



# Can sharia supervisory board affect intellectual capital efficiency?

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## Abstract

**Purpose** - This study aims to examine the influence of Sharia Supervisory Board (SSB) characteristics on intellectual capital efficiency in Islamic banks in Indonesia.

**Method** - This study employs a quantitative approach using panel data regression analysis. The population consists of Islamic banks in Indonesia, with the sample selected using a purposive sampling technique based on specific criteria. The final dataset comprises 63 observations from 10 Islamic banks over the period 2017–2023.

**Result** - The findings reveal that SSB size, education level and meeting frequency do not significantly affect intellectual capital efficiency. However, SSB cross-membership positively influence intellectual capital efficiency. These results highlight the importance of external expertise and board activity in enhancing intellectual capital in Islamic banks.

**Implication** - The study provides practical implications for regulators and Islamic bank managers in optimizing SSB governance structures to improve intellectual capital efficiency. Enhancing SSB effectiveness through cross-membership may contribute to better knowledge-sharing and decision-making processes, ultimately improving bank performance.

**Originality** - To the best of our knowledge, there is still limited research that examines the direct impact of various SSB characteristics on intellectual capital efficiency in Islamic banks, particularly within the Indonesian context. This study therefore contributes to filling this gap in the literature by providing new evidence from an emerging Islamic banking market.

**Keywords:** governance; sharia supervisory board; intellectual capital; Islamic bank

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## Introduction

Intellectual Capital (IC) is widely recognized as a key asset in today's modern business models due to its key role in achieving corporate competitiveness and creating value (Appuhami & Bhuyan, 2015; Buallay, 2018; Mouritsen et al., 2001; Youndt, 2004). Furthermore, IC is also considered one of the core competencies to support growth and protect a company's competitive advantage (Joshi et al., 2013). IC management is aimed at value creation, where companies are required to be able to manage not only financial capital and physical capital but also intangible assets (Keenan & Aggestam, 2001). These intangible assets include knowledge embedded in various resource capitals of firms (Bontis, 1998; Guthrie, 2001). Inevitably, IC is considered one of the most significant factors in gaining a competitive advantage among organizations (Haris et al., 2019). Consequently, IC needs to be managed, governed, and developed well by the company (Keenan & Aggestam, 2001) to maintain its competitive advantage, especially for companies pertaining to the knowledge-based economy.

Banks are part of a knowledge-based economy, where banks are an industry that uses high technology or is knowledge-based (Buallay & Madbouly, 2020; Martín-de Castro et al., 2019). A knowledge-based economy depends on IC components, including knowledge, skills, expertise, processes, creativity, innovation, advanced systems, and information technology (Haris et al., 2019). Then, IC can be considered to be one of the most important and strategic assets for a bank's success (Appuhami & Bhuyan, 2015; Nimtrakoon, 2015). Naturally, banks pay great attention to intellectual capital efficiency (ICE) to increase their success and wealth (Xu & Wang, 2018).

Corporate governance has been recognized as a mechanism for attaining maximum efficiency as well as sustainability, productivity, and profitability (Agrawal & Cooper, 2017) so as to safeguard bank wealth (Ali et al., 2021). Furthermore, corporate governance is also concerned with monitoring the creation and utilization of corporate value (Scafarto et al., 2021). In a knowledge-based economy, good corporate governance strengthens the bank's ability to draw in excellent employees, approve advanced technology infrastructure, and preserve good relationships with stakeholders (Gangi et al., 2019; Tran et al., 2020). Therefore, The responsibility for establishing and developing the IC of a firm rests with its corporate governance bodies (Keenan & Aggestam, 2001; Scafarto et al., 2021).

The Sharia Supervisory Board (SSB) is a distinctive aspect of Islamic banks' governance structure that sets them apart from regular banks (Ajili & Bouri, 2018; Neifar et al., 2020; Nomran & Haron, 2020). SSB is an important feature in the governance mechanism of Islamic banks (Choudhury & Hoque, 2006). Islamic banks have a complex business model, so they require advanced resource management and supervision

(Nawaz, 2019). SSB plays a role in ensuring the conformity of IB products, services, and operations with sharia principles (Hamza, 2013; Neifar et al., 2020; Safiullah & Shamsuddin, 2018; Taufik, 2023). Furthermore, technological developments that influence the modernization of Sharia bank operations necessitate a more sophisticated role for the SSB. Then, the demand for an advanced SSB role arises from the need to continuously encourage and monitor innovation in sharia banking practices without conflicting with Islamic principles (Karim, 1995). The more advanced role of SSB is expected to be able to support the creation of innovative technology-based products and services so that they are able to compete with other banks, both Islamic banks and conventional banks (Nawaz et al., 2021).

A vast number of empirical studies have examined the relationship between SSB and performance (Farak et al., 2018; Musibah & Alfattani, 2014; Nomran et al., 2017, 2018; Nomran & Haron, 2020; Nugraheni, 2018). However, there are limited empirical studies that have analyzed the role of SSB in improving IC in IBs, for example, Aslam & Haron (2020). Aslam & Haron (2020) have examined the influence of SSB size on ICE, but they failed to demonstrate that SSB can have a positive impact on ICE. Furthermore, the effect of governance mechanisms in IBs, especially SSB, on the quality of non-financial information such as ICE is still rarely studied. Therefore, the objective of this paper is to examine the influence of SSB characteristics on ICE. The SSB characteristics in the research are SSB size, SSB education level, SSB cross-membership, and SSB meeting, which refers to earlier studies (Ajili & Bouri, 2018; Elamer et al., 2020; Nomran et al., 2018; Nomran & Haron, 2020; Safiullah & Shamsuddin, 2018; Taufik, 2023).

Considering the importance and need for valuation of IC for the banking industry in general and the Islamic banking (IB) industry in particular, this study contributes to IB industry practices by investigating the role of SSB characteristics towards ICE. The present research contributes to the literature in several ways. First, this research aims to deepen and expand the understanding of the influence of SSB characteristics such as SSB size, meetings, cross-membership, and education level on ICE. Four SSB proxies were selected to evaluate the SSB's capabilities and determine its ability to carry out its responsibilities. Second, we provide empirical evidence for the first time on the effect of SSB characteristics on ICE in IBs.

## Literature Review

Based on previous research, this research uses governance theories such as agency theory and resource dependency theory (RDT) to explain the role of the SSB in ICE (Farook et al., 2011; Quttainah et al., 2013). Companies with strong CG can safeguard shareholder interests, minimize agency conflicts, and improve organizational performance (Ajili & Bouri, 2018). According to agency theory, the SSB serves as an

independent board whose role is to supervise management in order to prevent agency problems and control opportunistic behavior related to product and operational conformity with sharia principles (Quttainah et al., 2013; Safieddine, 2009). From the perspective of RDT, a strong SSB can drive value creation by leveraging its access to external resources and networks (Hillman et al., 2009; Hillman & Dalziel, 2003).

Intellectual capital (IC) has long been recognized as a critical intangible resource that supports competitiveness, innovation, and long-term sustainability (Edvinsson & Malone, 1997; Sveiby, 1997). Pulic (2000) developed the Value-Added Intellectual Coefficient (VAIC) model, which has been widely applied to measure IC efficiency through three dimensions: human capital efficiency, structural capital efficiency, and capital employed efficiency. Numerous studies have shown that higher IC efficiency enhances firm performance, innovation capacity, and value creation (Chen et al., 2005; Dumay & Garanina, 2013; Firer & Williams, 2003). In the banking sector, IC efficiency is especially important because financial services rely heavily on knowledge, expertise, and trust (Al-Musalli & Ismail, 2012). In Islamic financial institutions, IC efficiency not only contributes to competitiveness but also ensures compliance with sharia principles, as effective knowledge management and organizational processes are crucial for aligning governance with ethical and religious values (Nawaz & Haniffa, 2017).

Recent studies have also emphasized the interplay between sharia governance and IC efficiency. For example, Boudawara et al. (2023) highlight the role of the SSB in enhancing governance quality, which in turn strengthens IC utilization in Islamic banks. In a broader governance context, Al-Musalli & Ismail (2012) provide evidence that corporate governance mechanisms, including the board of directors, play a vital role in improving IC efficiency and fostering value creation. Despite these insights, limited research has examined the direct role of SSB characteristics in influencing IC efficiency. This study seeks to address this gap by linking governance theories with the intellectual capital literature to explore how SSB attributes shape the efficiency of intellectual capital management in Islamic financial institutions.

## Hypotheses Development

### SSB Size

According to agency theory, a greater SSB size can result in lower agency costs (Frag et al., 2018). In line with agency theory, RDT also posits that a larger board enhances supervisory performance (Jensen, 1993; Quttainah et al., 2013). A large SSB comprises members with diverse knowledge, skills, and experience in both business and *fiqh*, thereby encouraging product innovation and better operations that ultimately lead to improved performance (Hamza, 2016). Moreover, larger boards increase compliance with sharia principles (Farook et al., 2011) and provide assurance to stakeholders that

banks adhere to Islamic values in products and transactions (Alkhamees, 2013; Farook et al., 2011; Safieddine, 2009). Such compliance enhances legitimacy and reputation (Mallin et al., 2014). Prior studies confirm that SSB size positively influences bank performance (Alsartawi, 2019; Mollah & Zaman, 2015b; Nawaz et al., 2021), CSR disclosure (Nugraheni & Khasanah, 2019), risk reduction (Safiullah & Shamsuddin, 2018), and lower earnings management (Alam et al., 2020). From an intellectual capital perspective, a larger SSB can enhance human capital efficiency (HCE) through diverse expertise that improves managerial competence and employee development, structural capital efficiency (SCE) by strengthening organizational processes, compliance systems, and product innovation, and capital employed efficiency (CEE) through more effective monitoring of resource allocation and utilization in line with sharia principles. Considering previous research and these theoretical arguments, it is probable that SSB size is positively linked with intellectual capital efficiency.

H1: SSB size will be positively associated with intellectual capital efficiency

### **SSB Education level**

Qualified board members are viewed as a strategic asset to boosting competitiveness (Ingle & Van Der Walt, 2001). Highly educated board members will improve the quality of the board and be able to face new challenges positively (Hambrick & Mason, 1984). Firm performance is positively correlated with highly qualified board members (Haniffa & Cooke, 2005), and higher-quality SSBs can lead to higher profitability (Musibah & Alfattani, 2014).

SSB members with advanced degrees in business and economics are also better positioned to understand the contemporary implications of Islamic principles for financial institutions (Farook et al., 2011). From an RDT perspective, qualified board members are crucial for enhancing organizational competitiveness (Gabrielsson & Huse, 2005). Previous studies confirm that SSB education level positively affects Islamic banks' performance (Nomran et al., 2017, 2018), CSR disclosure (Farook et al., 2011; Musibah & Alfattani, 2014), reduces earnings management (Quttainah & Almutairi, 2017), and decreases banking risks (Safiullah & Shamsuddin, 2018).

From the perspective of intellectual capital efficiency, highly educated SSB members can enhance HCE by transferring knowledge, supporting managerial competence, and encouraging continuous staff development. They also strengthen SCE through the design of robust governance frameworks, compliance systems, and innovative processes aligned with sharia principles. Furthermore, advanced academic expertise allows them to improve CEE by ensuring that investments and resources are allocated productively and in accordance with sharia requirements. Based on these theoretical arguments and empirical findings, it is probable that SSB education level is positively associated with

intellectual capital efficiency. According to the theoretical justification, previous research, and discussion above, it is probable that the education level of the SSB is positively linked with ICE. Then, the hypothesis for this variable is that:

H2: SSB education level will be positively associated with intellectual capital efficiency

### **SSB Cross Membership**

Resource dependency theory assumes that boards provide critical resources to firms (Hillman & Dalziel, 2003). Cross-membership enables board members to access knowledge and information about the activities and policies of other organizations (Haniffa & Hudaib, 2006). In Islamic banks, cross-membership is one of the unique features of SSBs (Rahman & Bukair, 2013), as members serving in multiple institutions gain broader exposure to sharia law practices and industry dynamics (Farook et al., 2011). The knowledge and experience obtained through cross-membership can be used to develop more effective supervisory practices and ensure conformity with Islamic guidelines (Quttainah & Almutairi, 2017). Prior studies have found that SSB cross-membership improves Islamic bank performance (Nomran et al., 2017, 2018) and reduces undesirable practices such as tax avoidance (Taufik, 2023).

From the perspective of intellectual capital efficiency, SSB cross-membership can enhance HCE by transferring best practices, industry knowledge, and diverse expertise to managers and employees. It contributes to SCE by strengthening compliance systems, governance frameworks, and product development through exposure to innovative practices across institutions. Furthermore, it supports CEE by guiding more effective allocation of resources and ensuring that capital is employed productively and in line with sharia principles. Based on these arguments, it is probable that SSB cross-membership positively influences intellectual capital efficiency. Based on prior studies, theoretical justifications, and the preceding discourse, it is probable that the cross-membership of the SSB is positively linked with ICE. Therefore, this study proposes the following hypothesis:

H3: SSB cross membership level will be positively associated with intellectual capital efficiency

### **SSB Meetings**

According to agency theory, boards that meet regularly are more effective in monitoring management and safeguarding shareholder interests (Ntim et al., 2017; C. Ntim & Osei, 2011; Vafeas, 1999). From an RDT perspective, board meetings serve as channels for resource exchange, as members bring in external expertise and networks that strengthen the monitoring and advisory functions (Barros et al., 2013; O'Sullivan et al., 2008). Frequent meetings allow board members to discuss corporate strategies and

policies more intensively, potentially improving organizational outcomes (Nugraheni & Khasanah, 2019). In Islamic banks, the SSB is required to meet periodically to review compliance with sharia principles (Farag et al., 2018). Prior research shows that SSB meeting frequency influences performance (Alsartawi, 2019; Baklouti, 2022) and enhances risk disclosure (Alshirah et al., 2020).

From the perspective of intellectual capital efficiency, frequent SSB meetings can enhance HCE by enabling continuous knowledge transfer, capacity building, and learning opportunities for management and staff. They strengthen SCE through regular monitoring, refinement of compliance frameworks, and support for product and process innovation. Moreover, frequent meetings contribute to CEE by improving oversight of resource allocation and ensuring that assets and capital are employed productively and in accordance with sharia requirements. Based on these arguments, it is probable that the frequency of SSB meetings is positively associated with intellectual capital efficiency. Based on earlier research, agency theory, RDT, and the discussion above, it is probable that the frequency of meetings of the SSB is positively linked with ICE. Hence, this study hypothesizes that:

H4: SSB meetings level will be positively associated with intellectual capital efficiency

## Research Methods

The population in this study consists of Islamic banks in Indonesia. The sampling technique utilized was purposive sampling with a judgment sampling type. The criteria for sample selection included the following: 1) Islamic banks in Indonesia designated as Sharia Commercial Banks (BUS); 2) Sharia banks that published annual reports consecutively during the research observation period from 2017 to 2023; 3) Banks that reported a profit during the observation year. With these criteria, 10 Islamic banks were obtained as research samples with 70 observation data for seven years, from 2017 to 2023. However, some data points did not report profits for specific years, and outlier data were excluded, even though they had been winsorized. As a result, the tested data met the criteria for unbalanced panel data, leaving 63 data points available for analysis.

Data analysis techniques included descriptive statistical analysis, classical assumption tests, and data panel regression. Panel data regression is used to test the influence of the independent variable (SSB characteristics) on the dependent variable (intellectual capital). The regression equation is as follows:

$$VAIC_{it} = \alpha + \beta_1 SSBS_{it} + \beta_2 SSBD_{it} + \beta_3 SSBCM_{it} + \beta_4 SSBM_{it} + \varepsilon_{it}$$

Where the VAIC (value added intellectual coefficient) denotes intellectual capital efficiency, SSBS denotes SSB size, SSBD denotes SSB educational qualification, SSBCM denotes SSB cross membership, and SSBM denotes SSB meetings.

**Table 1**  
*Measurement of the Variables*

| Abbreviation | Variable                     | Measurement                                                                                                                                                                                                                                             |
|--------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HCE          | Human capital efficiency     | The ratio of value added is divided by human capital.<br>Where: the value added = operating profit + employee cost + depreciation.<br>Where: the human capital = total costs invested on employees (Chowdhury et al., 2019; Gupta & Raman, 2021).       |
| SCE          | Structure capital efficiency | The ratio of structural capital is divided by value-added.<br>Where: the structural capital = value-added – human capital<br>Where: the value added = operating profit + employee cost + depreciation (Chowdhury et al., 2019).                         |
| CEE          | Capital employed efficiency  | The ratio of value added is divided by capital employed.<br>Where: the value added = operating profit + employee cost + depreciation.<br>Where: the capital employed = total Asset – current liabilities (Chowdhury et al., 2019; Gupta & Raman, 2021). |
| SSBS         | SSB Size                     | Total number of SSB members (Nomran et al., 2018; Taufik, 2023).                                                                                                                                                                                        |
| SSBM         | SSB meeting frequency        | The number of meetings per year (Baklouti, 2022; Uyob et al., 2023).                                                                                                                                                                                    |
| SSBD         | The doctorate-qualified SSB  | % of scholars who have PhD degree (Nomran et al., 2017, 2018).                                                                                                                                                                                          |
| SSBCM        | SSB cross-membership         | % of scholars who sit on other SSBs (Baklouti, 2022; Nomran et al., 2017, 2018; Taufik, 2023).                                                                                                                                                          |

Source: Authors' work

First, descriptive statistical techniques, such as mean, standard deviation, and maximum and minimum values, will be used for data analysis. Then, the research data were tested to determine the best model, specifically the Chow test, the Hausman test, and the Lagrange Multiplier test. These testing stages will identify the most appropriate model for the research, which could be the Common Effect Model (CEM), the Fixed Effect Model (FEM), or the Random Effect Model (REM). Afterward, classical assumption testing will be conducted on the data. The final stage involves hypothesis testing using multiple regression analysis.

Our dependent variable is related to overall IC efficiency. We calculate the VAIC as a proxy for the aggregate intellectual capital efficiency consisting of HCE, SCE, and CEE (Goh, 2005; Mondal & Ghosh, 2012; Nawaz et al., 2021; Pulic, 2000; Scafarto et al., 2021).

The general formula takes the form of:  $VAIC^{TM} = HCE + SCE + CEE$ . The next set of independent variables is related to SSB characteristics. The characteristics consist of the size, meeting, educational qualification, and cross membership of SSB members. The measurement of those variables is described in Table 1.

## Results and Discussion

The descriptive statistics provide insights into the characteristics of the Sharia Supervisory Board (SSB) and its potential influence on intellectual capital efficiency in Indonesian Islamic banks. On Table 3, the Value Added Intellectual Coefficient (VAIC) has an average of 2.27 and a median of 2.18, indicating relatively balanced efficiency across banks. However, the wide range (0.57–6.13) suggests substantial variation in intellectual capital utilization, with a moderate standard deviation (0.89) reflecting differences in efficiency levels.

The SSB Size (SSBS) is uniform across banks, with an average of 2.19 members (median: 2, min–max: 2–3). The low standard deviation (0.39) suggests consistency in board size practices. In contrast, SSB Meeting Frequency (SSBM) varies significantly, with banks holding an average of 19.92 meetings per year (median: 13, min–max: 4–84). The high standard deviation (15.57) highlights discrepancies in meeting frequency, which may indicate differences in governance policies and engagement levels.

The SSB Doctorate Qualification (SSBD) also exhibits notable variation. On average, 51.3% of SSB members hold a PhD (median: 50%, min–max: 0–100%), with a standard deviation of 0.38, suggesting disparities in academic credentials across banks. Similarly, SSB Cross-Membership (SSBCM) shows significant differences, with an average of 60.62% of members serving as SSBs at multiple institutions (median: 67%, min–max: 0–100%). The high standard deviation (0.43) indicates substantial diversity in cross-membership practices, which may impact governance effectiveness and board independence.

**Table 2**

*Descriptive Statistic*

| Variables    | VAIC    | SSBS    | SSBM    | SSBD    | SSBCM   |
|--------------|---------|---------|---------|---------|---------|
| Mean         | 2.27039 | 2.19048 | 19.9206 | 0.51302 | 0.60619 |
| Median       | 2.18123 | 2       | 13      | 0.5     | 0.67000 |
| Maximum      | 6.13424 | 3       | 84      | 1       | 1       |
| Minimum      | 0.56576 | 2       | 4       | 0       | 0       |
| Std. Dev.    | 0.89711 | 0.39583 | 15.5722 | 0.38038 | 0.43518 |
| Observations | 63      | 63      | 63      | 63      | 63      |

Source: Authors' work

**Table 3***Summary of Specification Tests*

| Test         | Statistic          | p-value | Decision                  |
|--------------|--------------------|---------|---------------------------|
| Chow Test    | Chi-square = 42.12 | 0.0000  | FEM is preferred over CEM |
| Hausman Test | Chi-square = 11.66 | 0.0200  | FEM is preferred over REM |

Source: Authors' work

To determine the most appropriate panel data estimation method, we conducted the Chow Test, Hausman Test, and Breusch-Pagan Lagrange Multiplier (LM) Test to compare the Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM). As presented in Table 3, the Chow Test results (Chi-square: 42.12, p-value: 0.0000) strongly reject the null hypothesis ( $H_0$ ), indicating that FEM is preferred over CEM. To further validate this selection, the Hausman Test was performed, yielding a Chi-square statistic of 11.66 with a p-value of 0.0200. Since the p-value is below 0.05, we reject the null hypothesis, confirming that FEM provides more efficient and consistent estimates compared to REM. Based on these results, FEM is determined to be the most suitable model for this panel data analysis. Consequently, since FEM has been confirmed as the optimal model, conducting the Breusch-Pagan Lagrange Multiplier (LM) Test is unnecessary.

### Classical Assumptions

In this study, the best model selected is the FEM. If the chosen model is FEM, autocorrelation can be excluded from the classical assumption testing (Baltagi, 2005; Gujarati & Porter, 2012; Wooldridge, 2010). Therefore, the classical assumption tests that will be carried out on this research data are the normality test, the multicollinearity test, and the heteroscedasticity test.

The first classical assumption test to be carried out is the normality test using the Jarque-Bera test. The Jarque-Bera value is 2.882016, and the p-value is 0.236689, indicating that the data is normally distributed because the p-value is greater than 0.05. The next test is multicollinearity. Based on Table 4, the correlation between the independent variables is no greater than 0.08, indicating that there is no multicollinearity among the independent variables. The heteroscedasticity test will use the Gletjer test. shows that the p-value for each independent variable is greater than 0.05, indicating that there is no heteroscedasticity.

### Hypothesis Test

This study investigates the impact of Sharia Supervisory Board (SSB) characteristics on intellectual capital efficiency in Islamic banks in Indonesia. The regression results, as presented in Table 6, offer insights into the significance and direction of these relationships, with significance levels set at 5%.

**Table 4***Multicollinearity Test*

| Variables | SSBS      | SSBD     | SSBCM     | SSBM     |
|-----------|-----------|----------|-----------|----------|
| SSBS      | 1.000000  |          |           |          |
| SSBD      | 0.124672  | 1.000000 |           |          |
| SSBCM     | -0.054708 | 0.033248 | 1.000000  |          |
| SSBM      | 0.207993  | 0.056828 | -0.326063 | 1.000000 |

Source: Authors' work

**Table 5***Heteroscedasticity Test*

| Variables | Coefficient | Std. Error | t-Statistic | Prob.  |
|-----------|-------------|------------|-------------|--------|
| C         | 0.389620    | 0.236636   | 1.646495    | 0.1059 |
| SBS       | -0.098625   | 0.081478   | -1.210445   | 0.2318 |
| SSBD      | -0.109985   | 0.192554   | -0.571191   | 0.5704 |
| SSBCM     | 0.077928    | 0.121520   | 0.641276    | 0.5243 |
| SSBM      | 0.029930    | 0.063293   | 0.472879    | 0.6384 |

Source: Authors' work

**Table 6***Hypothesis Testing Results*

| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|----------|-------------|------------|-------------|---------|
| C        | 3.048523    | 0.500619   | 6.089513    | 0.0000  |
| SSBS     | -0.124233   | 0.172372   | -0.720725   | 0.4744  |
| SSBD     | -0.367637   | 0.407361   | -0.902485   | 0.3711  |
| SSBCM    | 0.630311    | 0.257083   | 2.451786    | 0.0178* |
| SSBM     | -0.259405   | 0.133900   | -1.937299   | 0.0584  |

Source: Authors' work

The first hypothesis (H1) posits that the size of the Sharia Supervisory Board (SSBS) is positively associated with intellectual capital efficiency. However, the regression results show a negative, statistically insignificant relationship (coefficient = -0.124233, p-value = 0.4744), indicating that an increase in the number of SSB members does not significantly enhance intellectual capital efficiency (H1 is not supported). This finding aligns with the work of Yermack (1996), who found that larger boards face coordination challenges that hinder decision-making, and Lipton & Lorsch (1992), who suggest that larger boards may struggle with communication and governance, undermining their effectiveness. While larger boards may offer diverse expertise, the complexity introduced by increased board size can impede efficient decision-making. Supporting this, Shah et al. (2024) argue that while agency theory highlights the importance of board size and independent directors, these factors alone do not guarantee effective intellectual capital management without strong governance mechanisms. Similarly, Chinwe & Umar (2024)

found that, in Nigerian conglomerates, board size did not significantly affect intellectual capital disclosure, whereas the quality of board engagement and strategic direction were more impactful. These results indicate that simply increasing the size of the SSB is not sufficient to enhance intellectual capital efficiency. Instead, fostering active participation, strategic engagement, and collaboration among board members is essential for effective governance and improved management of intellectual capital. This reinforces the broader understanding that board effectiveness depends more on the quality of its members' engagement than on the size of the board.

The second hypothesis (H2) posited that the education level of the Sharia Supervisory Board (SSBD), specifically the proportion of doctorate-qualified members, would be positively associated with intellectual capital efficiency. However, the regression results show a negative coefficient for SSBD (-0.367637) with a p-value of 0.3711, indicating that this relationship is statistically insignificant. Therefore, H2 is not supported. One explanation for this finding is the potential mismatch between academic qualifications and the practical demands of governance in Islamic banks. Doctorate-qualified members may possess strong theoretical knowledge but lack direct exposure to the operational, regulatory, and strategic complexities of the banking industry, which are crucial for enhancing intellectual capital efficiency. In such cases, high academic credentials might serve more as a symbolic signal of expertise than as a source of effective governance input, resulting in limited impact on intellectual capital management. This aligns with Anderson et al. (2004), who found that while academic qualifications such as doctorates indicate expertise, they do not necessarily lead to improved decision-making or organizational performance. Similarly, Salehi & Zimon (2021) further argue that practical experience and industry-specific knowledge are more influential than formal qualifications in improving firm outcomes. Similarly, Giannarakis et al. (2020) emphasize that board effectiveness depends more on governance skills and strategic engagement than on educational attainment alone. Therefore, the insignificant results suggest that, in the context of Islamic banks, advanced academic qualifications without complementary practical experience may not enhance governance or intellectual capital efficiency. These findings highlight the need for a balanced composition of SSB members who combine strong academic backgrounds with practical expertise and industry engagement.

The third hypothesis (H3) posits that Sharia Supervisory Board (SSB) cross-membership is positively associated with intellectual capital efficiency. Our regression analysis supports this hypothesis (H3 is supported), with a coefficient of 0.630311 and a p-value of 0.0178, indicating statistical significance at the 5% level. This finding highlights the positive impact of cross-membership on intellectual capital efficiency. This result aligns with existing literature, such as Mollah & Zaman (2015), who found that SSB

members with cross-membership bring diverse experiences and knowledge, enhancing governance and decision-making. Similarly, Farook et al. (2011) suggest that cross-membership improves oversight and strategic guidance, contributing to better performance. These benefits are often attributed to the broader networks and enriched perspectives gained through cross-membership, leading to more effective management of intellectual capital. Together, these studies reinforce the value of cross-membership in fostering knowledge transfer, best practice adoption, and enhanced governance, which are critical to optimizing intellectual capital efficiency in Islamic financial institutions. This supports the resource dependency theory, which posits that external connections of board members can expand an organization's strategic outlook.

Finally, Hypothesis 4 examines the relationship between the frequency of Sharia Supervisory Board (SSB) meetings and the efficiency of intellectual capital. The results reveal a coefficient of -0.259405 and a p-value of 0.0584, indicating statistical significance at the 5% level. Therefore, H4 is not supported, suggesting that meeting frequency does not significantly impact intellectual capital efficiency. This implies that increasing the number of meetings alone does not enhance intellectual capital; rather, factors such as meeting quality, strategic focus, and active participation are more critical. Organizations should prioritize improving meeting effectiveness to optimize governance and manage intellectual capital more effectively. In line with this, Kotte & Reddy (2023) found that while meeting frequency may affect intellectual capital, the improvements come from the quality and effectiveness of discussions, not just the number of meetings. Additionally, Hilliard et al. (2011) emphasized that the organization and structure of meetings play a key role in their success, suggesting that more frequent meetings may reduce discussion quality. Similarly, Fletcher (2022) argued that poorly structured meetings lead to inefficiencies, reinforcing the importance of focused discussions. Bergman et al. (2016) further highlighted that a well-prepared agenda is more influential in driving positive outcomes than simply increasing meeting frequency. Nguyen & Huynh (2023) echoed these findings, showing that strategic focus and agenda attributes significantly impact corporate performance. These studies collectively reinforce the idea that meeting frequency alone does not drive intellectual capital efficiency. Instead, the quality of preparation and strategic engagement during meetings is crucial for enhancing governance and effectively managing intellectual capital.

## Conclusion

This study examines the relationship between Sharia Supervisory Board (SSB) characteristics and intellectual capital efficiency in Islamic financial institutions. The findings provide key insights into the impact of SSB attributes on intellectual capital management, with significant implications for governance practices. The third

hypothesis (H3), suggesting that SSB cross-membership positively influences intellectual capital efficiency, was supported. Cross-membership fosters knowledge transfer, exposure to best practices, and improved governance, all of which enhance decision-making and intellectual capital management. This supports resource dependency theory, which underscores the value of external connections in broadening strategic perspectives. Conversely, the first (H1), second (H2), and fourth (H4) hypotheses were not supported. The size of the SSB had no significant effect on intellectual capital efficiency, indicating that simply increasing board size is insufficient to improve governance. Similarly, the education level of SSB members did not show a significant relationship with intellectual capital efficiency, suggesting that academic qualifications alone are inadequate for enhancing decision-making quality. Additionally, the frequency of SSB meetings did not significantly impact intellectual capital efficiency, emphasizing the importance of meeting quality and strategic engagement over frequency. These results highlight that while certain SSB characteristics, such as cross-membership, are crucial for enhancing intellectual capital efficiency, other factors, like board size, education level, and meeting frequency, are not directly impactful. To improve intellectual capital management, it is vital for Sharia Supervisory Boards to focus on governance quality, strategic engagement, and practical expertise rather than merely expanding board size or meeting frequency.

Theoretically, this study extends the application of resource dependency theory by showing that SSB cross-membership enhances intellectual capital efficiency through external linkages and knowledge transfer, while also refining agency theory by demonstrating that board size, education level, and meeting frequency are insufficient without effective engagement. Practically, the findings recommend that Islamic banks prioritize appointing SSB members with cross-membership experience and practical expertise rather than relying solely on academic qualifications or increasing meeting frequency. For regulators such as the Financial Services Authority (OJK), the results suggest the need for policies and guidelines that emphasize governance quality, cross-institutional expertise, and strategic contributions of the SSB to strengthen sharia governance and improve intellectual capital efficiency across the sector.

Despite the contributions of this study, several limitations should be acknowledged. The analysis is based on a specific sample of Islamic financial institutions, limiting the generalizability of the findings. Future research could extend the study to a broader sample or compare institutions across different countries or regions for greater external validity. In addition, our empirical models do not incorporate control variables such as firm size, leverage, or profitability, which are often considered in governance-performance studies. The exclusion of such controls was intentional to focus on the direct association between SSB characteristics and intellectual capital efficiency;

however, this choice may restrict the robustness of the results. Future research could extend the model by including firm-level controls to assess whether the documented effects remain consistent. Moreover, we did not conduct additional robustness checks, such as alternative model specifications or advanced econometric techniques (e.g., GMM or 2SLS), which could further address potential endogeneity concerns. While this was beyond the scope of the present study, future research may incorporate such techniques to validate and extend our findings. Furthermore, the reliance on quantitative data suggests that qualitative methods, such as case studies or interviews, could provide deeper insights into the influence of specific governance practices. Future studies could also explore additional variables, such as SSB involvement in strategic decision-making or the role of organizational culture in intellectual capital efficiency, to offer a more comprehensive understanding of governance structures and board dynamics in Islamic financial institutions. Addressing these limitations in future research would not only enhance the robustness of the findings but also contribute to a deeper understanding of how sharia governance mechanisms shape intellectual capital efficiency.

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