 2a	Model 3a	Model 3b	Model 3c	Model 4a	Model 4b	Model 4c	Model 5a	Model 5b	Model 5c
VAIC	0.189**												
VAICxIB		0.204***											
VAICxCB			0.287***										
HCE				0.130***	0.319***								
HCExIB						0.340***							
HCExCB							0.286***						
SCE				-0.150***				-0.181**					
SCExIB									-0.207***				
SCExCB										10.704***			
CEE				5.190***							6.222***		
CEExIB												6.480***	
CEExCB													5.359***
Size	0.960***	0.868**	1.027***	0.419*	0.852***	0.686**	1.027***	0.781**	0.776**	0.940***	0.444*	0.468*	0.854**
Risk_Level	-0.0005	-1.000	-0.000	0.001*	0.001	0.001	-0.0008	-0.0001	-0.00004	-0.0007	0.0002	-0.0001	-0.0004
KEI	-0.079	-0.118	-0.088	-0.140**	-0.157**	-0.137*	-0.084	-0.042	-0.036	-0.075	-0.119*	-0.049	-0.122
GDP	0.053***	0.052***	0.038***	0.028***	0.048***	0.055***	0.039***	0.047***	0.046***	0.034**	0.024**	0.049***	0.023*
Age	0.380***	0.421*	0.457**	0.205	0.173	0.160	0.451*	0.440***	0.396**	0.443*	0.424***	0.299*	0.558**
Cons	-1.318***	-0.461	-1.326*	-2.203***	-1.554***	-0.148	-1.098*	0.283	0.307	-5.079***	-2.284***	-0.581	-1.312*
R <sup>2</sup>	0.3181	0.0340	0.080	0.4127	0.2939	0.0322	0.0847	0.1244	0.1389	0.0440	0.2595	0.0150	0.0836
N	495	495	495	495	495	495	495	495	495	495	495	495	495
Model	Random effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Random effects	Random effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Note: (\*\*\*) refers that p value is significant at 1% level; (\*\*) refers that p-value is significant at 5% level; (\*) refers that p-value is significant at 10% level.

In Table 6, the regression results show that the VAIC and its components explain ROE as a measure of banks' financial performance in the GCC countries (Buallay, 2019; Buallay *et al.*, 2020; Al-Musali and Ismail, 2016). In Model 6, VAIC and its interaction variables by bank type have a statistically significant relationship with ROE. When VAIC components are examined together in model 7, HCE and CEE variables are statistically significant at the 1% level, while SCE is significant at the 10% level as partially similar to the literature, which also examines ROA as financial performance (Nawaz ana Haniffa, 2017; Ovechkin *et al.*, 2021; Ousama *et al.*, 2020).

When each component is examined separately, the HCE variable and the interaction variables for Islamic and conventional banks show a statistically positive effect at the 1 per cent level, as seen in model 8. These results, similar to those in models where ROA is a dependent variable, can be explained by the fact that these countries place a high value on human capital development as a means of promoting knowledge-based economies.

In Model 9, both SCE for all banks and SCE interaction variables for Islamic banks are not significant (Ousama *et al.*, 2020), but interaction variables for conventional banks have a positive impact at the 1% level. This result was also obtained with models based on ROA, which can also be attributed to the emergence of Islamic banking based on conventional institutional logic. In Model 10, CEE, CEE<sub>IB</sub> and CEE<sub>CB</sub> have a positive impact at the 1% level in all models.

Table 4 shows that, as expected, Size and GDP variables have a positive and statistically significant effect in all models, whereas Risk\_Level has a significant and positive impact only in the model that considers all VAIC pillars together and in models that consider HCE and HCE<sub>IB</sub> variables. Furthermore, contrary to expectations, the age variable is significant only in the models in which the HCE<sub>IB</sub>, SCE, and SCE<sub>IB</sub> variables are examined with respect to ROE, but it is negative in the model in which the HCE interaction variable created for Islamic banks is examined. Lastly, it was determined that KEI did not have a significant relationship with ROE. The result of this analysis shows that, like in the analyses where ROA was the dependent variable, the GCC countries are in the process of transitioning to a knowledge economy and that this transition will affect macroeconomic results as well as financial institutions' performance over the long run.

**Table 4. Regression Results (ROE)**

ROE	Model 6a	Model 6b	Model 6c	Model 7a	Model 8a	Model 8b	Model 8c	Model 9a	Model 9b	Model 9c	Model 10a	Model 10b	Model 10c
VAIC	2.416***												
VAICxIB		2.596***											
VAICxCB			1.995***										
HCE				0.756***	2.896***								
HCExIB						3.447***							
HCExCB							1.961***						
SCE				0.720*				0.4386					
SCExIB									0.055				
SCExCB										83.460***			
CEE				56.989***							62.419***		
CEExIB												67.549***	
CEExCB													43.102***
Size	10.778***	9.602***	10.828***	6.112***	9.538***	7.816***	10.815***	10.175***	9.981***	10.269***	5.406***	5.483***	9.588***
Risk_Level	0.007	0.007	-0.002	0.010*	0.015*	0.019**	-0.003	-0.002	-0.002	-0.002	0.008	0.004	0.00002
KEI	-0.480	-0.316	0.209	-0.396	-0.471	-0.374	0.237	0.089	0.087	0.283	-0.183	0.525	-0.096
GDP	0.391***	0.456***	0.309**	0.180**	0.387***	0.459***	0.320**	0.366***	0.364***	0.273**	0.149*	0.408***	0.181
Age	-0.251	-0.284	0.159	-0.288	-2.411	-2.841*	0.124	2.458*	2.352*	0.053	-0.166	-1.480	0.979
Cons	-11.541**	0.535	-1.756	-19.823***	-7.037	5.352	-0.069	2.486	3.083	-32.324***	-16.035***	0.746	-3.322
R <sup>2</sup>	0.2427	0.0127	0.0707	0.4556	0.2043	0.0120	0.0742	0.0742	0.0733	0.0362	0.3689	0.0196	0.0784
N	495	495	495	495	495	495	495	495	495	495	495	495	495
Model	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Random effects	Random effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Note: (\*\*\*) refers that p value is significant at 1% level; (\*\*) refers that p-value is significant at 5% level; (\*) refers that p value is significant at 10% level.

In summary, VAIC and its components have mostly positive and significant impacts in both models examining ROA and ROE. But there are significant differences between Islamic and conventional banks, particularly in the model of SCE. Accordingly, the SCE interaction variable created for Islamic banks appears to negatively impact the models where ROA is examined but is not significant in ROE. This is how the SCE, which represents equity and long-term liabilities, differs from Islamic banks, which can be explained by the emergence of Islamic banks.

## **6. Discussion and Practical Implications**

The empirical analyses presented in this study explored and examined the financial performance of banks in the GCC countries *vis-à-vis* intellectual capital they produced, which is measured by the VAIC model for the 2012 to 2020 period. While institutional distinction in the sense of being an Islamic or conventional bank is considered important in this paper by using interaction variables, the use of KEI as a determining variable developed in this study should also be regarded as an important novelty introduced by this study. Comparing conventional and Islamic banks for the intellectual capital and financial performance nexus should also be considered bridging the observed gap in the literature by comparing these two types of banks and expanding the nature of the analysis.

As the findings indicate, VAIC and its pillars are statistically significant for the financial performance in the GCC countries, which is in line with the literature (Ovechkin *et al.*, 2021; Buallay *et al.*, 2020; Ousama *et al.*, 2020; Buallay, 2019; Nawaz and Haniffa, 2017; Al-Musali and Ismail, 2016; Sharma and Mani, 2012; Muhammad and Ismail, 2009; Ting and Lean, 2009; Kamath, 2007; do Rosário Cabrita and Vaz, 2005; Goh, 2005; Mavridis and Kyrmizoglou, 2005; Mohiuddin, 2006; Pulic, 2004). However, the impact of SCE on conventional banks is better than that of Islamic banks.

Since it was anticipated that KEI would have a positive and significant relationship with the financial performance of banks, it is important to note that policies on a knowledge economy in the GCC countries that have become popular in the last decades aimed at diversifying the oil-dependency in the region have an impact on the financial performance of banks, but its impact may be long in coming.

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As depicted in the findings, the interaction variables of banks for HCE and CEE also have a significant positive relationship with the financial performance of banks in GCC countries. However, the findings show differences between Islamic and conventional banks in terms of SCE interaction variables. The results, therefore, imply that being an Islamic bank in the VAIC model has a significant but negative relationship with the financial performance of the banks in the GCC countries as seen in model 4b. This is a conflicting result with the methodology of Islamic moral economy that prioritises human well-being, knowledge creation, intellectual contribution, as explained in an earlier section under the conditions of a positive impact of intellectual capital on the financial performance of banks. This can be associated with the emergence process of Islamic banks that mimicked the conventional banking system rather than following a knowledge-oriented emergence as discussed in the initial section of this paper.

As for the individual sub-models relating to the components of VAIC, they have significant positive relationship with ROA and ROE, which is in line with the literature (e.g. Al-Musali and Ismail, 2016; do Rosário Cabrita and Vaz, 2005; Mavridis and Kyrmizoglou, 2005; Nawaz and Haniffa, 2017; Ting and Lean, 2009). Furthermore, while bank size and GDP are significant and have a positive relationship, the KEI variable is not significant in all models.

Based on the results, it can be argued that human capital in the Islamic banking and finance sector needs to develop expediently, necessitating high levels of intellectual development and intensive knowledge-oriented skills. Therefore, evaluating the intellectual capital performance of Islamic banks when compared to conventional banks in the GCC countries is conducted following an examination of knowledge-based policies in the region along with analysing the impact of a knowledge-based economy on subsequent economic performance in the GCC region, as empirically conducted by this paper.

The empirical results produced in this study imply that concerning the intellectual capital formation, there is a divergence between the norm-based Islamic institutional formation in intellectual capital and its institutionalised articulation in the form of Islamic banks in everydayness. Islamic banking sectors are considered as a new way of financing, incorporating a new form of knowledge-based institutions inspired by capitalist institutional formation, while they aim at ensuring compliance with Islamic legal norms and values. Furthermore, Islamic banks as institutions are similar to conventional banks in their operational form in the sense that they have replicated the institutional logic of conventional banks (Asutay, 2012, 2013). Therefore, it is possible to conclude that these institutions are similar to conventional banks in

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terms of intellectual capital and use of knowledge. However, in origin, their authenticity is located within Islamic ontology and epistemology. As such, as presented empirically, Islamic banks still lag behind conventional banks in their intellectual capital performance.

Regarding practical implication, according to the results which consider the SCE, Islamic banks appear to have an insignificant relationship or negative impact, even though knowledge and intellectual capital are crucial to Islam since Islamic banks are considered to be constituted through the ontological basis of Islamic knowledge. The development of intellectual capital should be encouraged by Islamic banks through research and development since Islamic banking is considered an alternative financing method, incorporating a new form of knowledge-based institutions as referred to in Islamic values. Even though their national vision recognizes the need to transition their natural resource-based economies to knowledge-based economies, their knowledge economy indicators lack the strength to support the process, as seen by their ineffectiveness on bank performance. Hence, the policymakers of these countries should focus on developing intellectual capital, which is part of the knowledge economy, to improve the financial performance of banks in these countries.

As for research limitations, since it is difficult to determine intangible assets from actual data, conducting survey and disclosure analysis studies will help complement secondary data-based studies in the future, such as this study.

## **7. Conclusion**

This paper examined the impacts of intellectual capital performance on Islamic banks' financial performance compared to conventional banks in the GCC countries. In addition, this paper argues that Islamic banks should essentially be more successful in developing intangible capital by emphasizing the importance of knowledge and human capital within Islamic teachings. However, the findings of the analyses concluded that Islamic banks are behind conventional banks, especially in terms of an SCE. This result led to a discussion of the emergence of Islamic banks, which can be attributed to the fact that Islamic banks did not emerge out of their own ontology and emerged as an alternative within the existing system. Therefore, using knowledge to develop research and development potential for Islamic banks is in line with Islamic values.

This study also shows that the development of knowledge economies in the GCC countries will likely have an impact on the financial performance of banks in the region, although the impact is likely to take a long time to manifest. Due to this, the KEI was found to be

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insignificant for banks' financial performance in the GCC. As a result, intellectual capital as a part of the knowledge economy is essential for banks, particularly Islamic banks, due to their commitment to Islamic thought.

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## APPENDIX

### Table A1. Variables and data sources

Acronym	Definition of Variables	Source	Years (available)
ROA	Return on Assets	Fitch Connect	2012-2020
ROE	Return on Equities	Fitch Connect	2012-2020
VAIC	Value Added Intellectual Capital	Authors Calculation (Data was collected from Fitch Connect)	2012-2020
VAICxIB	Interaction Variable for Islamic Banks	Authors Calculation	2012-2020
VAICxCB	Interaction Variable for Conventional Banks	Authors Calculation	2012-2020
HCE	Human Capital Efficiency	Authors Calculation (Data was collected from Fitch Connect)	2012-2020
HCExIB	Interaction Variable for Islamic Banks	Authors Calculation	2012-2020
HCExCB	Interaction Variable for Conventional Banks	Authors Calculation	2012-2020
SCE	Structural Capital Efficiency	Authors Calculation (Data was collected from Fitch Connect)	2012-2020
SCExIB	Interaction Variable for Islamic Banks	Authors Calculation	2012-2020
SCExCB	Interaction Variable for Conventional Banks	Authors Calculation	2012-2020
CEE	Capital Employed Efficiency	Authors Calculation (Data was collected from Fitch Connect)	2012-2020
CEExIB	Interaction Variable for Islamic Banks	Authors Calculation	2012-2020
CEExCB	Interaction Variable for Conventional Banks	Authors Calculation	2012-2020
Size	Size of Bank as Total Asset	Fitch Connect	2012-2020
Risk_Level	Level of Risk (Net Loans to Total Assets)	Fitch Connect	2012-2020
KEI	Knowledge Economy Index	Authors Calculation (Data was collected from the World Bank)	2012-2020
GDP	Gross Domestic Product (per capita)	World Bank	2012-2020
Age	Age of Operation	Annual Reports	2012-2020

**Table A2. Sampled banks**

Countries	Islamic Banks	Conventional Banks
<b>Bahrain</b>	Al Baraka Islamic Bank (2012-2020) Al Salam Bank (2012-2020) Bahrain Islamic Bank (2012-2020) Khaleeji Commercial Bank (2012-2020) ABC Islamic Bank (2012-2020)	Ahli United Bank (2012-2020) Arab Banking Cooperation (2012-2020) Bank of Bahrain and Kuwait (2012-2020) National Bank of Bahrain (2012-2020)
<b>Kuwait</b>	Ahli United Bank Kuwait (2012-2020) Boubyan Bank (2012-2020) Kuwait Finance House (2012-2020) Kuwait International Bank (2013-2020)	Al Ahli Bank of Kuwait (2012-2020) Commercial Bank of Kuwait (2012-2019) National Bank of Kuwait (2012-2020)
<b>Oman</b>	Alizz Islamic Bank (2014-2020) Bank Nizwa (2014-2020)	Ahli Bank (2012-2020) Bank Dhofar (2012-2020) Bank Muscat (2012-2020)

		HSBC Bank Oman (2012-2020) National Bank of Oman (2012-2020) Oman Arab Bank (2012-2020) Sohar International Bank (2012-2020)
<b>Qatar</b>	Dukhan Bank (2012-2020) Masraf Al Rayan (2012-2020) Qatar International Islamic Bank (2012-2020) Qatar Islamic Bank (2012-2020)	Ahli Bank (2012-2020) Al Khalij Commercial Bank (2012-2020) Doha Bank (2012-2020) Qatar National Bank (2012-2020) The Commercial Bank (2012-2020)
<b>Saudi Arabia</b>	Al Rajhi Banking and Investment (2012-2020) Alinma Bank (2012-2020) Bank Albilad (2012-2020) Al Jazira Bank (2012-2020)	Banque Saudi Fransi (2012-2020) Riyad Bank (2012-2020) Saudi British Bank (2012-2020) Saudi Investment Bank (2012-2020) The Saudi National Bank (2012-2020) Alawwal Bank (2012-2018) Arab National Bank (2012-2020)
<b>UAE</b>	Abu Dhabi Islamic Bank (2012-2020) Al Hilal Bank (2012-2020) Dubai Islamic Bank (2012-2020) Emirates Islamic Bank (2012-2018 and 2020) Sharjah Islamic Bank (2012-2020)	Abu Dhabi Commercial Bank (2012-2020) Bank of Sharjah (2012-2020) Commercial Bank International (2012-2020) Commercial Bank of Dubai (2012-2020) Emirates NBD (2012-2020) Masreqbank (2012-2020)
<b>Total</b>	24	32