



ADVANCED INTERNATIONAL JOURNAL
OF BUSINESS, ENTREPRENEURSHIP
AND SMES
(AIJBES)

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DOES BANKING MODEL MATTER FOR INTELLECTUAL CAPITAL EFFICIENCY? EVIDENCE FROM ISLAMIC AND CONVENTIONAL BANKS IN DUAL BANKING COUNTRIES

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Article Info:

Article history:

Received date: 16.07.2026

Revised date: 28.07.2026

Accepted date: 17.08.2026

Published date: 17.09.2026

To cite this document:

Mohd-Zameri, S. N., Aziz, N. F. A., & Alias, F. (2026). Does Banking Model Matter for Intellectual Capital Efficiency? Evidence From Islamic and Conventional Banks in Dual Banking Countries. *Advanced International Journal of Business Entrepreneurship and SMEs*, 8 (29), 1289-1304.

Abstract:

As the global economy enters the Fourth Industrial Revolution (4IR), knowledge-based resources have supplanted physical capital as the primary drivers of value creation. This study investigates Intellectual Capital (IC) efficiency within the dual-banking systems of eight countries (Malaysia, Pakistan, Jordan, Bangladesh, Saudi Arabia, Bahrain, Qatar, and the UAE) through the dual lenses of Resource-Based View (RBV) and Institutional Theory. Data were retrieved from the Fitch Rating Pro database for the period 2014–2024. Utilizing the Value-Added Intellectual Coefficient (VAICTM) model, we calculate and compare Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE). Inferential statistical analysis, including Independent Samples t-tests, reveals that Islamic banks possess a significant comparative advantage in HCE, driven by specialized expertise in Shariah-compliant contracts. Conversely, conventional banks demonstrate superior SCE and CEE, benefiting from mature organizational infrastructures and broader capital deployment flexibility. These results provide empirical evidence that banking models fundamentally influence IC utilization. This study contributes to the literature by demonstrating how institutional frameworks shape intangible resource efficiency, offering critical policy implications for bank managers seeking to balance IC components for long-term sustainability in a knowledge-driven market.

DOI: 10.35631/AIJBS.829073 **Keyword:**

Capital Employed Efficiency (CEE), Dual-Banking, Human Capital Efficiency (HCE), Intellectual Capital, Structural Capital Efficiency (SCE), VAIC



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Introduction

The world's economy has evolved from a traditional economic system to an industrial economy and has more recently entered the era of the knowledge-intensive and information-driven economy, a transformation widely recognized as the Fourth Industrial Revolution (4IR). Physical capital no longer became the basis measurement in measuring a firm's performance. The growth of innovation and technologies, as well as the increase in competitive environment has shifted the business industry view from 'know-what' industrial society, to 'creation and diffusion of knowledge'. Due to this, knowledge-based resources becomes essential in creating value and are considered to be a crucial success factors in all value creation activities (Al-Musali & Ku Ismail, 2016; Maji & Saha, 2023). And the heart of the knowledge-based resources is intellectual capital, due to the concept that it carries, which is said to have the potential of generating both tangible and intangible values.

Intellectual capital (IC), which comprises three components, the human capital, structural capital and capital employed, has gained attention and being recognised in the scientific studies. It became more prominent in the service industry, as it brings additional value to an organisation (Roslan et al., 2025). The banking industry, known to provide services as its core business, rely heavily on intellectual capital. Banks are knowledge -intensive firms, and their nature of business focuses on customers. The products of banks are not manufactured goods; thus, banks need to offer the highest quality of services to their customers. This requires banks to invest in human resources, brand names, and systems, in order for them maintain in the long-term competitive advantage. Banks play an important role in the economy and needs to ensure that they can sustain in their business.

In certain countries, conventional banks operate side by side with the Islamic banks in a dual-banking system. Compared to conventional banks, which has long dominated the global financial sector, the modern Islamic banking industry only began to develop in the beginning of 1960's, when Mit Ghamr Savings Bank in Egypt was introduced. As Islamic banks represent a relatively younger segment as compared to the conventional banks, Islamic banks are said to have less competitive advantages and is under the pressure to maintain their performance to be as good as their counterpart. The primary asset of commercial banks is disbursing loans and advances (Sivarajan et al., 2023). Both banks compete for clients and investors, and the unique features of Islamic banks, which differs from the interest-based conventional banks, requires

Islamic banks to adhere to additional requirements under the Shariah law. Also known as the Shariah-compliant banking, the financial activities of the Islamic banks must adhere to the principle and law of Islam (Mohamad et al., 2022). Islamic banks operate based on two fundamental principles. The first principle is the forbidden of the collection and payment of interest (Aziz et al., 2024), and the second principle is the sharing of profit and loss. Islamic banks earn their profit through equity participation or profit-sharing system, where conventional banks earn profit mainly from the interests. To ensure that Islamic banks operate according to the Islamic law, they have additional layer of governance, which is the Shariah advisory to monitor their operations. The differences in features, although operating under the same business nature, has bring attentions to many previous researchers to compare the performance of Islamic and conventional banks.

However, the outcome of the research resulted in mixed results. Many researchers found that Islamic banks are more stable and performed better (Gazi et al., 2021; Kolsi & Grassa, 2017), while others found that conventional banks perform better (Chazi et al., 2024; Grassa et al., 2022). In March 2023, the 29th largest bank in the U.S, the Signature Bank New York (SBNY), was closed by the New York State department of Financial Services (NYSDFS). Credit Suisse, Switzerland's second largest bank, was bought over by its rival after failing to regain the confidence from the market. Al Baraka Banking Group, International Bank of Qatar, Kuwait Finance House and Dubai Islamic Bank also were reported to perform inefficiently (Aysan & Hersi, 2024). All these are because of poor and incompetency of the management and misallocation of resources (AlAli, 2020; The Association of Islamic Banking Institutions Malaysia, 2016).

This brings the importance of intellectual capital promoting the performance in banks. However, most of the research done on intellectual capital are done for conventional banks and for a single country (Aidah & Lestari, 2024; Barak & Sharma, 2024), and not many were done for Islamic banks. Furthermore, existing studies tend to focus on the impact of intellectual capital on performance of the banks, with less attention given to comparative efficiency measurement across banking system using VAICTM. Therefore, there is a need for a comprehensive cross-country analysis that compares intellectual capital efficiency between Islamic and conventional banks. The research intends to achieve the following objectives: the first objective is to calculate the VAICTM, a measurement used to measure intellectual capital for Islamic and conventional banks, and the second objective is to compare the VAICTM value between Islamic and conventional banks.

This research contributes by answering the fundamental questions whether different banking models, which is the Islamic and conventional banks, utilize intellectual capital differently and whether the nature of the banking system influence the intellectual capital efficiency. The study contributes to the intellectual capital literature by providing a cross-country comparison of intellectual capital efficiency between Islamic and the conventional banks operating in the dual-banking system. This study contributes to the Sustainable Development Goals (SDGs), particularly SDG 8, which is on Decent Work and Economic Growth, SDG 9, emphasising on Industry, Innovation and Infrastructure, and SDG 16, which is on Peace, Justice and Strong institutions, by examining how intellectual capital efficiency and institutional frameworks influence sustainable value creation within dual-banking system.

The structure of this paper will continue with the literature review segment, research methods, results and discussions, and finally the conclusion.

Literature Review

The theoretical studies, definition of intellectual capital and its components will be discussed here.

Resource-based View (RBV)

The resource-based view (RBV) theory was developed by Barney (1991), and focuses on firm's internal resources and capabilities in creating competitive objectives. (Penrose, 2009) expanded the theory, by portraying a firm as a coordinated bundle of resources and developed a model on the effective managements of firms' resources to find the ways firms can achieve their goals and strategic behaviours. From there, RBV is widely used to determine important resources that a firm can use to achieve competitive advantage. According to RBV, organisations gain competitive advantages through valuable and difficult-to-imitate resources.

In the banking industry, intellectual capital is made of three components, human capital, structural capital and capital employed. All these components contribute to the value creation process. Human capital reflects employees' knowledge, skills and expertise. Structural capital represents organizational systems, processes and databases, and capital employed encompassed the utilization of financial and physical resources. RBV suggested that banks that are more efficient in leveraging these intellectual capital resources are better positioned to generate value and maintain a competitive advantage. Islamic banks and conventional banks differ in their ability to convert intellectual resources into value added. Human capital efficiency reflects how effectively employee knowledge creates value. RBV predicts Islamic banks should exhibit higher HCE than conventional banks, as Islamic bank employees require expertise in both finance and Shariah law, and Shariah scholars and compliance experts are difficult to imitate. Structural Capital Efficiency (SCE) refers to systems, procedures, databases, organizational knowledge, and culture. RBV predicts conventional banks may possess stronger SCE due to superior organizational infrastructure. Capital Employed Efficiency (CEE) measures efficiency in utilizing financial and physical capital. RBV suggests unique financing capabilities can create competitive advantage and predicts Islamic banks may demonstrate superior CEE due to efficient utilization of capital resources. RBV generally predicts Islamic banks should attain higher VAIC, due to specialized human capital, unique Shariah knowledge and ethical reputation.

By comparing the intellectual capital efficiency different banking model, we can look how different banking models utilize strategic knowledge-based resources within a competitive environment.

Institutional Theory

The Institutional theory, suggests that organizations are influenced by the formal and informal rules, norms and regulatory structures within their operations (Powell & DiMaggio, 1983). These institutional pressures will shape the organizational behaviour, strategic decisions, and resource allocation practices. When organizations operate within different institutional setting,

they are prone to develop distinct structures, processes, and practices, as they try to achieve legitimacy and comply with the stakeholders' expectations. This resulted in the institutions to have variations in organizational outcomes, including how efficient the resources are being utilized.

In the banking sector, the Islamic and conventional banks operate under different institutional frameworks, even though being in the same industry. Conventional banks are governed primarily by the conventional banking regulations and market mechanisms. Islamic banks, on the other hands, are additionally subjected to Shariah principles, Shariah governance requirements, and also specific regulatory standards related to Islamic finance. This will influence how intellectual capital is developed, managed and transformed into value-added activities.

Institutional Theory predicts higher HCE in Islamic banks due to compliance demands, develop stronger specialized structural capital and higher overall VAIC for Islamic banks because legitimacy requirements stimulate intellectual capital development.

Intellectual Capital (IC) in the Banking Sector

The increasing importance of knowledge-based resources shifted the attention from tangible assets to intangible resources as the key drivers of a firm's performance. Intellectual capital is seen as a critical resource that will drive a firm towards achieving outstanding economic, financial and market performance. In the banking sector, intellectual capital is crucial due to its highly information-intensive nature, where decision-making, risk assessment, and customer relationship management rely heavily on human expertise and organizational systems. According to Le et al. (2022), intellectual capital can help bank to enhance their effectiveness and efficiency. Previous studies found that intellectual capital is a strategic and unique component of banks and can improve bank's efficiency by increasing output through optimum utilization of input (Filatie & Sharma, 2024; Maji & Saha, 2023; Onumah & Duho, 2020). There are arguments between the intellectual capital differences between Islamic and conventional banks. One of the bases of this issue is in term of the human capital. Unlike conventional banks, employees of Islamic banks require dual expertise, as they do not only need to be an expert in banking operations and services, but they also need to have knowledge in Shariah and *fiqh muamalat*. These employees must undergo specialize training on special contracts such as *mudharabah*, *musyarakah* and *ijarah*. Islamic banks also require Islamic scholars and Shariah compliance officers. Apart from that, the structural capital also differs as Islamic banks have additional governance layer which make them more complicated in operations. They must follow the Shariah Supervisory Board (SSB) and also the shariah compliance framework, whereas conventional banks have more mature and standardized operational systems. Conventional banks also benefit from the longer institutional history and larger technological infrastructure, which resulted in them demonstrating stronger structural capital efficiency because of their established systems and processes.

Most of the studies were done on a single country, where Ahuja and Ahuja (2012), Maji and Saha (2023) and Barak and Sharma (2024) did on the banking sector in India, Aidah and Lestari (2024) and Muhidu and Zaid (2026) did on the banking sector in Indonesia, and Alhassan and Asare (2016) did on the banking sector in Ghana. There were also studies on intellectual capital for Islamic banks (Aslam et al., 2024; Nawaz et al., 2021), which suggested that Islamic banks

should focus more on intellectual capital, as it was found that the performance of Islamic bank decreases due to ineffectiveness and less trained workforce (Aslam & Haron, 2021). There were also cross-country analysis on intellectual capital, which is mainly done for the GCC countries (Al-Musali & Ku Ismail, 2016; Farooque et al., 2023) as well as emerging markets (Dalwai & Singh, 2022; Le et al., 2022).

Value Added Intellectual Coefficient (VAICTM) Model

The Value Added Intellectual Coefficient (VAICTM) was developed by Pulić (1998), and became one of the most widely used methods for measuring intellectual capital efficiency. VAICTM method is in line with the knowledge-based economy and became the alternative to the traditional measures such as using EBITDA (Marzo, 2022). The VAICTM model evaluates how efficient a firm utilize its resources to generate value added. VAICTM comprises of three main components, which are Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE). To calculate VAIC, all the three components will be added. An increase in the value of VAICTM indicates an improvement in the efficiency of a firm's resources.

VAICTM is widely used in banking studies due to its objectivity, comparability, and reliance on publicly available data. Unlike survey-based IC measures, VAICTM allows for cross-country (Dalwai & Singh, 2022; Farooque et al., 2023) and cross-bank comparison (Olohunlana et al., 2022; Rehman et al., 2022; Ting et al., 2022), making it suitable for large-scale empirical banking studies. Despite that, VAICTM also received many criticisms. Many argued that VAICTM may not fully capture the qualitative aspects of intellectual capital, particularly human capital efficiency, structural capital efficiency, capital employed efficiency and tacit knowledge (Bakhsha et al., 2017). However, VAICTM remains widely applied in banking research due to its practicality and consistency.

Research Methods

This study adopts a quantitative descriptive research design to examine and compare intellectual capital efficiency between Islamic and conventional banks across selected dual banking countries. The study employ the Value Added Intellectual Coefficient (VAICTM) methodology developed by Pulić (1998) to measure intellectual capital efficiency. Using Fitch Rating Pro database, all the data for countries having Islamic banks are downloaded. The data for conventional banks are then downloaded, selecting only the countries downloaded for Islamic banks earlier. A total of 22 countries is identified to have both Islamic and conventional banks data. However, only the countries that have Islamic banks assets at least 15 percent of the total domestic banking assets reported by the Islamic Financial Services Board were included. This is to ensure that both banking systems contribute significantly and allows a more balanced comparison. 15 countries are identified to have more than 15 percent Islamic bank shares in total banking assets according to the Islamic Financial Services Industry Stability Report by IFSB. These 15 countries were then compared to the countries being listed in the World Bank's fragile and conflict-affected countries. The listed countries were then excluded as these countries are instable and can become the outlier. 9 countries were then finalised to be the sample for the research, but only 8 countries have enough data. Brunei was excluded due to small number of banks as compared to the other 8 countries. The eight countries selected are

Malaysia, Pakistan, Jordan, Bangladesh, Saudi Arabia, Bahrain, Qatar and United Arab Emirates. The data collected are from 2014 until 2024.

Calculation of Value-Added Intellectual Coefficient (VAICTM)

VAICTM requires the calculation of VA during a particular year, which can be obtained by calculating the difference between the outputs and the inputs of the banks. The inputs of the bank are the bank's operational costs, consisting of both administration costs and interest costs. Personnel expenses is not considered as bank's input but treated as the capital investments. Output is the bank's total revenue, including the interest and non-interest income.

Human Capital Efficiency (HCE) is calculated by dividing the VA with Human Capital (HC). While Structural Efficiency (SCE) is calculated by dividing Structural Capital (SC) with VA. To calculate SC, it is VA minus HC. And finally, for Capital Employed Efficiency (CEE), the calculation is VA divided by Capital Employed (CE).

To obtain the VAICTM, all the three components need to be added. The measurement of VAICTM and its components are shown in Table 1 below:

Table 1: Measurement of VAICTM

Measurement	Formula
VA	Output - Input
HCE	VA / HC
SC	VA-HC
SCE	SC / VA
CEE	VA / CE
VAIC	HCE + SCE + CEE

Source: Own Work

Findings and Discussions

The comparison between Islamic and conventional banks produces valuable findings regarding the varied impact of IC components, human capital, structural capital and capital employed efficiency, for the two types of banks. According to the RBV theory, Islamic banks should exhibit higher HCE, CCE and overall VAIC than conventional banks, while conventional banks may possess stronger SCE due to superior organizational infrastructure.

Institutional Theory predicts higher HCE, SCE and overall VAIC in Islamic banks due to compliance demands, due to legitimacy requirements stimulate intellectual capital development.

Description Table: Sample by Country

Table 2 shows the description table showing countries, number of Islamic banks, number of conventional banks, years covered, total bank-year observations.

Table 2: Description Table: Sample by Country

Country	No. Conventional Banks	No. Islamic Banks	Bank-year observations
UAE	12	0	121
Bangladesh	3	21	244
Bahrain	3	0	33
Jordan	2	2	40
Kuwait	3	0	32
Malaysia	9	13	232
Pakistan	1	10	108
Qatar	5	0	49
Saudi Arabia	5	1	55
Total	43	47	914

Source: Own Work

The table shows that the number of Islamic banks is slightly more than the conventional banks. Bangladesh contributes to the greatest number of Islamic banks while Qatar, Bahrain and Kuwait have no Islamic banks. This is due to the missing value when calculating VAIC. To calculate VA, HCE, SCE and CCE, requires data from the financial statements. Some of these data were not available in the Fitch Data Pro, which resulted this measurement being unable to calculate. Due to that, the banks that do not have enough data for VAIC calculation will be omitted. For conventional banks, the highest number is from United Arab Emirates and Pakistan gives the lowest number of conventional banks.

Mean VAICTM for Islamic and Conventional Banks

Table 3 shows the mean VAICTM calculated for conventional and Islamic banks. It can be seen that the mean VAICTM for Islamic banks are higher than the conventional banks for each year. This indicates that the Islamic banks have a more relative intellectual capital efficiency as compared to that of conventional banks. This is in line with the RBV and Institutional theories which suggested that Islamic banks should have higher VAIC due to Islamic bank employees require expertise in both finance and Shariah law, and Shariah scholars and compliance experts are difficult to imitate. Structural Capital Efficiency (SCE) refers to systems, procedures, databases, organizational knowledge, and culture. Institutional Theory suggest Islamic banks to have higher VAIC due to the legitimacy requirements of Islamic banks that stimulate intellectual capital development.

The same results were obtained by Al Ahmed and Aloutaibi (2025). The findings show parallelism with the methodology of Islamic economics that prioritise knowledge creation and intellectual contribution. However, a study by Farooque et al. (2023) and Islam (2026), where

both studies found that conventional banks have higher mean VAICTM as compared to Islamic banks. They suggested that this signifies that the conventional banks have more effectively leverage IC, which increases the value. The results confirmed that the is different between both type of banks.

A higher VAICTM suggests that Islamic banks are more efficient in transforming their human, structural, and financial resources into value added. The dual requirements of financial expertise and Shariah compliance may be one of the reasons that encourages Islamic banks to invest more in knowledge-based resources and governance mechanisms. This enhances the overall intellectual capital efficiency. The below table shows the average VAICTM across countries for Islamic and conventional banks.

Table 3: Annual Pooled Average VAICTM Across Countries By Bank Type

Year	Conventional Banks	Islamic Banks
2014	3.710	5.686
2015	3.984	5.382
2016	3.854	5.080
2017	3.715	4.704
2018	3.768	4.627
2019	3.894	5.600
2020	4.569	5.691
2021	4.292	6.435
2022	4.684	6.768
2023	5.523	6.680
2024	5.717	6.776

Source: Own Work

Mean VAICTM Components for Islamic and Conventional Banks

As the VAICTM is calculated by adding all the three components, the average for each component is calculated to see how these components contribute to the VAICTM value. Table 4 shows the average HCE across countries by year. It can be seen that the average of HCE for Islamic banks are also higher than of the conventional banks.

A higher HCE means that the bank is more efficient in generating value for the money spent on their employees. This can also indicate that the employees are more productive, and the staff knowledge and expertise are effectively utilized. The bank is obtaining better returns from its investment in human resources.

Islamic banks show a higher average of HCE as compared to the conventional banks. This indicates stronger human capital. Even though the operations of conventional and Islamic banks are quite similar, but due to Shariah requirements, Islamic banking requires their staff to have understanding not only on banking and finance, in general, but also on Islamic contracts such as *Murabahah*, *Ijarah*, and *Musharakah*, shariah compliance requirements and Islamic risk management. Due to this, the employees of Islamic banks need to possess specialized knowledge, combining both financial expertise with Shariah principles. This type of expertise may enhance decision-making, customer advisory services and product innovation. This resulted in Islamic banks to generate greater value from their investment in human resources.

Table 4: Annual Pooled Average HCE Across Countries By Bank Type

Year	Conventional Banks	Islamic Banks
2014	2.862	4.850
2015	3.091	4.539
2016	2.982	4.272
2017	2.788	3.964
2018	2.826	3.971
2019	3.093	4.773
2020	3.638	4.834
2021	3.355	5.602
2022	3.705	5.832
2023	4.446	5.708
2024	4.614	5.877

Source: Own Work

For the average SCE, out of the 11 years data, conventional banks show a higher average SCE in 8 years, as compared to Islamic banks. The average SCE is higher for Islamic banks only for the year 2014, 2015, and 2019. A higher SCE may indicate that the organizational systems, procedures, databases, technology, and governance structures contribute more effectively to value creation. Conventional banks are seen to have a higher average SCE, which may indicate that the conventional banks have better risk management systems, stronger internal controls, efficient digital banking platforms. This is because conventional banks have a more mature organizational systems as they existed much longer than Islamic banks. Over time, these institutions have developed sophisticated systems, standardized procedures, and extensive knowledge infrastructure that facilitate value creation and operational effectiveness.

Apart from that, many large conventional banks invested heavily in digital banking platform, artificial intelligence, data analytics, customer relationship management systems, and automation technologies, which strengthen the structural capital and improve the efficiency.

Islamic banks are subjected to additional governance and compliance requirements associated to Shariah principles. Even though these may strengthen the oversight and legitimacy, they can also increase organizational complexity and costs, which may reduce the structural capital efficiency. Table 5 below shows the average SCE across countries for Islamic and conventional banks:

Table 5: Annual Pooled Average SCE Across Countries By Bank Type

Year	Conventional Banks	Islamic Banks
2014	0.594	0.605
2015	0.610	0.625
2016	0.602	0.584
2017	0.602	0.504
2018	0.607	0.415
2019	0.487	0.567
2020	0.615	0.606
2021	0.654	0.588
2022	0.665	0.662
2023	0.708	0.659
2024	0.751	0.603

Source: Own Work

And finally, looking into the third component of VAICTM, which is the Capital Employed Efficiency (CEE), the result shows that conventional banks have a higher average of CEE as compared to Islamic banks. A higher CEE indicates that conventional banks are utilizing their capital base more efficiently to create value. Conventional banks may benefit from a greater flexibility in investment and financing activities, as they can participate in interest-based investment and financing activities. This allows conventional banks to allocate capital across a wider range of income-generating opportunities, which contribute to more capital utilization and higher capital employed efficiency.

Islamic banks on the other hand, tends to maintain a larger liquidity reserved since the Shariah-compliant liquidity management instruments are more limited. Holding excess liquidity can reduce capital efficiency. Table 6 shows the average CEE for Islamic and conventional banks.

Table 6: Annual Pooled Average CEE Across Countries By Bank Type

Year	Conventional Banks	Islamic Banks
2014	0.253	0.231

2015	0.283	0.218
2016	0.270	0.223
2017	0.325	0.236
2018	0.335	0.241
2019	0.315	0.259
2020	0.317	0.252
2021	0.283	0.245
2022	0.313	0.274
2023	0.369	0.313
2024	0.353	0.296

Source: Own Work

Conclusions

This study compared the intellectual capital efficiency of Islamic and conventional banks operating across dual banking countries using the Value-Added Intellectual Coefficient (VAICTM). The findings reveal a difference in the average value across countries for VAICTM, and its three components, HCE, SCE and CEE. Islamic banks show a higher VAICTM scores, which indicates having a better intellectual capital than the conventional banks. This is further supported by Islamic banks having higher average of HCE, suggesting that Islamic banks are more effective in generating value through their investments in employee knowledge, skills and expertise. In contrast, the average value for SCE and CEE demonstrate that conventional banks outperform Islamic banks, implying a more efficient in leveraging organizational systems, technological infrastructure, operational process, and capital to create value. The difference in results supports that the banking model influences the intellectual capital and its components. While intellectual capital serves as a strategic resource that contributes to value creation, institutional differences between Islamic and conventional banks can be seen to shape the intellectual capital efficiency. These differences highlighted the importance of adapting a balanced approach to intellectual capital, while striving to maintain in the long-term competitiveness and sustainability in the banking sector.

Based on the finding, several recommendations can be suggested. For Islamic banks, they should continue to strengthen their human capital development while emphasizing to improve structural capital and capital utilization efficiency. Islamic banks can invest more in digital transformation, process automation, and organizational innovation. Conventional banks need to enhance human capital development by investing more on knowledge sharing, professional development programs or employee training. Banking regulator and policymakers should encourage intellectual capital development through industry-wide training initiatives and enhanced governance frameworks, to strengthen the competitiveness and sustainability of both Islamic and conventional banking sector.

The main limitation of the study is the calculation of intellectual capital efficiency, using VAICTM that received many criticisms. Future study may adopt other methods to measure intellectual capital such as the Modified Value-Added Intellectual Coefficient (MVAIC) model. Future research can also incorporate qualitative dimensions of intellectual capital that are not fully captured by the VAICTM methodology. Future research may compare the intellectual capital between countries from high-income and middle-income nations.

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- Acknowledgements:** This paper acknowledges Management and Science University (MSU) for providing the necessary financial resources for publication.
- Funding Statement:** This paper is funded by the Management and Science University (MSU) Publication Fund.
- Conflict of Interest Statement:** The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the Advanced International Journal of Business, Entrepreneurship and SME's (AIJBES).
- Ethics Statement:** This study did not involve any human participants, animals, or sensitive data requiring ethical approval. The authors confirm that the research was conducted in accordance with accepted academic integrity and ethical publishing standards.
- Author Contribution Statement:** All authors contributed significantly to the development of this manuscript. Sarah Nursaadah Mohd-Zameri contributed to the literature review, handled data collection, analysis, and interpretation of results. Nor Farradila Abdul Aziz was responsible for the conceptualization, methodology, and overall supervision of the study. Farah Alias handled drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.
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