Intellectual Capital Efficiency and Firm Performance in Pakistan and Turkey: A Moderating Role of Industry Concentration

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Abstract

In this modern era emerging economies are realising the importance of Intellectual Capital (IC) for firm performance to survive in competitive industries. The purpose of this study is to analyse the moderating role of industry concentration to explore the impact of three components of intellectual capital efficiency (ICE): Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) on two measures of financial performance: Return on Asset (ROA) and Economic Value Added (EVA) of Pakistani and Turkish firms. Secondary data is collected from 193 Pakistani and 177 Turkish firms listed on PSX and BIST respectively from the period of 2009 to 2019 based on their market capitalization. A panel regression analysis approach is used to identify the variables that significantly contribute to firm performance. Findings reveal that inclusion of industry concentration as a moderator positively significantly influences the relationship between and HCE and financial performance (ROA and EVA), CCE and financial performance (ROA and EVA), but negatively significantly influences the relationship between and SCE and financial performance (ROA and EVA) in Pakistani firms. These findings further reveal that in Turkish firms industry concentration positively significantly moderates the relationship between and HCE and financial performance (ROA), CCE and financial performance (ROA and EVA), but negatively significantly influences

the relationship between and HCE and financial performance (EVA) as well as SCE and financial performance (ROA and EVA).This study advances the understanding of intellectual capital (IC) among academics and management and emphasises its role for creating value. The findings can assist stakeholders and policymakers in developing countries in effectively redistributing intellectual resources. In order to thrive and achieve success, firms must not only rely on physical resources, but also embrace contemporary strategies and policies that address industrial competitiveness.

Key words: Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), Capital Employed Efficiency (CEE), Firm Performance, Industry Concentration.

Introduction

Intellectual capital has emerged as a key concern for scholars and professionals in the global economy since it has been demonstrated to be a significant factor in a firm's ability to achieve better performance. The efficient use of human resources in any organization necessitates prioritising the workability of intellectual capital inside the firm as a crucial aspect for gaining a competitive edge and its impact on organizational performance. The study conducted by Pulic (1998) on the relationship between intellectual capital and firm performance has significantly contributed to the recognition and importance of intellectual capital (Adegbayibi, 2022).The value of a firm has shifted from tangible to intangible assets due to global knowledge development. Intellectual capital is a highly valuable intangible asset that may provide substantial value to firms. Effective intellectual capital management is crucial for every organization to efficiently utilize its organizational resources, including information, skills, expertise, inventions, and relationships with customers, and networking.

Intellectual capital is often seen as a crucial asset for organizations in attaining their objectives, mostly because of the

challenges posed by intangible factors. Hence, intellectual capital is crucial for enhancing a company's performance, ultimately impacting the overall economy. Tayles et al. (2007) emphasized the crucial significance for companies to recognize, value, and control their intellectual capital in order to attain exceptional performance. Furthermore, the firm's knowledge management strategy should be modified to incorporate IC Efficiency as a primary element. Undoubtedly, this can result in the achievement of the firm's aims and objectives.

Beside understanding the firms internal resources that can impact its performance it is also important for firms to analyse those factors that may influence the relationship or its internal resources with performance. One of the example of such factors is industry where the firm is operating. Industry is an environment where firms are consistently engage in competition with competitors to acquire resources and gain market dominance. Industry have major implications for the policies implemented by firms. According to economic theory, firms operating in markets with high concentration are expected to have greater motivation to engage in innovation. In today's highly competitive industry, standing out has become a significant issue for firms (Griffith and Van Reenen, 2021).Hence, survival in highly competitive industries and achieving higher profits entails continuous investing by companies in intellectual capital in order to gain competitive advantage. The interaction between intellectual capital and company performance has been extensively researched; however, the moderating role of industry concentration on this relationship has not been investigated, particularly in emerging countries such as Pakistan and Turkey. This gap presents a distinctive opportunity for the current study to provide novel insights to the existing literature. Therefore, to fill this gap, this study introduces the moderating role of industry concentration.

The selection of Pakistan and Turkey for cross-country analysis is compelling due to several factors. Both countries are emerging markets with diverse industrial structures and have adopted IFRS-based accounting standards, ensuring comparability of financial data. Starting from 2008, the Security and Exchange Commission of Pakistan (SECP) requires listed firms in Pakistan to use internationally recognized accounting rules to ensure their financial reports are clear, consistent, and comparable with other firms globally (Maqbool, 2015). Since 2005, publicly traded firms in Turkey have been required to prepare their financial statements in accordance with IFRS. The Capital Markets Board of Turkey (CMB) oversees the implementation of IFRS for publicly traded firms, ensuring compliance and guiding the transition from local accounting standards (Bahadır et al., 2016)

The subsequent sections of this paper are structured in the following manner. Section 2 provides an overview of the existing theoretical literature and empirical research that examine the influence of ICE and its components on financial performance with moderating effect of industry concentration. The development of hypotheses is covered in this part based on the review. Section 3 outlines the methodology employed in this study, including details on the sample, measurements of the variables, and the empirical model utilized. Section 4 presents the empirical findings that are achieved. Section 5 contains the final conclusions.

Literature Review

This study is based on the Knowledge-Based theory. The Knowledge-Based theory was formulated by Stalk in 1992. The idea posits that a firm's competitive advantage is contingent upon its skills and competences, which are in turn influenced by knowledge. Marr and Schiuma (2004) argue that organizational capabilities are derived from knowledge, which serves as a foundational resource for corporate capabilities. Therefore, possessing specific information

enables organizations to possess certain capabilities. This study can be linked to this theory because the information gained by firm is considered intellectual capital, and firms can improve their performance by effectively utilizing their HCE, SCE and CEE.

The academic literature emphasizes the crucial significance of effectively utilizing and controlling intellectual capital (IC) in order to achieve performance objectives and sustain a competitive edge. (Mention, 2012; Martın-de Castro et al., 2019). At today the productivity and performance of firms rely heavily on the management of their intellectual capital (IC).Therefore, evaluating the return on investments in IC is a crucial challenge that must be addressed in order to transform these investments into sources of competitive advantage.Firms that possess- exceptional human capital are expected to surpass their counterparts (Riyanto & Dameria, 2023). The implementation of RBV provided a theoretical rationale for how possessing exceptional human capital may result in long-lasting competitive advantages for firms. Enhancing the influence as well as efficiency of human resources in firms is a fundamental focus of organizational studies.

Firms can generate value and enhance performance by investing in structural capital. Firms should rely on cutting-edge technology to succeed and remain competitive, necessitating careful management of their structural capital (Dinu et al., 2023).Structural capital has been found to favourably impact organisational performance and contribute to value generation (Hsu & Wang, 2012).Hejazi et al. (2016) analysed the impact of two key component of intellectual capital; human capital and structural capital on firm performance (Popoola et al., 2019) also discussed the structural capital as one of the important components of IC and he further categorised into external and internal capital. External capital, sometimes referred to as relational or customer's capital, pertains to a company's association with external entities. While, internal

capital, or organisational capital, pertains to the inherent capacities of a company. The term encompasses the many components of an organisation, such as its systems, policies, management philosophy, routines, culture, and networks, all of which are specifically tailored to meet the demands of the market. An efficient method to enhance organisational operations is through the use of mixtures of explicit and implicit information, as well as formal and informal knowledge(Nekane & Sáenz, 2013) (Hejazi et al., 2016) (Nadeem et al., 2018) (Abdullah & Sofian, 2012).These study also presents ample data that supports the concept that SC is crucial in improving profitability.

Another important component of ICE is CEE, includes the level of effectiveness that SCE and HCE are unable to grasp. Pulic (1998) argues that Intellectual Capital (IC) is unable to generate value alone and hence must be integrated with the CEE (both physical and financial) According to Pulic (1998), a firm is more likely to use capital efficiency (CE) effectively if each unit of capital CE produces greater profits for the business. Several pieces of research have proved CEE positively influences a firm's financial performance (Hamdan, Buallay & Alareeni, 2017; Costa, Silva & Paula, 2020).

Highly competitive firms demonstrated higher chances to capture the maximum profit and have a positive relationship with financial performance, while less competitive firms were negatively associated with financial performance. A high level of industry concentration can result in intense competition among a small number of dominant participants. Within such contexts, firms may encounter the necessity to uphold or acquire market dominance, which might possibly influence pricing strategies and profit margins (Markusen, 2017).A company's capacity to successfully navigate and prosper in a competitive environment might have an impact on its financial performance. In industries with high levels of

concentration, dominant businesses possess increased market power and the capacity to exert influence on price (Pervan & Višić, 2012). Smaller firms may see a negative effect on their profit margins and financial performance due to this, since they may encounter difficulties in securing advantageous terms or pricing with suppliers or consumers. Significant obstacles to entry are often linked to a high concentration of industry. This might potentially impede the market entry of new firms, so granting current firms a more secure and unchanging position. For established firms, the existence of entry barriers can have a dual effect on financial performance, serving as both a safeguard and a potential obstacle (Berger et al., 2017).Firms in more concentrated industries earn lower returns, even after controlling for size, book-to-market, momentum, and other return determinant (Hashem & Su,2015). On the basis of above discussion following hypothesis of this study has been formulated:

H_1: HCE significantly influences a firm's performance

H_2: SCE significantly influences a firm's performance

H_3: CEE significantly influences a firm's performance

H_4: Industry concentration moderates the relationship between HCE and firm performance

H_5: Industry concentration moderates the relationship between SCE and firm performance

H_6: Industry concentration moderates the relationship between CEE and firm performance

Methodology

The research employed a longitudinal design. This is due to its capacity to encompass a substantial dataset, hence enhancing the accuracy of the estimates derived from the sample, owing to the extensive number of observations from the panel data (Moffitt,& Zhang, 2018). It employs a deductive research methodology which is

appropriate for quantifying the collecting and analysis of data. This study applies purposive sampling technique of data collection. Through this technique it can be assured that the study's participants are relevant to research objectives. With the help of purposive sampling technique total non-financial Firms listed on Pakistan Stock Exchange (PSX) and Borsa Istanbul stock exchange (BIST) are the population of this study.

As of January 13th, 2024, there are a total of 544 firms listed on the PSX. The listed firms are classified into different primary Industries (PSX, 2024). On January 1, 2023, the BIST has 541 firms listed and traded. Since 2009, the number of firms listed on the BIST has varied between 322 and 541(BIST, 2023). Top traders from all the manufacturing and service industry are chosen as the sample of this study from both stock markets. At first place 202 Pakistani firms and 231 Turkish firms' data were collected but afterwards applying the exclusion criteria only 193 Pakistani firms and 176 Turkish firm became the part of sample. The time period chosen for this study is from year 2009 to 2019 and employs an annual data frequency. This study selected the time frame spanning from 2009 to 2019, with a deliberate exclusion of the 2007-2008 financial crisis and the influence of COVID-19 on data analysis.

Definition and Measurement of Variables

Dependent Variables

Return on Asset (ROA : Accounting-based measures, such as profitability ratios (e.g., ROA) offer a clearer and more stable reflection of a firm's operational success, focusing on actual financial outcomes rather than market perceptions. Accounting variables are widely accepted and frequently used in finance research to assess firm performance, particularly when examining firm-level strategies and internal resources (Pervan and Višić, 2012). By focusing on accounting-based profitability ratios, the study ensures a more robust and consistent evaluation of how well firms are utilizing

their resources to generate profits. Additionally, firms in developing economies often include both publicly listed and non-listed firms, with accounting data being available for a broader range of firms. This makes accounting variables more applicable and reliable for capturing firm performance across different sectors in Pakistan and Turkey. Therefore, selecting accounting variable (ROA) allows for a more accurate and comprehensive analysis of firm performance (Yaqub et al., 2015).

Return on asset (ROA) is measured using one of the profitability ratios. ROA shows a firm's efficiency in turning its assets into profit. It is a reliable metric for evaluating a company's performance since it assesses its long-term profitability while mitigating any potential distortions caused by financial strategies. This ratio is used frequently to evaluate a firm's financial performance. This study calculates the return on asset ratio by dividing net operating profit before tax (NOPAT) by average total assets. NOPAT is the operating profit made from "operating assets." It represents the firm's actual economic return after adjusting for the influence of certain factors to show the outcome of the primary business activity (Voráček, 2021).

$$ROA = \frac{Net\ Operating\ Profit\ After\ Tax(NOPAT)}{Total\ Assets} \qquad (1)$$

Economic Value Added (EVA) :EVA is a metric that quantifies the additional value generated by a firm, taking into account the cost of capital. Valuation Added (VA) could be determined by deducting the cost of capital from a firm's operational profit and subsequently multiplying it by the capital invested in the company(Weaver, 2001). The outcome refers to the added value generated by the firm during a specific timeframe.

$$EVA = NOPAT - (Invested\ Capital * WCAA) \qquad (2)$$

Where:

NOPAT = Net operating Profit after tax

Invested Capital= Total Assets- Current Liabilities

WCAA= Weighted Average Cost of Capital

Independent Variables

Human Capital Efficiency (HCE): HCE is the measure of VA to the amount of money paid to all the workers by the firm. It is computed as:

$$HCE = \frac{VA}{HC} \qquad (3)$$

Where

VA= Value added

HC= Human Capital

Structural Capital Efficiency (SCE) : The ratio of SC to VA is SCE. Structural capital includes software systems, transport networks, the supply chain, brands, trademarks, management methods, etc. Pulic (2000) says that human capital and structural capital have opposite roles in creating value, which means that "the less human capital is involved in creating value, the more structural capital is." This argument proposes that structural capital can be calculated as the difference between VA and human capital, and it is computed as below:

$$SC = VA - HC$$

$$SCE = \frac{SC}{VA} \qquad (4)$$

3.5.2.3. Capital Employed Efficiency (CEE) : What is missing from SCE and HCE is included in CEE. According to Pulic (1998), IC is insufficient to generate value without the addition of other forms of capital employed (CE). CE is defined as the total assets of the firm. CEE can be computed as:

$$CEE = VA / CE \qquad (5)$$

Moderating Variable

Industry concentration (Herfindahl-Hirschman Index -HHI) : The HHI takes into consideration both the concentration and the total number of firms in a market by calculating their relative size, or market share. The formula involves taking each company's market share and squaring it, and then adding the squares. The Herfindahl-Hirschman Index (HHI) is sensitive to the size of businesses and considers all firms in the industry. Existing studies have used different techniques to measure market competition, such as the Herfindahl Hirschman Index (HHI) and Boone Index (Fosu, 2013). Previous research has shown that HHI is the best measure of market competition among other available methods (Zou et al., 2015). Past research has also shown that companies usually compete based on their sales, indicating the industry's competition in terms of revenue.

$$\text{HHIjt} = \sum_{i=1}^{Nj} (Sales_{it} / \sum_{i=1}^{Nj} Sales_{ijt})^2 \quad (6)$$

Where sales j and sales i used form industry and firm respectably in time (IsolaWakeel and AkanniLateef, 2015). Increased values of the Herfindahl-Hirschman Index (HHI) indicate heightened market concentration and reduced competitiveness.

 Control Variables

This study used two control variables to obtain more relevant results including financial leverage and firm size.

Firm Size : Firm size is measured by the logarithm (log) value of total assets of each firm in particular year. It Is computed as (UNAL, 2017):

$$\text{FIRM\_SIZE} = \log(Total\ Assets_{it}) \quad (7)$$

Firms exhibit substantial variation in terms of their scale, and this diversity can have an impact on their performance indicators. Large firms may exhibit distinct dynamics, possess greater resources, and occupy different market positions in comparison to smaller firms. By using size as a control variable, researchers seek to isolate and

comprehend the influence of other independent factors on performance while maintaining a consistent size (Ibhagu & Olokoyo, 2018).

Financial Leverage: The level of financial leverage indicates how much of a company's funding comes from debt. The financial outcomes of a firm are likely to be affected by this variable. Researchers can better determine the extent to which variations in financial structure explain observed variances in business performance when leverage is included as a control variable (Ibhagu & Olokoyo, 2018).

In this study financial leverage of a firm is calculated by the following formula:

$$\text{Financial Leverage} = \frac{(\text{Long Term Debt} + \text{Short Term Debt})}{\text{Total Share holder's equity}} \quad (8)$$

Empirical models

To deal with the invisible heterogeneity issue, the usage of the OLS model only may not be fruitful. According to researchers, the fixed effect (FE) or Random effect (RE) models are the best techniques to overcome the unnoticeable heterogeneity. Additionally, Gujarati (2014) reported that the FE model is considered as a time invariable residual. Furthermore, Wooldridge provided evidence and exposed that the FE model does not allow the lag of dependent variables to use independent variables in the econometric examination. Normally, there is a proper criterion to select a fixed or random-effect model. The Hausman test results decide which model is more appropriate for data. All hypotheses in this study have been tested with the help of regression analysis. All preliminary requirements for running panel data regression analysis have been met. The econometric model of this study are formulated as:

$$\text{ROA}_{i,t} = \beta_0 + \beta_1 \text{HCE}_{i,t} + \beta_2 \text{SCE}_{i,t} + \beta_3 \text{CEE}_{i,t} + \beta_4 (\text{HCE}^*\text{HHI})_{i,t} + \beta_5 (\text{SCE}^*\text{HHI})_{i,t} + \beta_6 (\text{CCE}^*\text{HHI})_{i,t} + \beta_7 \text{FSIZE}_{i,t} + \beta_8 \text{FLEV}_{i,t} + \mu_t \text{------}$$
$$(\text{Model1})$$

$$EVA_{i,t} = \beta_0 + \beta_1 HCE_{i,t} + \beta_2 SCE_{i,t} + \beta_3 CEE_{i,t} + \beta_4 (HCE*HHI)_{i,t} + \beta_5 (SCE*HHI)_{i,t} + \beta_6 (CCE*HHI)_{i,t} + \beta_7 FSIZE_{i,t} + \beta_8 FLEV_{i,t} + \mu_t$$ ------
(Model2)

Results and Discussion

Table No 1

Descriptive Statistics

Table 1. Descriptive statistics of the variables of Pakistani firms

Variables	Observations	Mean	SD	Minimum	Maximum
ROA	1687	0.110	0.102	0.001	1.603
EVA	1687	13.089	1.845	6.495	18.767
HCE	1687	6.936	6.658	1.250	84.925
SCE	1687	0.789	0.119	0.200	0.988
CEE	1687	0.230	0.132	0.022	2.210
HHI	1687	14.390	13.34	2.204	86.36
Firm Size	1687	15.665	1.653	10.020	20.457
Fin Leverage	1687	0.520	0.197	0.009	1.412

Table 2

Descriptive statistics of the variables of Turkish firms

	Observations	Mean	SD	Minimum	Maximum
ROA	664	0.077	0.068	0.001	0.748
EVA	664	15.996	2.224	7.070	20.861

HCE	664	5.591	5.178	1.221	65.077
SCE	664	0.748	0.130	0.181	0.985
CEE	664	0.179	0.093	0.006	1.073
HHI	664	24.82	15.23	10.862	100.00
Firm Size	664	19.111	2.063	10.370	23.958
Fin Leverage	664	0.525	0.207	0.022	0.984

Table 1 and Table 2 displays the mean, standard deviation, minimum and maximum values of all variables of Pakistani and Turkish firms respectively. The mean value of ROA for Pakistani firms is 0.110, but for Turkish firms it is 0.077. These findings suggest that, on average, Pakistani firms exhibit higher levels of profitability in relation to their assets when compared to Turkish firms. A higher ROA indicates that Pakistani firms have a greater ability to efficiently utilize their assets to generate revenues, indicating superior operational efficiency or more effective asset management. It can also be seen that the average Economic Value Added (EVA) for Turkish firms is 15.996, surpassing the average of 13.089 for Pakistani firms. These findings indicate that Turkish firms, on average, generate a higher amount of value in relation to their cost of capital compared to Pakistani firms. A greater EVA signifies that Turkish firms has superior capabilities in creating returns that surpass their capital expenses, indicating a possibly more efficient process of value creation. Above tables also indicate that Pakistani firms have superior efficiency in terms of human capital, structural capital, and capital employed when compared to Turkish firms. More specifically, they have a higher level of efficiency in employing

435

human capital (6.936 compared to 5.591), a slightly better performance in structural capital (0.789 compared to 0.748), and a higher level of efficiency in capital employed (0.230 compared to 0.179). The mean value of HCE of Pakistani firms (6.936) is greater than that of Turkish firms (5.591). This implies that, on average, Pakistani firms have superior efficiency in leveraging their human resources in comparison to Turkish firms.

The average value of SCE of Pakistani enterprises is 0.789, which is somewhat more than the SCE of Turkish firms, which is 0.748. These findings indicate that Pakistani firms have a higher level of proficiency in leveraging their structural capital, including procedures, databases, and organizational structures, in comparison to Turkish firms. The CEE of Pakistani enterprises (0.230) is greater than that of Turkish firms (0.179). This suggests that Pakistani enterprises exhibit more efficiency in leveraging their capital investments to generate profits in comparison to Turkish firms.

The HHI for industry concentration in Pakistani enterprises is 14.390, which is notably lower than the HHI for Turkish firms, which is 24.820.This implies that the market in Pakistan has a lower level of concentration, which indicates a more competitive environment with a greater number of firms and less control by fewer players. Whereas the higher HHI in Turkey indicates a market that is more concentrated, with a few players controlling a larger share of the market. This might result in reduced competition and perhaps more market influence for these dominating firms. The mean size of Pakistani enterprises (15.665) is smaller than that of Turkish firms (19.111). This suggests that, on average, Pakistani companies have a lesser size in comparison to their Turkish counterparts.

The mean value of financial leverage for Pakistani firms (0.520) is nearly identical to that of Turkish firms (0.525), indicating that the utilization of debt in relation to equity is

comparable across the two countries. Overall, Pakistani firms are often smaller in scale than Turkish firms, however they employ comparable levels of financial leverage. Turkish enterprises, being larger in size, have more resources and potentially higher market impact. Additionally, their comparable financial leverage suggests similar risk profiles in terms of debt use

Correlation Matrix

An important assumption for regression analysis is the non-availability of multi-collinearity in our sample data set. Although, there are many tests in statistics which can be used to detect the multicollinearity in our data set but the simple one is correlation analysis which is presented in table 3 and 4.

Table 3

Correlation matrix for dependent, independent and control variable of Pakistani firms

	ROA	EVA	HCE	SCE	CEE	HHI	FIRM_SIZE	FIN_I
ROA	1.000							
EVA	0.261	1.000						
HCE	0.079	0.329	1.000					
SCE	0.190	0.450	0.586	1.000				
CEE	0.845	0.162	0.019	0.035	1.000			
HHI	0.078	0.134	0.006	0.028	0.070	1.000		
FIRM_SIZE	-0.011	0.852	0.287	0.378	0.127	0.120	1.000	
FIN_LEV	0.295	0.063	0.096	0.042	0.154	0.060	0.105	1.000

Table 4. Correlation matrix for dependent, independent and control variable of Turkish firms

	ROA	EVA	HCE	SCE	CEE	HHI	FIRM_SIZE	FIN_LEV
ROA	1							

EVA	0.226	1.000						
HCE	0.013	-0.002	1.000					
SCE	0.477	0.275	-0.006	1.000				
CEE	0.863	0.167	0.023	0.272	1.000			
HHI	-0.022	0.071	-0.102	0.030	-0.016	1.000		
FIRM_SIZE	-0.058	0.850	-0.038	0.097	-0.118	0.057	1.000	
FIN_LEV	-0.372	-0.020	-0.060	-0.105	-0.295	0.178	0.104	1

According to table-3 and 4 it is clear that all of our variables are free from multicollinearity.

Regression Analysis

	Pakistan		Turkey	
	Model 1 (ROA) Fixed Effect	Model 2 (EVA) Fixed Effect	Model 1 (ROA) Fixed Effect	Model 2 (EVA) Random Effect
HCE	0.034 (0.029)	-0.094(0.572	0.002 (0.0004)***	0.004 (0.020)
SCE	0.231(0.018)***	3.688(0.350)***	0.065 (0.013)***	4.842(0.808)***
CEE	0.535(0.013)***	2.049(0.237)***	0.594 (0.022)***	1.773(1.072)*
HHI*HCE	0.010(0.002)***	0.155(0.036)***	0.015(0.002)***	-0.002(0.021)
HHI*SCE	-0.558(0.045)***	⁻3.878(0.659)***	-0.003(0.0003)***	⁻0.017(0.006)***
HHI*CCE	2.398(0.086)***	13.680(1.259)***	0.011(0.001)***	0.129(0.017)***
FIRM_SIZE	-1.355(0.317)***	0.951(0.013)***	0.002(0.001)*	0.953(0.024)***
FIN_LEV	-0.099 (0.013)***	-0.253(0.193)	-0.072(0.017)***	⁻0.926(0.237)***
R- square	0.730	0.822	0.831	0.720
Adjusted-R square	0.695	0.799	0.768	0.717

Source: compiled by authors: ***, **, * show the significance level at 1%, 5%, and 10% respectively and parenthesis show the standard errors

The regression results in above Table 5 show HCE has insignificant impact on ROA and EVA for Pakistani firms (do not support hypothesis 1) while it has significant positive impact on ROA and EVA for Turkish firms (supporting hypothesis 1) .The insignificant impact of HCE on ROA and EVA for Pakistani firms means Pakistan have limitations in resources, which restrict firms from investing in staff training, development programs, and other activities that improve the efficiency of human capital. Lack of resources can impede the progress of a competent and driven team. These results are similar to the studies of Mehralian et al. (2013) and Danjuma and Ajike (2016) who reported that HCE had an insignificant influence on the firm's performance.

The significant positive relationship of HCE with ROA and EVA shows when staff receive comprehensive training, are highly motivated, and are in sync with organisational objectives, they may make valuable contributions to optimising procedures and enhancing operational efficiency which ultimately influence firm's financial performance. These results are similar to the results of Tran and Vo (2020), Danjuma and Ajike (2016) ,Hidayat and Widodo (2022),Nyathi and Kekwaletswe (2023) ,Fedyk and Hodson (2017) ,Ahmed et al. (2022) ,Ghosh and Mondal (2009) who strongly confirmed that human capital efficiency makes a positive contribution to firm performance. Being a rapidly developing country, Turkey lead in technical developments. An adept and flexible workforce is crucial for firms to leverage the advantages of automation, digitalization, and other technological advancements, resulting in enhanced performance. The positive significant impact of ROA and EVA on HCE also support the RBV that the possession of extraordinary human capital might lead to enduring competitive advantages for firms.

Table 5 further shows that SCE has positive significant impact on both performance measures (ROA and EVA) in both

countries (thereby supporting hypothesis 2). This means that firms in all industries are implementing efficient operations that has resulted in the best utilisation of assets, hence minimising waste and enhancing performance of firms. These results also support the results of Dinu et al.(2023) who analysed that firms in today competitive business environment are more focusing on cutting-edge technology necessitating careful management of their structural that ultimately enhance their performance. For rapidly developing countries like Turkey it's very obvious to have well designed structural capital but developing nations like Pakistan which are encountering several obstacles, are progressively acknowledging the significance of effectively utilising their structural capital to stimulate economic advancement and promote sustainable expansion. It can also be seen from above that CCE has positive significant impact on both performance measures (ROA and EVA) in both countries (supporting hypothesis 3). Significant positive impact of CEE on firm performance means that all firms in manufacturing and service industries in Pakistan and Turkey are efficiently using their capital assets.

But, here the significance of the individual variables is not concerned rather the researcher is concerned with the significance of interaction term and it is clearly seen that interaction term (HHI*HCE) shows that there is significant positive moderation effect of industry concentration between HCE and ROA in Pakistan as well as in Turkey (these results support hypothesis 4). These results revealed that HCE is not individually value relevant to firm financial performance, but it is value relevant to firm financial performance through the moderation of industry concentration. This results suggest that in industries in Pakistan where few firms dominate the industries (Ahmad et al., 2023), the efficacy of human capital is more pivotal in enhancing performance. This may be due to the fact that in concentrated industries, businesses often compete

on variables beyond pricing, such as innovation, customer service, or operational efficiency, where the efficiency of human capital becomes a more crucial determinant of success (Gupta & Raman, 2020;Handoyo et al., 2023)

While Interaction Term (HHI*SCE) shows that there is significant negative moderation effect of industry concentration between SCE and both performance measures in Pakistan as well as in Turkey (these results support hypothesis 5).. The result indicates that in highly concentrated industries, dominant firms may have already implemented established procedures and systems, so diminishing the competitive advantage that further enhancements in structural capital might provide. On the other hand, structural capital may not be as important in concentrated industries due to the competitive dynamics, which could instead emphasize other elements like market share or strategic positioning. These results are consistent with the study of Fawzi Shubita (2022), which explained that Firms that depend substantially on management mechanisms yet lack robust management abilities often exhibit weaker performance, as they possess systems that are ineffectively exploited or controlled. The problem may not lie in the structure capital itself, but rather in its management and utilization, particularly in industries where firms prioritize dominance of markets above enhancing internal efficiency via structural capital. This clarifies why, in concentrated industries, the advantages of SCE might diminish or even detrimentally impact performance when businesses fail to utilize their internal structures efficiently (Mbo, 2017).

The next interaction term (HHI*CCE) shows significant positive moderation effect of industry concentration between CCE and both performance measures in Pakistan as well as in Turkey (these results support hypothesis 6).Various studies has highlighted the importance of industry concentration in firm performance

441

literature. Empirical studies revealed that industry concentration has both positive and negative effects on the firm performance (Singla et al.,2019: Markusen, 2017; Moradi et al.,2017).Jensen and Meckling (2019) explained that competition is a tool that forces managers to work harder on behalf of shareholders, therefore, it reduces agency cost which leads to higher profitability .This indicates that in industries characterized by a fewer number of big players, the effective utilization of capital becomes increasingly vital, resulting in enhanced profitability (ROA) and value generation (EVA).

Effectively utilizing capital offers a more robust competitive edge in highly concentrated industries (Babar & Habib, 2021). Firm size has negative significant impact on ROA and positive significant impact on EVA in Pakistan. The results of negative impact of firm size on performance are consistent with the results of previous studies (Sardo et al., 2018; Carter & Auken, 2006; García-Posada, 2014). These studies empirically proved that big firms may become more cautious about taking risks because of the possible consequences of failures on a bigger magnitude. Their risk aversion might hinder their capacity to develop and go into new markets, potentially impacting their long-term success. Firm size also has positive significant impact on ROA and EVA in Turkey. Positive significant of firm size on firm performance shows that big firms frequently get advantages from economies of scale, which enable them to distribute fixed expenses across a greater volume of production. This can result in decreased average costs per unit, hence improving profitability. Big firms often possess a more dominant market position, which allows them to shape industry trends, establish benchmarks, and wield greater influence over suppliers and distributors. This can result in improved agreements and conditions, so favourably influencing the financial performance of the company. These results are consistent with the multiple

existing studies (Mukras & Nzioka,2015; Gabbi & Levich, 2019).Financial leverage has significant negative impact on ROA in Pakistan and Turkey. While it has insignificant impact on EVA in Pakistan and has significant negative impact on EVA. High levels of financial leverage enhance the likelihood of encountering financial challenges and insolvency, particularly if a firm faces difficulties in fulfilling its loan commitments. Such outcomes can be highly adverse, perhaps resulting in liquidation and a decline in shareholder value. Many studies have found negative significant impact on performance of firm (Ilyukhin, 2015; Shahzad et al., 2015; Iqbal & Usman, 2018; Ibhagui & Olokoyo, 2018)

Conclusion

This is a state-of-the-art work, which sheds light on the importance of the industry concentration for firm performance while employing the intellectual capital efficiency. However, it concludes that HCE is enhanced by industry concentration, prompting firms to engage in staff development to address industry challenges. Similarly, CCE markedly enhances business performance, especially in concentrated sectors, where proficient capital management is crucial for optimizing performance. While in concentrated industries, the prospective advantages of SCE on firm performance might not become apparent until businesses innovate their management approaches and modify their structures to improve overall efficacy.

This study provides important implications for managers that industry concentration plays a key role in moderating the relationship between ICE and firm performance. In Pakistan managers should prioritize investing in HC initiatives, such as quality improvement programs, training and development initiatives and favourable working atmosphere to fortify their workforce and increase productivity through HCFirms must prioritize the optimization of their structural capital while always improving their management strategies. It is also strongly recommended that

managers should take initiatives to invest their resources more in intellectual capital because it has proved to be positively affecting not only the firm accounting performance (ROA) but economic performance (EVA) as well.

This study has its own limitation because it is only carried out on quoted non-financial firms and the result cannot be used to generalize what happened in other sectors like financial institutions. It is a cross country analysis and only two developing countries are chosen as the research participants (Pakistan and Turkey).In order to conduct a deep comparative analysis of all the industries of these two countries it was not possible to increase the number of countries. Further studies could explore other countries. The time period of my study spans from 2009, following the end of the subprime crisis, up to just before the COVID-19 pandemic (2019). This excludes the potential impact of these major economic disruptions, which is acknowledged as a limitation in assessing the long-term trends and external shocks affecting firm performance and stability. Further studies can incorporate additional elements of intellectual capital, such as social capital, relational capital, customer capital and innovation capital. In addition, future research can investigate the relationship between intellectual capital and other performance indicators, including as sales growth, stock price, stock returns, or non-financial metrics like the balanced scorecard. Future researches can also incorporate the Covid-19 period as well as other financial crisis period and differentiate the results that how firm performance determinants respond in normal and crisis period.

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