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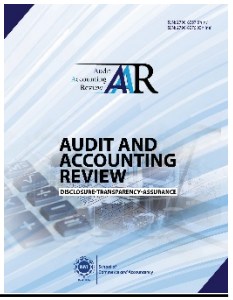


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# Intellectual Capital Efficiency from the Lens of Audit Committee Attributes

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## Abstract

The purpose of this research is to find out the association between audit committee traits and intellectual capital efficiency in the context of Pakistan. For this purpose, this study employs a sample of 28 banks covering a duration of 10 years (2010-2020). Furthermore, this study employs audit committee attributes as an independent variable, while the dependent variable is the efficiency of intellectual capital, which is measured by using the value-added intellectual coefficient (VAIC) approach. As the audit committee aids in strengthening the internal control systems by overseeing the top management decision-making process, thus, it improves the overall effectiveness of organizations. Preluding to the control system process, the results of this study are justified by revealing a significantly positive impact of audit attributes on banks' intellectual capital efficiency. Therefore, this research illustrates the insights of intellectual capital efficiency with audit committee attributes as a major component, which would be significant for managers in making decisions regarding audit committee composition to increase intellectual capital in the developing nations.

***Keywords*:** audit committee attributes, intellectual capital efficiency, value -added intellectual coefficient (VAIC)

## Introduction

In the last few decades, with the evolution of economic transition, organizations are stirring from a traditional based-approach to a knowledge-based environment (Tiwar & Vidyarthi, 2018). In this contemporary knowledge-based business environment, the emergence of the knowledge economy is mainly driven by the skills of the knowledge process. Furthermore, with the advent of globalization, the importance of intellectual capital as an instrument for gaining a sustainable competitive edge has increased. Therefore, the quick adoption of technologies and

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knowledge-based approaches lead towards the transformation of traditional tangible resources into intangible ones. One of the critical intangible components in a knowledge-driven environment is intellectual capital (Olohunlana et al., 2022). It denotes that the human capital skills and efficiency would ultimately lead an organization to a sustainable competitive position in a business environment. Switching from a production economy to a knowledge economy includes inimitable ideas, capabilities, and processes that replace tangible assets as the major "economic wealth production component." Intellectual capital refers to the intellectual as assets that are convertible into revenue nonetheless disclosed by companies in their annual reports. Astuti et al. (2020) also defined intellectual capital as a knowledgeable resource that would employ profits, creates demand for clients, launch a new product, or otherwise improve the organization's efficiency. In a knowledge-based financial system, the successful use of intangible instruments helps in establishing most of the value creation. These intangible assets, also known as intellectual capital resources, are a company's intangible assets that provides a competitive edge and contributes to a company's bottom line. It also includes the employee's financial expertise, the process of a company and the information contained within a company.

In recent year, many organizations, particularly banks, are focusing on improving their Intellectual Capital Efficiency (ICE) as a means to increase their wealth. Due to the recent increasing demand for the supplementary approaches, and for the improvement of a firm's performance, IC is thought to be the most suitable strategic source for producing value and enhancing performance in any organization. Appuhami and Bhuyan (2015) contended that when intangibles are not sufficiently employed, they would be sub-optimal and their ability to create value would be underutilized. Due to its multidimensional nature and diverse variation, managing IC remains a significant problem for the businesses. For this purpose, Audit Committee (AC) is seen as representing the interests of its investors. It is defined in various ways by different researchers such as Bamahros (2021) defined AC as "a board of directors standing committee to operate as a bridge between companies management and the outside auditor". Sydler et al. (2014) defined it as "A standing committee of the board of directors established by the corporation's regulations. The committee's responsibilities are outlined by best financial standards and practice including but not limited to financial reporting, auditing, compliance, and risk management practices". Zraiq and

Fadzil (2018) defined it as "a small company's board of directors group tasked with assisting auditors in remaining independent of management". The concept of AC varies according to the aims, functions, and obligations allocated to them. Precisely, it is elaborated in terms of the committee made up of the non-executive directors. The committee was originally established as having the objective of enlightening the quality of investigation of the company's management. It is elaborated as a committee accountable for maintaining the auditor's independence. Sultana et al. (2015) stated that an audit committee is perhaps much required to keep an eye on organizations' systems, particularly, from stakeholders' viewpoint. The current research expands the literature in terms of ICE, particularly, in the context of a developing region, such as, Pakistan.

There is a significant impact of audit committee characteristics on ICE. Many other researchers have discussed the determinants of ICE in the banking sector of emerging markets including, Nigeria (Olohunlana et al., 2022). Bamahros (2021) conducted a research on AC chair characteristics and IC performance of banks, dependent variable ICP measurement was based on the VAIC model by taking 12 Saudi Arabian banks. Whereas, Buallay (2018) focused on the role of audit committee characteristics on ICE in Iran. Nadeem et al. (2017) determined the relationship between a firm's performance and ICE in BRICS countries but the literature lacks the association of audit committee (AC) attributes with intellectual capital efficiency (ICE) in Pakistan's banking sector. This study bridges the gap by investigating the influence of audit committee characteristics on ICE in Pakistan using the MVAIC model, which was predominately neglected by previous researchers. This research would contribute by helping scholars to increase their knowledge, investors, and regulatory bodies in making better decisions. The research findings of this study would be helpful for stockholders, investors, and scholars in getting insight into the appreciative role of an audit committee. For the implementation of internal control systems, AC would lead the financial institutions towards the potential growth. Keeping in view the critical role of financial sector in a country, AC is essential to a country's economy for the necessary growth. It oversees formulation of monetary policies and managing all measures implemented in Pakistan in order to sustain economic stability gradually, as banks are evolving and are becoming more aware of their intellectual capital efficiency.

By assessing the association of AC characteristics and value creation efficiency of Pakistani banks, this study aims to contribute to understand the effective role of ICE in the banking sector of Pakistan. This study also investigates the capability of audit committee (AC) characteristics to better support IC and improve bank performance directly or indirectly through the contribution of audit committees toward IC and efficiency in Pakistan's banking sector. This research contributes to the existing literature by exploring the impact of audit committee (AC) characteristics on intellectual capital efficiency (ICE). It also draws some implications, as the significance of the study lies in fact that it would aid company stakeholders, investors, decision-makers, regulators, legislators, bank officers. Furthermore, in academics to better understand Intellectual Capital (IC) and the need to incorporate audit committee (AC), while also increasing its adaptability

## Literature Review

### Significance of Intellectual Capital Efficiency (ICE) and its components

From the last three decades, the global financial system has switched from an industrialized economy towards a knowledge economy. In the context of resource-based view, traditional means of production are replaced with knowledge-based resources (Nawaz et al., 2021). IC is steadily earning more prominence being a crucial strategic asset in today's knowledge-based economies, with more dependence on intangibles (Khalique et al., 2015). According to Appuhami and Bhuyan (2015) the inherent limitations of the prevailing framework for financial reporting have resulted in a break between stakeholder beliefs and knowledge, motivating academics to develop different methods for assessing, and disclosing IC. Human Capital Efficiency (HCE) is considered the most important part of IC efficiency as it allows companies to uphold their competitiveness in the market (Anifowose et al., 2018). Soewignyo and Soewignyo (2018) highlighted that HCE addresses information, understanding, education, training, and the abilities of representatives, which employees take with themselves when they get retirement from their jobs. Hamdan et al. (2017) stated that RC equips HC and SC with the foundation and reserves they require to maximize their resources for the better use and improvement of the overall business performance. CE refers to knowledge that organization retains after a worker retires from the firm. The association of IC with firms' performance is a plain and simple fact. Many studies have found a substantial and favourable connection between the major IC elements and

their impact on an organization's worth. Nadeem et al. (2017) determined the relationship between firms' performance and ICE in BRICS countries. The data used was for the period of 2005-2014 and 6045 registered companies in BRICS countries. The results concluded that there is a direct relationship between IC and an organization's profitability. Buallay (2019) also scrutinized the influence of IC and banks' performance by taking into account 59 banks listed on the gulf countries' stock exchange for the duration of 2012-2016. The research apprehended that there exists a direct impact of MVAIC on banks' operational, financial, and market performance.

There has been a lot of research done in the existing literature, showed the influence of ICE and CG on the firms' performance. Chowdhury et al. (2019) investigated the association of the ICE with the organization's efficiency in the pharmaceutical sector, which contained data for five years from 2013-2017 and a sample of 28 listed pharmaceutical companies. He used the VAIC technique to measure the ICE components, which were the independent variables, whereas ATO, ROA, ROE, and M/B were dependent variables to quantify the firm's performance. Hamdan et al. (2017) explored the moderating role of corporate governance to study the relationship between companies' operational, market, and financial performance with ICE. Data used was for the period of 2012-2014 and the sample used consisted of 171 firms. Results showed that CG has a significant direct relationship with ICE and different measures of the organization's performance. Ginesti et al. (2018) researched to evaluate the association between the organization's IC with its financial performance. Data used for this research was taken from 452 Italian firms and the data was for the annual year of 2016. The results showed that if the companies want to improve their reputation then the companies should invest more in human capital (HC), which is said to be the key component for the corporate reputation. Moreover, it is also considered as a company's performance indicator, which is positively related to IC.

Asiaei et al. (2018) investigated the indirect and mediated effects of intellectual capital on operational efficiency, which are mediated by performance assessment methods. This study concluded that organizations having an enhanced value of IC should invest further in the balanced use of performance measurement systems. Different researchers have measured intellectual capital using different tools and techniques such as

questionnaires and surveys (Andreeva & Garanina, 2016; Dumay, 2016). Sydler et al. (2014) used a method for analyzing IC to verify the company's knowledge-based approach that explained long-term variances in the profitability. The sample used in the study consisted of 69 biotechnology and pharmaceutical companies that were finalized by implementing filtering mechanism. Andreeva and Garanina (2017) conducted research by selecting industrial sector organizations and studied the association between the IC and financial performances by employing data from the annual year 2015,which was collected using questionnaires. Results concluded that HC and SC have a positive relationship with firms' performance, whereas relational capital does not indicate a positive relation. Dženopoljac et al. (2016) also measured the same by taking the sample consisting of 13989 Serbian ICT companies. The data examined were from 2009-2013. The consequences concluded that only CEE has a significant impact on the performance of ICT companies. Xu and Li (2019) researched to explore the relationship between companies' performance on their intellectual capital. The sample consisted of SMEs operating in China's industrial sector; data was used for the period 2012-2016.

Furthermore, Agostini et al. (2017) explored the association of SMEs' performance with IC, the data was collected through a survey and the sample size of 150 SMEs. Buenechea-Elberdin et al. (2018) stated that because organizations differ in terms of many knowledgeable characteristics different combinations of IC components are expected to boost their innovative performance, in addition to this variance in product and management innovation might lead to shifts in the relative importance of various IC components. Razak et al. (2016) studied intellectual capital elements of the Saudi banking sector through the VAIC model to determine and explore IC disclosure practices used by Saudi commercial banks. The data used was for the annual year 2014 and the sample consisted of 12 Saudi Arabian banks. The findings showed that banks disclosed more information about HCE relative to the external and internal capital of banks. Aslam and Haron (2020) conducted a study to identify the relationship between CG on ICE. A sample of 129 non-conventional banks of 29 OIC states was examined from the period of 2008-2017. The study concluded that some variables such as board size, and independent directors have a direct impact on firms and the audit committee members and CEO duality have a negative association with ICE. However, this study focuses on the audit committee (AC) characteristics and its influence on intellectual capital efficiency

(ICE), which would be studied in depth in order to contribute in the existing literature on ICE. Many authors used the VAIC model in their studies to measure ICE (Molodchik et al., 2019).

**Audit Committee Characteristics**

Previous studies have identified the relationship between AC traits and intellectual capital. These studies have certainly highlighted the fact that the success of an audit committee (AC) depends on its characteristics. Bamahros (2021) conducted research on AC chair characteristics and the IC performance of banks, the dependent variable ICP measurement was based on the VAIC model by taking 12 Saudi Arabian banks from 2014-2019. Dalwai and Mohammadi (2020) explored the relationship between IC performance and Corporate Governance (CG) elements of Oman's financial listed firms, which consisted of 31 listed financial sector corporations. The findings showed a significant relationship between VAIC and audit committee size and meetings. Dashtbayaz et al. (2020) also evaluated the relationship of CG with IC comprising a sample of 132 enterprises from 2013-2016. Sultana (2015) in her study pointed out that the agency theory method is a crucial foundation for establishing a corporate governance. Considering the concept of the agency relationship, which elaborated a collaboration agreement in which different shareholders appoint another representative or agent on their behalf to operate the company's day-to-day activities. The principals are the shareholders, owners, or investors, and the manager, which acts as their agent, and manage the company on the principal's behalf. Establishing an audit committee (AC) is one of the most crucial steps, used to avoid fraud and ensure proper oversight (Appuhami & Tashakor, 2017).

AC can help the board to maintain and promote the interests of owners by improving the value and consistency of yearly financial position statements. However, the results found by Al-Matari et al. (2012) showed that the presence of an audit committee (AC) does not reduce the principal-agent conflict. Conferring to the resource dependence theory, a large AC allows the executives to offer more resources to the bank, such as experience, information, stronger relations with customers, and skills, which would help AC to effectively oversee management in making better decisions in achieving higher intellectual capital efficiency (ICE). Zina (2019) stated that one strategy to address organizational incentive issues, such as altering financial statements to obtain greater compensation is

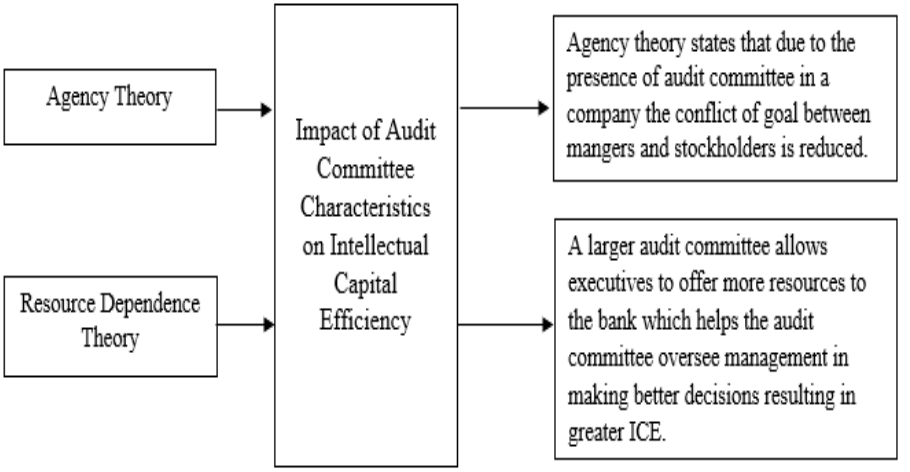
primarily to establish an audit committee (AC). Hence, audit committees' efficiency boosts the reliability of financial statements. The theoretical foundation of agency theory illustrated the existence of an audit committee, which would improves the reliability of financial statements. Zraiq and Fadzil (2018) investigated the existence of a robust audit committee, which was found to reduce the financial statement errors and enhance the likelihood of management by preventing fraud.

Aryan (2015) conducted a study with a sample of 69 companies of the industrial sector to scrutinize the effect of audit committee traits on the profitability of the firm the data for research period was from 2009-2014. Vadasi et al. (2021) illustrated that the audit committee guarantee the honesty and accuracy of corporate reporting procedures, offer improved checking and, efficiently assess the matters by holding frequent meetings he also found that independent directors are considered to be a critical component of corporate responsibility. Setiany et al. (2017) stated that a fully independent audit committee has more non-executive than executive directors, which are linked to its outcomes and a more efficient committee is likely to improve governance. Salloum et al. (2014) also observed the relationship between financially and non-financially distressed banks of Lebanese with AC characteristics, the sample consisted of 54 banks, which were examined from 2009-2011. Siswanto and Fuad (2017) also studied the impact of AC characteristics on financially distressed companies using logistic regression on a sample of 92 companies. Numerous authors used AC expertise, frequency of meetings, and size to measure the audit committee (AC) characteristics (Aldamen et al., 2012; Alzeban & Sawan, 2015; Vadasi et al., 2021).

**Relationship between the Audit Committee Characteristics and Intellectual Capital Efficiency**

Several previous studies have highlighted the relationship between the audit committee (AC) characteristics and intellectual capital efficiency. The theoretical support of this association is mentioned in the diagram below. The underlying agency theory suggests that the presence of audit committee in an organization reduces the agency cost of any organization, thus, portraying the better results. Furthermore, the resource dependency theory states that a better and large audit committee offers more improved resources for the organization which leads it towards intellectual capital efficiency (ICE) (Li et al., 2012).

**Figure 1**
*Theoretical Framework*




## Hypothesis Development

As supported by earlier literature it is identified that the IC of banks and their performance is crucial for the investigation. Therefore, this research illustrates the insights on intellectual capital efficiency (ICE) with the components of audit committees, which would be significant for organizations in making decisions regarding audit committee composition in order to increase intellectual capital in Pakistan's banking sector that was predominately neglected by previous researchers for the mentioned period. Consequently, the following hypothesis is deduced:

### *Main Hypotheses*

Ho: There is no impact of audit committee characteristics on banks' intellectual capital efficiency (ICE).

H1: There is a significant impact of audit committee characteristics on banks' intellectual capital efficiency (ICE).

### *Sub-Hypotheses*

$H_{a1}$ = There is a significant impact of audit committee size on banks' intellectual capital efficiency (ICE).

$H_{a2}$ = There is a significant impact of audit committee meetings on intellectual capital efficiency (ICE) of banks.

$H_{a3}$ = There is a significant impact of audit committee independence on the intellectual capital efficiency (ICE) of banks.

## Research Methodology

### Sample Size and Data Collection

The target population of this study contains 33 State Bank of Pakistan (SBP) listed banks The sample of the current study consists of financial companies listed on SBP, which are 28 banks encompassing 11 years period from (2010-2020) thus, comprising 308 observations. The secondary data for conducting this research is abstracted using the official websites and annual reports of the respective companies from the publications of the State Bank of Pakistan. The period of study is from the years 2010-2020, resulting in a total 308 observations.

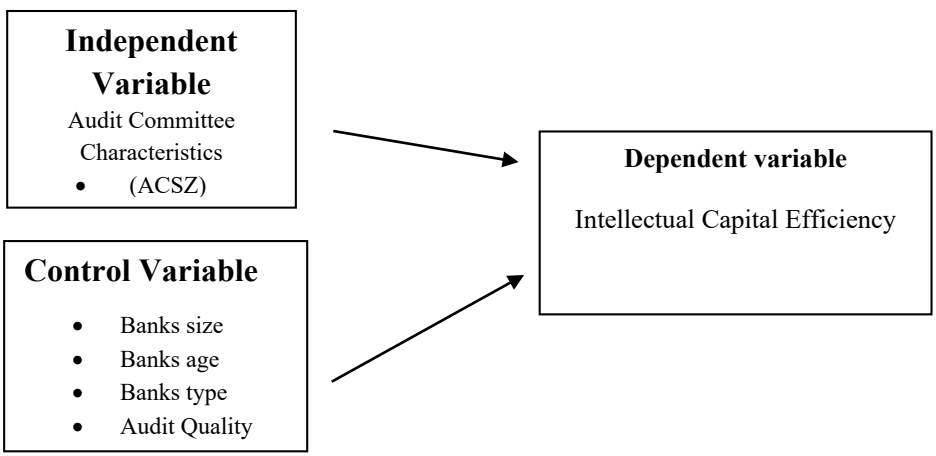
### Statistical Tool and Application

The discussion of results is based on the regression models run on STATA software.

### Conceptual Framework

**Figure 2**

*Conceptual framework*



## Econometric Equation

The equation for measuring the relationship between IC and AC characteristics is done using the following models:

$$\#IC_{it} = \beta_0 + \beta_1 ACSZ_{it} + \beta_2 ACIND_{it} + \beta_3 ACM_{it} + \beta_4 BSZ_{it} + \beta_5 BAG_{it} + \beta_6 ADT_{it} + \beta_7 BTYP_{it} + \varepsilon_{it}$$

## Description

$IC_{it}$ = Intellectual Capital

$ACSZ_{it}$ = Audit committee size

$ACIND_{it}$ = Audit committee independence

$ACM_{it}$ = Audit committee meetings

$BSZ_{it}$ = total assets

$BAG_{it}$ = The total no. years since the bank is established

$ADT_{it}$ = Outside auditor is from E&Y, KPMG, deloitte, PWC corporations

$BTYP_{it}$ = the bank is Islamic or not

ε = denotes error term of equation

i = denotes the bank

t = denotes the specific time period

# Results

## Descriptive Statistics

**Table 1**

*Descriptive Statistics*

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| IC | 308 | 4.422 | 4.47 | -43.05 | 52.295 |
| ACSZ | 308 | .425 | .495 | 0 | 1 |
| ACIND | 308 | .948 | .222 | 0 | 1 |
| ACM | 308 | .581 | .494 | 0 | 1 |
| BTYP | 308 | .857 | .35 | 0 | 1 |
| BSZ | 308 | 506697000 | 629305000 | 861000 | 3643712000 |
| ADT | 308 | .143 | .35 | 0 | 1 |
| BAG | 308 | 34.464 | 22.391 | 1 | 73 |

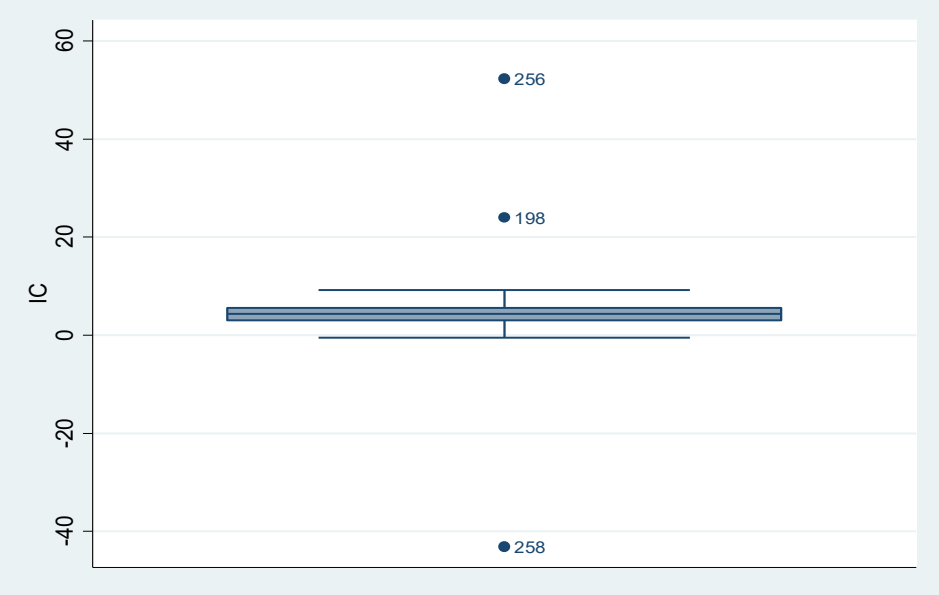
It can be observed from Table 1 that the average intellectual capital (IC) is "4.42", which is in line with earlier studies (Al-Musalli & Ismail, 2012; Ismail, 2012). The standard deviation of IC is "4.47" having a maximum value of "52.29" with a negative minimum value of "-43.04". The audit committee size (ACSZ) arithmetic mean is "0.42" with standard the deviation (SD) of "0.49". The audit committee independence (ACIND) shows a mean of "0.948" and the standard deviation of "0.222".

## Descriptive Graphs

Descriptive graphs are used to illustrate a trend by summarizing the data and by making a comparison of those trends, which allow the reader to quickly recognize the data distribution and clearly describe facts and figures.

**Figure 3**

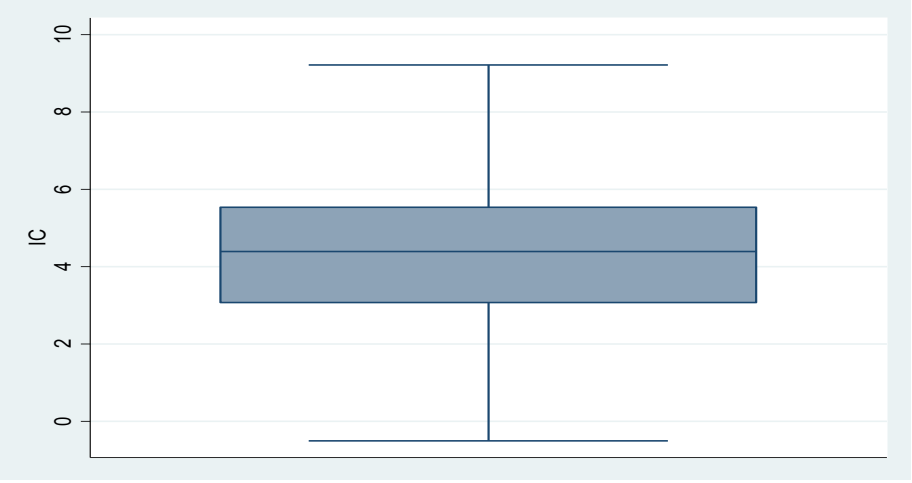
*Boxplot showing Outliers in Dataset*




In Figure 3, outliers are detected using box plot, which shows that there exist 3 outliers in our dependent variable IC of which one is a negative outlier for this an ID was generated in order to identify these outliers.

**Figure 4**

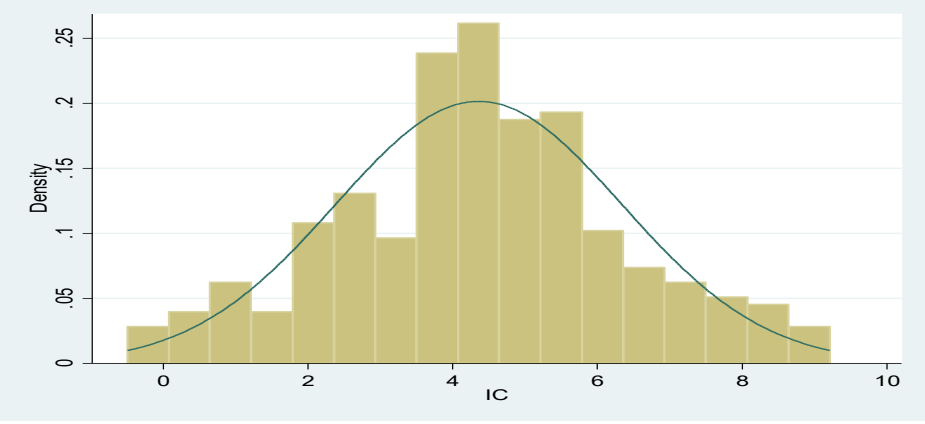
*Boxplot after Removal of Outliers*




The outliers were removed from the variable by using winsorization in which the outliers were replaced by the mean value of IC if the standardized variable generated showed value greater than 3 or less than -3, which can be seen in Figure 4.

**Figure 5**

*Histogram showing Normality in Data*




It is observed through the histogram in Figure 5 that data is normally distributed as it depicts a bell shape for IC.

**Figure 6**

*Residual Versus Fitted Plot to detect Heteroskedasticity*

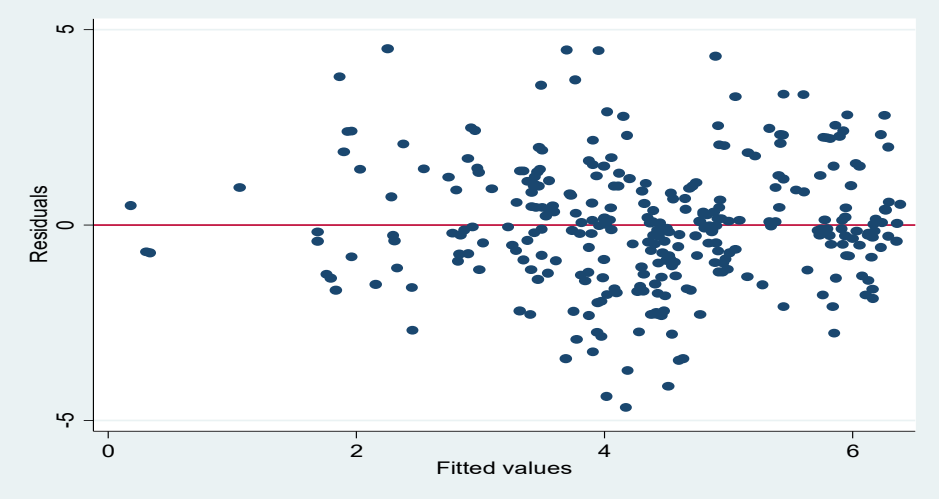



Figure 6 shows that the pattern of the data points is scattered they are not clustered at a point, which is an indication of homogeneity, hence errors being scattered shows heteroscedasticity is not present in the regression model.

## Correlation Matrix

**Table 1**

*Correlations Matrix*

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| IC | 1.000 | | | | | | | |
| ACSZ | 0.040 | 1.000 | | | | | | |
| ACIND | 0.106 | 0.049 | 1.000 | | | | | |
| ACM | 0.096 | 0.081 | 0.073 | 1.000 | | | | |
| BTYP | 0.212 | 0.030 | -0.023 | 0.200 | 1.000 | | | |
| BSZ | 0.311 | 0.098 | 0.045 | 0.212 | 0.157 | 1.000 | | |
| ADT | -0.293 | 0.121 | -0.140 | 0.183 | 0.167 | -0.260 | 1.000 | |
| BAG | 0.450 | 0.060 | 0.042 | 0.286 | 0.378 | 0.484 | 0.058 | 1.000 |

Table 2 shows us the correlation analysis between the independent variables. The pair-wise correlation test was used to determine the extent of

multicollinearity among the independent variables. At a very high level, the correlation matrix may yield erroneous findings. Table 2 identifies that there exists a degree of direct correlation among ACSZ, ACIND and ACM. Hence, there exists no correlation since all variables showed a correlation less than 0.90, which is in line with the study of (Harlow & Duerr, 2013).

**Assumptions of Regression**

There are assumptions of regression such as normality, multicollinearity, homogeneity, and serial correlation, which are tested by using STATA software. Each of these assumptions are discussed below:

***Normality***

**Table 2**
*Shapiro Wilk test for Normality*

| Variable | Obs. | *W* | *V* | *Z* | Prob>*z* |
|---|---|---|---|---|---|
| IC | 308 | 0.991 | 1.879 | 1.482 | 0.069 |

Table 3 shows results for Shapiro-Wilk test for normality the p-value of the test that is 0.06915>0.05, therefore, according to the criteria the null hypothesis is accepted and concluded that there is enough evidence to assume that the variable is normally distributed. The large value of W also indicates normality in the data.

***Multicollinearity***

**Table 3**
*Variance Inflation Factor and Tolerance*

| | VIF | 1/VIF |
|---|---|---|
| BAG | 1.622 | .616 |
| BSZ | 1.506 | .664 |
| BTYP | 1.203 | .832 |
| ADT | 1.2 | .833 |
| ACM | 1.13 | .885 |
| ACSZ | 1.053 | .949 |
| ACIND | 1.046 | .956 |
| Mean VIF | 1.251 | . |

Table 4 shows that no variable has VIF greater than 5, hence, there is no multicollinearity present in our data, which is in line with the findings of (Rogerson, 2010). In table 4 all variables values are closer to 1, hence, all independent variables ACIND, ACSZ, ACM, and the control variables could be considered as a linear combination of other independent variables meaning that there is no multicollinearity in the dataset.

### *Heteroscedasticity*

**Table 4**

*Heterogeneity Testing*

| Breusch-Pagan / Cook-Weisberg test for heteroskedasticity | |
|---|---|
| $\chi^2(1)$ | 2.08 |
| $p > \chi^2$ | 0.0415 |

In Breusch-pagan test the P-value higher than the significance α that is 0.0874>0.05 for Breusch-pagan test, hence, the null hypothesis was accepted, which showed that the variance of residuals is homogenous by rejecting the alternative hypothesis, which means that heteroskedasticity is not present in the data.

### *Autocorrelation*

**Table 5**

*Autocorrelation Testing*

| Durbin-Watson d-statistic | |
|---|---|
| Before Removal | 0.9011364 |
| After Removal | 2.39829 |

Durbin-Watson test value 0.9011364 indicates that there exists a positive autocorrelation in the model. Autocorrelation from the data was removed from the set using Prais-Winsten method, which resulted in a transformed value of 2.39, which is in between 1.5 and 2.5, indicating that there is no auto correlation in the specified regression model.

### *Regression Analysis*

**Table 6**

*Hausman test*

| Hausman Test Specification | |
|---|---|
| $\chi^2$ | 6.05 |
| $p > \chi^2$ | 0.3013 |

Hausman test is performed to select the suitable regression type for the panel data. Hausman test in Table 7 shows that the *p*-value 0.3013>0.05, which means that the alternative hypothesis is rejected and null hypothesis is accepted showing random effect model is pertinent for testing.

**Table 8**
*Random- Effect GLS regression*

| IC | Coef. | St. Err. | *t*-value | *p* | 95% Conf Interval | |
|---|---|---|---|---|---|---|
| ACSZ | .389 | .175 | 2.22 | .026 | .045 | .732 |
| ACIND | 1.245 | .334 | 3.72 | 0 | .589 | 1.9 |
| ACM | .397 | .193 | 2.06 | .039 | .019 | .775 |
| BTYP | .651 | .642 | 1.01 | .311 | -.608 | 1.91 |
| BSZ | 0.211 | 0.119 | -1.50 | .134 | 0 | 0 |
| ADT | -1.966 | .349 | -5.63 | 0 | -2.649 | -1.282 |
| BAG | .036 | .011 | 3.37 | .001 | .015 | .057 |
| Constant | 1.416 | .654 | 2.17 | .03 | .134 | 2.698 |
| Mean dependent var | | 4.354 | *SD* dependent var | | | 1.975 |
| Overall r-squared | | 0.362 | Number of obs. | | | 308 |
| Chi-square | | 70.821 | Prob > chi2 | | | 0.000 |
| *R*-squared within | | 0.137 | *R*-squared between | | | 0.516 |

In Table 8 random effect GLS regression is used to fulfil the objective of the current research, as there exists evidence through Hausman test to perform generalized least square Random effect regression in which IC was the dependent variable and ACSZ, ACIND, and ACM are independent variables, while BTYP, BSZ, ADT, and BAG are control variables. Coefficient of determination, R-Square overall for the model was 0.362 that signifies that 36% of the variation of IC can be described by the changes in independent variables using significance levels 1%, 5%, and 10% whereas the remaining 63.76% of the unexplained variability in IC is due to the parameters external to this paper's model.

## Discussion

The results of the current study are concluded by performing GLS regression after testing all the assumptions of regression that are Durbin Watson test, Breusch-Pagan test for heterogeneity, and variance inflation factor (VIF) for multicollinearity. Graphical representation of these tests is also performed using box plot, histogram, and RVF plot. Hausman test showed clearly that random effect GLS regression was a better fit for this study other than the fixed effect regression model. The conceptual framework clearly showed the variables that are studied in this research, whereas the theoretical framework showed the theories that support the findings. The independent variable ACSZ showed a positively significant impact on IC at a 5% level of significance (α) as its P-value was lower than 0.05 (0.026<0.05). Hence, the $H_{o1}$ is rejected and the $H_{a1}$ is accepted indicating that larger the size of audit committee, greater the ICE. This conclusion is in line with the research of Dalwai and Mohammadi (2020), however, it contradicts the finding of (Bamahros, 2021).

Variable ACIND also showed a positive significant impact on IC at 1% significance level as 0.039<0.05 this indicates that alternative hypothesis is accepted and this result is in line with the findings of Bamahros (2021). However, these findings are not in agreement with the work of (Attarit et al., 2017). The independent variable ACM showed a positive significant effect on IC at 5% significance (α), the results allowed the acceptance of alternative hypothesis since 0<0.05. This means banks with greater audit committee (AC) independence would enjoy improved intellectual capital (IC). This result is in agreement with the work of Dalwai and Mohammadi (2020), however, it contradicts the findings of (Bamahros, 2021). The findings of this study are consistent with the existing literature of Buallay (2018) which focused the role of audit committee characteristics on intellectual capital efficiency and analyzed the positive association between the audit committee characteristics and intellectual capital efficiency.

The results of this study are also similar with the study of Rehman et al. (2021) which analyzed a positive association among the IC components andislamic banks' performances measured through performance indicators. The independent variable audit committee meetings showed a direct influence on IC , which is consistent with the work of Buallay (2018), however, it is not in line with the findings of Mahmudi and Nurhayati (2015). They stated that this could be due to less effective meeting agenda

in conducting a review of the reports on the company performance. Audit committee size (ACSZ) in the current study showed a positive relationship with IC, which is also not in agreement with the research of Dashtbayaz et al. (2020) who observed a degree of negative relation among ACSZ and IC. As a result, it can be stated that the association between explanatory and outcome variables as demonstrated in this paper is empirically significant. The control variable bank age showed a positive significant impact on IC where positively significant means that as IC increase the BAG increases. Audit quality showed a negative significant impact on the IC, which means that IC decreases as ADT increases. Lastly, bank size and bank type do not show any relationship with IC these results are in accordance with the work of (Soewignyo & Soewignyo, 2018).

## Conclusion

This research aimed to study the link between intellectual capital of banks with respect to Audit Committee (AC) in Pakistan. The outcome variable intellectual capital was calculated using MVAIC approach. Audit committee characteristics, which were the explanatory variables included size, meetings, and the independent members, which were binary variables. The audit committee independence showed a positively significant impact of different degrees on the outcome variable (IC). The independent variable audit committee meetings showed a direct effect on IC. The model showed good explanatory power as the coefficient of determination showed the value of 36%.

## Recommendations

The research findings would be helpful for stockholders, investors, and scholars in getting the insights into the appreciative role of an audit committee in implementing the internal control systems. This would lead towards the potential future growth of financial institutions. Furthermore, it would facilitate the governing authorities, academicians, and researchers, which have more awareness on IC and its substantial role in determining the future potential of an organization, which would be helpful for the banks for the efficient and effective utilization of intellectual capital for sustaining a better position in this competitive business environment. The results of this study bring attention of the banks top level management in improving their intellectual capital efficiency by focusing on critical role of audit committee characteristics in order to gain a competitive edge in today's

knowledge-based business environment. Additionally, the research findings facilitate the banks' management in allocation of intellectual capital resources that lead towards ultimately the banks' performances. Furthermore, this study focuses the concern of financial sector towards improving the audit committee characteristics in terms of audit committee independence, sufficient audit committee size and frequent audit committee meetings for improving the intellectual capital efficiency that plays a significant role in competitive knowledge-based environment.

## Limitations

This research has certain limitations. Data used in the current research contains only 11 years of data of the banking sector. Hence, findings are significant for banks alone. The current study is focused only on Pakistan, hence the results would not be useful for other countries. The sample consists of only 28 banks due to the unavailability of data of certain banks. Only IC relationship was identified with AC neglecting the individual impact of IC components (HCE, SCE, CEE, RCE) on AC components. Keeping in view the limitations, there is opportunities for the future researchers regarding this topic. Firstly, future researchers could find impact of the HCE, SCE, RCE, and CEE independently with the audit committee characteristics. Secondly, research could also be done by segregating Islamic and conventional banks or public and private banks and the impact of IC on AC characteristics can be studied. Thirdly, researchers could also inspect different sectors other than banking such as textile, automobile, cement sector to provide a comparative study, which could be conducted on the relationship of IC and AC in two different sectors.

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