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THE NEXUS BETWEEN INTELLECTUAL CAPITAL AND FIRM VALUE: EVIDENCE ON THE MEDIATING ROLE OF FINANCIAL PERFORMANCE AND COMPETITIVE ADVANTAGE.

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Abstract
This research study aims to investigate the intellectual Capital and Firm Value, where Financial Performance and Competitive Advantage are the mediating variables. It involves 20 Pakistani stock exchange listed banks in the time span between 2015 and 2024, which constitutes 200 bank-year observations. Statistical tests like descriptive statistics and multiple regression were carried out to test the hypothesis. This study employs python for data analysis. According to the results, intellectual capital positively influences the firm value directly, significantly, and positively, whereas the association of intellectual capital with the competitive advantage is strong, and the relationship between intellectual capital and financial performance is not significant. There is no significant impact of financial performance on firm value, but competitive advantage has a statistically significant positive impact on firm value. Moreover, IC has a very low positive moderating impact on firm value, as it is a result of financial performance, but its impact on the firm's value is negative when the impact is on the competitive advantage.

1. INTRODUCTION

1.1 Background

Knowledge-based economy is relevant in the current modern and demanding competitive business world to spur growth and enhance the financial and operational systems of organizations. Most of the businesses operated in the knowledge-based economy, and particularly the banking industry. In economically advanced countries such as the United States around 60 percent of workers are in the knowledge-based economy. Past research established that greater knowledge competencies help companies to undertake

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their business operations in a more professional and successful manner (Mills and Smith, 2011; Zaied, 2012). Such vibrant economic systems allow the transactions to be quicker, efficient and cost effective as opposed to the traditional industrial economy. An organization is primarily interested in making as much profit as possible and as cheaply as possible (Juliani, Tanwijaya, 2022). According to the Global Industry Classification Standard (GICS), the banking sector was picked for this investigation because it represents a highly knowledge-intensive service business. Banking is a fundamental sector in economic growth of a nation. The birth of the knowledge-based economy has enhanced banking activities, more customer service, better service delivery and advanced international competitiveness. According to Mavirds (2004), the global banking economy has evolved into a knowledge-based economy.

Under the impetus of the shift to the knowledge-based economy, a range of scholars have interested themselves in researching and exploring intangible assets. These resources are good for the sustainability and competitive advantage of firms. As an example, intangible assets of the major S&P 500 corporations constitute 90% of these in 2020, which is the contrast of 17% in 1975 (Tomo,2020). Such statistics are congruent with the World Intellectual Property Organization (WIPO, 2022), which wrote that in 2021, the total value of the assets of all registered companies in the world was USD 74 trillion, which increased by over 25 percent since 2019. These assets are essential factors of growth of developing companies to compete economically and technologically (Haskel and Westlake, 2018; Kumari and Mishra, 2020).

The Intellectual capital is represented by all the non-physical (intangible assets) of the corporation, such as patents, the knowledge of the employees, the processes, the innovation, the workforce capabilities, and skills (de Frutos-Belizon et al., 2019). According to Razafindrambinina and Anggreni (2011), one of the distinctive aspects of the Intellectual Capital (IC) is that it is not easily replicable by rivals hence influential resources of business organizations. Kalkan et al., (2014) and Ozkan N, Cakan S, Kayacan M. (2017) stated that IC comprises three mechanisms, namely Human capital (abilities, experience, employees' knowledge, and expertise), Structural capital (system, processes, and business strategy of the company), and Rational or Customers capital (company relationship with shareholders and stakeholders). The Value-Added Intellectual Coefficient (VAIC) procedure, invented by Pulic (2000), is very popular in assessing the effectiveness of intangible and tangible resources of a company. Also, firms must manage their intellectual capital effectively and put them to good use to generate value, maintain competitive advantage and financial performance.

One of the key intangible assets that a company must enhance its financial performance is intellectual capital. The functioning of the intellectual capital in the knowledge-based economic system is also the key that reinforces the competitive advantage of the company (Anggraini et al., 2019). It has been noted that in more than a few research studies, intangible assets positively and significantly effect on the financial performance of the corporations (Felix et al., 2020; Kaymaz et al., 2019; Zhang, 2017; Li and Wang, 2014). In other research works, it has been observed that intangible assets negatively affect financial performance (Vanderpal, 2019)

Firm value creation is an essential need for firms and a base of attaining competitive advantage. Intellectual capital is also among the essential sources of value generation in knowledge-based economy (Nawaz and Haniffa, 2017). The value creation in firms is also significant in investment in appropriate intangible assets (Garanina and Pavlova, 2011). Firm value refers to the image of an organization held by its investors, and it is reflected in the share price. It is the goodwill and reputation of the organization, recognized by the stakeholders and shareholders, and is the very important consideration to be made during the investment. Furthermore, the creation of high firm value through intellectual

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capital indicates the firm's capacity and ability to use its assets more effectively and efficiently, thus creating additional value and strengthening the firm's competitive advantage.

Several research studies have investigated that there is association between IC and Competitive Advantage and have found both components are reliable determinants of Competitive Advantage (CA). Further analysis of the dimensional level of intellectual capital further revealed that among its three dimensions, the Rational Capital (RC) is the key indicator of the IC (Dyer & Singh, 1998)

In present literature, competitive advantage (CA) lacks well-defined definitions, as its conceptualizations vary across different businesses and professional fields. Commonly, however, the competitive advantage refers to a company's competencies and strengths that enable it to sustain itself over a long time and achieve greater profitability compared to its rival and other businesses working within the same business environment (Porter & Millar, 1985). The firm requires increases in CA to enhance performance (S. Z. Khan, Yang, & Waheed, 2019). Resource-based theory stresses the fact that it is a crucial component of developing a competitive advantage in a knowledge-based economy because it helps companies to create and apply their resources in the most efficient and effective manner (Rachmah et al., 2023). Nadeem et al. (2017), Ur Rehman et al. (2022) explained intellectual capital as a key competitive asset that enhances monetary performance and the foresight of competitive advantage. Dalwai et al. (2022) and Weqar et al. (2021) proposed that it is not a vital convincing variable of the company's financial performance.

Intangible assets, especially the intellectual capital, are deemed to be significant factors in the contemporary and extremely competitive business environment. However, the direct impact on firm worth is obscure. Though other studies have indicated positive and significant effects have been experienced on FP and FV, the other study has indicated that it has negative or weak effect on the firm value. Nixon Kamukama, et al. (2011) also found out that CA and FP intervene in the association between IC and FV.

Moreover, studies that have been conducted to date have not given much attention to the intervening impact of financial performance and CA. Secondly, most of the Prior studies have been done in developed nations and little attention has been paid in developing nations like Pakistan. Thus, the problem of interest to the current researcher would be to explore this issue.

1.2 Objectives of the Study

The major goals of this study are:

1. To analyze the direct nexus between intellectual capital and firm value in listed commercial banks on the Pakistan Stock Exchange (PXS).
2. To investigate the mediating impact of financial performance in the connection between intellectual capital and firm value.
3. To evaluate the intervening role of competitive advantage on firm value.

1.3 Research Questions

1. What is the direct nexus of IC on the FV of commercial banks listed on the Pakistan Stock Exchange (PXS)?
2. Does the financial performance mediate the association between IC and FV in the Pakistani banking sector?
3. To what extent does competitive advantage mediate the association between IC and FV in listed Pakistani banks?

1.4 Problem Statement

The intangible assets are well recorded as important tools on the modern and strict knowledge-based economy. Their direct effect on the value of a firm is explicable. The current research analysis has not considered the mediating position of financial performance and competitive advantage at one place. This knowledge gap leaves firm managers in a confused state in the ability to realize aspiration outcomes of intangible assets in a strategic manner. Nonetheless, there is a need to examine the way in which intangible assets maximize firm value with respect to the

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mediating role played by financial performance and competitive advantage.

1.5 Significance of the Study

The study has added to the body of knowledge as it looks upon the role of intellectual capital on the firm value of the PSX-listed banks which lacks evidence in the emerging markets. It builds on the previous studies with the inclusion of financial performance and competitive advantage as the mediating variables. The findings have some practical implications for the bank managers to strategically address the intellectual capital to maximize value creation. The research has policy implications for regulators, including SBP and SECP, to foster effective knowledge-based practices. Overall, it reinforces the knowledge on the value drivers in the banking industry in Pakistan.

2. LITERATURE REVIEW

2.1 Intellectual Capital

Intellectual capital is a complex, diverse, and multifaceted concept that includes institutional, individual, and coherent magnitudes (N. Bontis, S. Janošević, and V. Dženopoljac,2015). Utilizing a three-layered framework or analytical model makes it easier to realize the apparatuses of intellectual capital. These three basic apparatus of the IC are Human Capital (HC), Structural Capital (SC), and Rational Capital (RC) (Felix, N. A., Okwo, M. I., & Obinabo, C. R.; N. S. Beltramino, D. García-Perez-de-Lema, and L. E. Valdez-Juárez, 2020); F. Sardo, Z. Serrasqueiro, and H. Alves, 2018). HC describes to the competencies, talent, expertise, and abilities seized by a firm's workforce, and it is acknowledged as the most significant component of IC since it reflects the worth of the firm's workforce (Kamath, G.B. 2007; R. Gul, M. A. S. Al-Faryar, and N. Ellahi, 2022). Human capital is tremendously significant for strengthening firm productivity and profitability (Zhang, N. (2017). In this regard, current research underscores the magnitude of the nexus between intellectual capital and workplace commitment and consistency. These studies also show that there is a robust connection between IC and FP, demonstrating human capital is a crucial asset for safeguarding appropriate firm financial performance (Nawaz, & Haniffa. 2017; Shih, Kuang-Hsun, Chang Chia-Jung, Lin Binshan 2010; Kubo, I., dan A. Saka. 2002). SC refers to the essential framework that assists human capital in a firm, which embraces enterprise capability and the tangible infrastructure for the dissemination and storing of knowledge resources (Shih, Kuang-Hsun, Chang Chia-Jung, Lin Binshan 2010; Kamath, G.B. 2007). SC can be reproduced and transferred, includes intellectual property rights under legal protection, and plays an imperative role for knowledge transfer, optimizing production standard, effective organizational communication, and decision making (de Frutos-Belizon, J., Martin-Alcazar, F., & Sanchez-Gardey, G. 2019; Zaied, A. N. H. 2012). RC indicates the company's association with customers, which is essential for organizational worth and for value generation through external stakeholders' engagement, hence impacting customer perception, corporate identity, and credibility (Kamath, G.B. 2007; R. Gul, M. A. S. Al-Faryar, and N. Ellahi, 2022). Wang and Hu (2018) stated that the RC is the most important element of IC, emphasizing the role of customers and stockholders in company performance and encouraging customer participation in vender choice for improved contentment (de Frutos-Belizon, J., Martin-Alcazar, F., & Sanchez-Gardey, G. 2019).

2.2 Firm Value

A robust firm value draws the attention of prospective investors and increases the company's reputation and creditability as a reliable investment opportunity. Hence, firms should be capable of meeting the expectations of both stakeholders and shareholders by concentrating on and boosting their firm's value. Researchers have studied numerous factors that may establish firm value as a main objective of the company. However, many scholars believe that intellectual capital, competitive advantage, and corporate

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governance play the most important roles in achieving a high firm value (Bemby et al., 2015; Rashid and Islam, 2013; Wijayanto et al., 2019).

2.3 Financial Performance

According to signal theory, firm financial performance is a favorable indicator that provides valuable information to investors regarding its present financial strength and future expansion capacity. The high profitability demonstrates managerial efficiency, the firm's ability to produce reasonable earnings, operational stability, which leads to increase the investors' confidence. This positive profitability encourages increased demand for the firm shares, which leads to stock prices increases. As stock prices increase, the overall firm value is appreciated.

Firm financial performance can be assessed from numerous perspectives. One of them is the performance of the business in the market, and another is the accounting presentation (Vanpoucke, Vereecke, and Wetzels, 2014). It was determined by indicators, like market capitalization, return on sales, the sales growth rate, returns on stock markets, revenue per customer, and market share as the business performance in the market (Gherghina and Simionescu, 2015). In contrast, accounting performance evaluated through market-based, profitability, and operational efficiency perspectives. (Felício, *et al.*, 2012; Gherghina & Simionescu, 2015) ;(Bashir, *et al.*, 2013).

2.4 Competitive Advantage

In the contemporary business environment, organizations progressively consider competitive advantage as an indispensable element for sustaining survival and competitiveness in the global arena. Competitive advantage refers to the significant assets through which firms generate firm value (Day and Wensley 1988; Ma, 1999; Sigalas and Economou, 2013). The value of the CA of a firm is measured into assets and competencies which are durable, immobile, and uncopiable (Sadler, 2003).

2.5 IC and FV

Banking is one of the cognitively demanding service industries or businesses, which requires a high level of mental effort, creativity, expertise, problem-solving, and decision-making skills. The banking sector depends primarily on the intellectual capacity and expertise of its workforce. This empowers the banking industry to obtain excellent firm value as compared to other industries.

However, there are several previous studies that have contradicted the evidence providing support of the effect of IC on FV. They found that the intellectual capital evaluated with the VAIC approach positively influences the firm value, which was presented by the Tobin Q (Nguyen and Doan, 2020). Likewise, Lukas et al. (2018) also reported that IC has a positive influence on firm value in the banking industry. Nonetheless, other studies have indicated opposite findings. As an example, the study by Susanti et al. (2020) of the consumer goods industry concluded that the IC does not impact on the firm value significantly. Based on this, it is the following hypothesis:

H1: Intellectual Capital has a significant effect on firm value.

2.6 IC and FP

Smooth and efficient exploitation of the organizational capabilities and assets enables the firms to meet their financial performance goals. As cited in Ulum (2008) it showed that IC positively influences the FP of firms, in terms of indicators of financial performance, which include return on equity and return on assets. The research conducted by Firer and Williams (2003) on the influence of IC on FP of the firm discovered that physical capital was also influential on financial performance. Chen et al. (2005) had similarly detected that IC had both positive and negative impacts on FP and the short-run and long-run market value. The research conducted by Chen et al. (2005) and Abdolmohammadi (2005) was a joint methodology to analyze the effect of IC on the establishment of FP of firms. The same has been highlighted in other empirical analyses that have stressed the importance of IC in raising returns on assets (ROA) of firms (Chen et al., 2005; Ghosh and Mondal, 2009; Zeghal and Maaloul, 2010).

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Thus, the literature has inconsistencies in the relationship between intellectual capital and financial performance because prior researchers have found a direct optimistic association between IC and FP (Smriti and Das 2001; Sardo, Serrasqueiro and Alves, 2018; Gupta, Rathore and Kashiramka, 2023) and other researchers have identified a direct negative link between IC and FP. Considering all these expressed contradictions and on the basis of the recommendations of some of the earlier studies, it can be suggested that further research should be conducted to explore the link between the two variables (Forliano, C., Ballerini, J., De Bernardi, P., & Quaglia, R. (2022).

The management of the elements concerning intellectual capital can be efficient and effective, which can influence the use and growth of firm resources. In reference to this, the hypothesis is developed as follows:

H 2: Intellectual capital has a significant effect on financial performance.

2.7 IC and CA

Competitive advantages of industries play significant role in company development, as it influences the capacity of the company to compete efficiently in the robust and competitive market and form their ability to obtain sustainable development and growth. Moreover, it establishes opportunities for firms to earn more profit. Furthermore, competitive advantage increases the skill and expertise of firms to prosperous greater firm value for the shareholders, hence supporting their inclusive situation in the industries. The nexus of intellectual capital and competitive advantage that Utari (2013) did in his study supported the resource-based theory.

According to the resource-based theory, the capability to manage a market dominance and competitive advantage by a firm can maximize corporate value and deliver superior incomes to stakeholders in the form of well-structured leveraging of a firm strategic resource which are rare, non-substitutable, valuable and inimitable. In the study, Hsu and Fang (2009) found the influence on IC on CA. Their study discovered that structural capital has a positive impact on competitive advantage and its influence is immense. Among the factors of IC in the design corporations of Taiwan, it was identified that rational capital was the crucial factor followed by structural capital and human capital. According to the above discovery, the hypothesis is stated as follows concerning the correlation between IC and CA:

H 3: Intellectual capital has a significant effect on competitive advantage.

2.8 FP and FV

Financial Performance is generally identified as the consequence of how well an organization utilizes its assets to produce profit, revenue, and value for investors over a specific period. Cabrita and Vaz (2006) and Chahal and Bakshi (2014) specified that the financial performance of companies can be measured using both quantitative and qualitative approaches. Quantitative financial performance emphasized financial indicators such as ROE, ROA, and ROI, along with certain non-monetary attributes. From a qualitative perspective, financial performance is assessed through stakeholders' perceptions of multiple operational and non-monetary factors.

Signal theory suggests that the financial performance of a firm will denote the company's present condition and its strategic prospects. Profitability in the market should provide a good signal and therefore it will be able to increase the prices of shares and eventually increase the value of firms. Ghosh and Ghosh (2008) pointed out that profitability is a crucial sign of financial performance of firms and can make its mark to help in the determination of the firm value that prior research in this area has informed mixed results. Studies conducted by Chen and Chen (2011), Ghosh and Ghosh (2008), Nuryaman (2015), Sudiyatno et al. (2012), and Wang (2014) indicated that the financial performance and firm value relationship is an important factor. On this basis, we develop hypothesis as follows:

H 4: Financial performance has a significant effect on firm value.

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2.9 CA and FV

As is mentioned by Porter (1985), competitive advantage (CA) can be defined as the power to achieve returns on investment that are above average in industry. Those companies that possess a distinct value will be able to dominate the market because the customer will readily recognize them. Competitive advantage explains the better assets that are utilized into creating firm value (Day and Wensley 1988; Ma, 1999; Sigalas and Economou, 2013). Therefore, competitive advantage is significant to the achievement of long-term objectives of an organization.

Sustaining a position in competitive business environment needs the creation of high firm value through enhancing competitive edge.

Nonetheless, there are extremely limited research studies that have researched the impacts of competitive advantage on the value of the firm as a performance indicator of an organization. Boasson et al. (2005) have found the correlation between competitive advantage and firm value with the emphasis on spatial assets. Wijayanto et al. (2019) investigated that the competitive advantage is an independent variable as the determinant of the firm value based on dynamic-capability and institutional approaches. The observation of Wijayanto et al. (2019) reveals that the competitive advantage is a more crucial factor in the value of influential firms rather than financial performance.

Their proof authenticated the perception that stockholders consider competitive advantage as a stronger component of firm value than financial performance. Standfield (2005) highlighted that the CA could enhance the corporate valuation, market price per share, profitability, and sales performance. In line with signaling theory, companies communicate positive information to shareholders and other stakeholders to encourage auspicious feedback, eventually enhancing stock prices (Connelly et al., 2011). Signaling theory recommends that superior organization's competitive advantage serve as an indication of the firm's present status as well as its potential for future expansion. The communication of constructive signals increases stock prices and contributes to the upgrading of firm's value. Established on this model, we propose the following hypothesis:

H 5: Competitive Advantage has a significant effect om firm value.

2.10 The Effect of Intellectual Capital on Firms Value Mediated by Financial Performance

Natsir's study (2020) found that financial performance intervenes in the effect of IC on FV. Effective and efficient managing of intangible assets enables a firm to increase competitive advantage. This competitive advantage then serves as a tool to develop financial performance, which leads to ultimately increased firm value (Chen et al., 2005).

Jumratun Choirunnisyah and Exy Nur Aisyah (2022) studied Indonesian banks as the sources of VAICTM as the measures of IC and found that the influence of intellectual capital on financial performance of firms (ROE) is significantly high and, vice versa, the direct effect of Intellectual capital on the firm value is not significant. The modifications in company value brought about by the indirect effects of IC were high. Harahap (2014) also examined the link between intellectual capital and firm financial performance and affirmed financial performance as a mediator of the impact of IC and FV. Pramelasari's study (2010) also proved that various components of IC influence the FV and the FP. Established on this model, we propose the following hypothesis:

H 6: Financial Performance significantly mediates the relationship between intellectual capital

and firm value.

2.11 The Competitive advantage Meditated the Relationship between Intellectual Capital and Firm value

Competitive advantage is the firm competence and capacity to generate firm value with the help of intangible and tangible assets of the organizations. Preceding studies recommended that competitive advantage positively intervene the link between IC and FV. Pulic (2000)

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highlighted that intellectual capital increases organizational productivity, capability and outcome, which are important mechanisms of firm value creation. According to Barney (2004), structural capital, human capital, and rational capital can create constant competitive advantage, which in turn contributes to higher results. Favoring this opinion, Youndt et al. (2004) based on evidence verified that firm with greater level of intellectual capital can restored aligning to enhance competitive advantage, eventually, foremost to amended firm value and performance. Therefore, intellectual capital gives firm value not only directly but also indirectly through its positive influence on competitive advantage.

H 7: Competitive Advantage significantly mediates the relationship between intellectual capital
and firm value.

Signaling theory explains that firms convey their expected outcomes and organizational capability to stakeholders through publicly disclosed indicators such as financial performance and competitive advantage, which influence firm value (Spence, 1973). Shareholder theory suggests that the key aim of a firm is to optimize shareholders' wealth, rendering firm value a main indicator of organizational achievement (Friedman, 1970). In this study, intellectual capital enhances financial performance and competitive advantage, which provides positive and reliable signals to the market participants. These signals minimize information gap between parties and positively affect firm valuation. However, signaling and shareholders theories provide a theoretical based alongside the resource-based view for understanding how value creation within the firm leads to wealth maximization.

The researcher aims to conduct theoretical investigation concentrating on two main aspects: first, how, intellectual capital determines firm value both directly and indirectly through financial performance, competitive advantage, and second, how these mediating variables contribute to firm value. The scholars have left further examination on these questions to upcoming studies that apply suitable data. The summary of hypotheses and its measurements, indicator are as under:

H1: Intellectual Capital has a significant effect on firm value.

H 2: Intellectual Capital has a significant effect on financial performance.

H 3: Intellectual Capital has a significant effect on competitive advantage.

H 4: Financial Performance has a significant effect on firm value.

H 5: Competitive Advantage has a significant effect om firm value.

H 6: Financial Performance significantly mediates the relationship between intellectual capital
and Firm Value.

H 7: Competitive Advantage significantly mediates the relationship between intellectual capital
and firm value.

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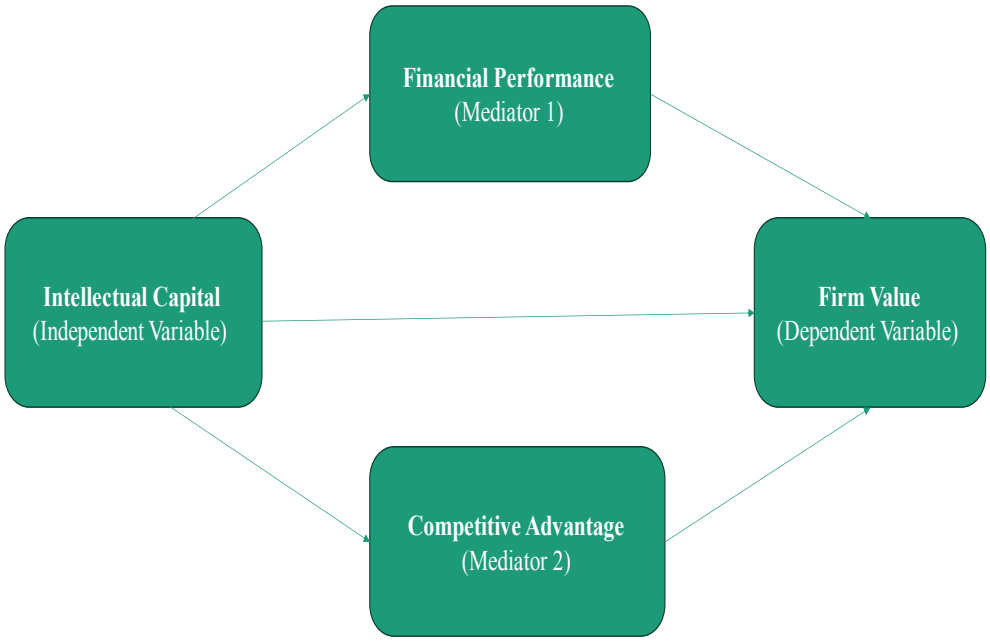
2.12 The conceptual framework



3. RESEARCH METHODOLOGY

3.1 Type of Research

This study used a quantitative research design, as it allows us to use the numerical forms of data to develop a more thorough and rigorous study of the nexus between IC and FV. The leading aim of such quantitative approach is to define relationships between independent and dependent variables to give an overview in the form of statistical results and test hypotheses to predict and forecast. This method is appropriate for examining already explored topics through empirical validation using statistical models.

3.2 Data Type and Sources

The secondary data collected indirectly through a variety of sources, including annual reports and financial statements (income statements, balance sheets and notes to accounts), the Pakistan Stock Exchange (PSX) and publications of the State Bank of Pakistan (SBP) for the period 2015-2024.

3.3 Population and Sample

The sample selection used in this research is in line with preceding analyses such as Kamath (2007) and Mavridis. (2005), and Firer and William (2003). The study sample will include all banks that were listed on the Pakistan Stock Exchange (PSX) and have been in operation since 2015 to 2024. The purposive sampling which is also referred to as selecting is a non-probability sampling method employed to choose sample in population. The sampling enables researchers to select purposefully those who have certain attributes and qualities that are most appropriate to the purpose of the research (Sugiyono, 2011). The choice of the criteria is since we are selected banks listed on the Pakistan Stock Exchange (PSX) having full financial data on the period 2015-2024 since the data can be used to conduct reliable and relevant research analyses. The inclusion criteria used to select the sample in this study are as below:

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1. Only banks listed on the Pakistan Stock Exchange (PSX) during the research timeline were consider in the analysis.
2. The sample will include banks whose financial data is fully available for the study period.
3. Banks must have operated continuously without major operation disruptions throughout the research period.

Research Variables and Measurement

In this research paper, the panel study design was used, where the researcher's gathered data of the banks listed on the Pakistan Stock Exchange (PSX) during a specific time and examined the link between IC and FV. The intervening function of Financial Performance (FP) and Competitive Advantage (CA) of this relationship was also examined in this research paper. To test the hypothesis, Python was employed where the association between IC, FP, CA and FV was to be established.

Independent Variable

The independent variable in the study is the IC that is explained using the VAIC model developed by Pulic (2000). Making the calculation of IC, the model identifies three factors, which are Capital Employed Efficiency, Human Capital Efficiency, and Structural Capital Efficiency.

3.6 Dependent Variable

The dependent variable is firm value, is determined using Tobin's Q ratio (Lukas et al., 2018).

3.7 Mediating Variables

The mediating variables used in this paper are Financial Performance (FP) and Competitive advantage (CA). ROA is used as a proxy of FP (Hidayat et al., 2022). It demonstrates the effectiveness with which the management of a firm can use its assets to make profit (Ousama & Fatima, 2015). Return on Equity (ROE) is applied to disclose the efficiency with which the owners of the company use its equity to make a profit (Dženopoljac et al., 2017). And whereas Assets Turnover (ATO) is used to determine the efficiency with which a firm utilizes its resources to produce revenue (Nawaz and Haniffa, 2017). Asset utilization capability measures competitive advantage which determines the efficiency of a corporation in terms of its capabilities to utilize its assets to compete and secure profit. This measure has been employed in preceding research, including (Gani & Jermias, 2006; Mayangtari & Wahidahwati, 2016).

4. DATA ANALYSIS AND RESULT

4.1 Descriptive Statistics

The data acquired during the sourcing process was to be processed with the help of the various statistical packages, including Python, Windows Version 24, Microsoft Excel 2016. These software applications were to compute the characteristics of the data in the independent variables (Intellectual capital), Dependent Variable (Firm Value), and the Mediating variables (Financial Performance and competitive advantage) in terms of calculating the descriptive statistics of central tendency (mean) and dispersion (standard deviation, variance).

The descriptive statistics of all the variables in the study up to 200 observations are represented in table 1. The findings reveal that there is a significant difference in the constructions, which depict heterogeneity of the sampled firms.

Intellectual Capital

Intellectual capital mean = 3.65 SD = 3.19 with a variation of -5.44 to 36.21 showing that there is a lot of variation in Intellectual capital accumulation and use among firms. The intellectual capital elements such as CEE (M = 0.36, SD = 0.39) and HCE (M = 2.82, SD = 2.84) indicate moderate efficiency in using capital, especially human capital. SCE (M = 0.46, SD = 0.93) also shows significant dispersion, which means that there is a significant difference between firms and additionally, provides evidence that there are firm-level differences in capital efficiency.

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Firm Value.
The distribution of firm value is constant (M = 0.94, SD = 0.03), with a small difference range of 0.85 to 1.13. This low standard deviation indicates that the value of firms is relatively stable among the sampled firms.

Financial Performance
There are mixed results when it comes to financial performance indicators. ROA is characterized by low means (M = 0.01, SD = 0.07), which reflects the modest profitability, whereas the ROE displays higher dispersion (M = 0.14, SD = 0.53), with the value varied between -3.18 to 5.83 which represent a wide range of the returns of shareholders. The ATO has a low mean (M = 0.042, SD = 0.041), indicating a moderate level of the mean, and the SD near the mean indicates that there is a great difference in the observations. The standard deviation of the composite Financial Performance variable is also quite high (M = 0.19, SD = 0.54), which indicates variation in financial performance of firms. The composite Financial Performance variables are also characterized by a high level of variability (M = 0.19, SD = 0.54), which indicates dissimilarity in financial performance of firms.

Competitive Advantage
The means of competitive advantage is fair (M = 4.22, SD = 4.12) with a large range (Min = -2.93, Max = 45.04) which means that there are some firms with good competitive positions, and there are those with much better positions.

Table 1 Descriptive Statistics of Study Variables

Variables	N	Mean	Std. Deviation	Minimum	Maximum
IC	200	3.645	3.194	-5.437	36.213
CEE	200	0.362	0.394	-2.399	4.187
HCE	200	2.821	2.838	-4.25	31.628
SCE	200	0.462	0.928	-1.338	8.624
FV	200	0.935	0.034	0.853	1.125
FP	200	0.192	0.541	-3.221	5.926
ROA	200	0.012	0.072	-0.089	1.0
ROE	200	0.137	0.525	-3.179	5.832
ATO	200	0.042	0.041	-0.029	0.45
SCE	200	0.462	0.928	-1.338	8.624
CA	200	4.222	4.124	-2.926	45.038

4.2 Inferential statistical
The initial inferential statistical test was a Pearson Correlation test which was run at Python to determine the association of independent, dependent and mediating variables.
Table 2 shows the outcomes of regression analyses that were done to test the direct hypotheses that discussed the relationship between IC, FP, CA and FV. The hypotheses were tested upon using the significance of regression coefficients (β), t -values, p -values, and the power of explanations (R^2) of each model.

H1: Intellectual Capital → Firm Value
The outcomes show that the significant impact of IC on FV is statistically significant (= -0.0028, = -3.8392, = 0.0002). The coefficient is negative, but the association is statistically significant at a 1 percent level. The model explains a variance of about 6.9 percent in the value of a firm (R^2 = 0.0693). Therefore, H1 is supported.

H2: Intellectual Capital → Financial Performance
The regression findings indicate that intellectual capital does not fit into the financial performance significantly (β= 0.0040, t = 0.6797, p = 0.4975). The financial

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performance variance explaining the model (R^2 =0.0023) is very low, and as such, the model has low explanatory power. Thus, H2 is rejected.

H3: Intellectual Capital → Competitive Advantage

According to the findings, intellectual capital is strongly positively and significantly related to competitive advantage (β = 0.4935, t = 16.2893, p < 0.001). The model has a high explanatory power with a variation in competitive advantage that is explained by 57.3%. (R 2=0.5727). Thus, H3 is supported effectively.

H4: Financial Performance → Firm Value

It has been analyzed that financial performance does not have a significant effect on firm value (β= 0.0126, = 1.4088, = 0.1605). The model has weak explanatory power (R^2 = 0.0099) meaning that the financial performance accounts for less than 1 per cent of the variance in firm value. Hence, H4 is rejected.

H5: Competitive Advantage → Firm Value

These findings indicate that competitive advantage is statistically significant on firm value (= -0.0048, t = -4.3926, p = 0.001). The model accounts for 8.9 percent of variance in firm value (R 2 =0.0888). Although the correlation coefficient is negative, it is statistically strong.

Accordingly, H5 is supported. Overall, the findings suggest that intellectual capital is a major factor in the firm value indirectly through competitive advantage instead of direct in terms of financial performance. The close-to-significance of the H3 and H5 support an empirical foundation to the H6 and H7 mediation assumptions, which further supports the theoretical position that competitive advantage is one of the main mechanisms that mediate intellectual capital and firm value.

Table 2 Results of Hypotheses Testing

Hypothesis	Beta (β)	t-value	p-value	R^2	Decision
H1: IC → Firm Value	-0.0028	-3.8392	0.0002	0.0693	Supported
H2: IC → Financial Performance	0.004	0.6797	0.4975	0.0023	Not Supported
H3: IC → Competitive Advantage	0.4935	16.2893	0.0	0.5727	Supported
H4: Financial Performance → Firm Value	0.0126	1.4088	0.1605	0.0099	Not Supported
H5: Competitive Advantage → Firm Value	-0.0048	-4.3926	0.0	0.0888	Supported

Mediation Results

The outcome of the bootstrapping mediation analysis that invested the extent to which intellectual capital is related to the firm value using financial performance and competitive advantage as the mediating factors is as shown in Table 3. The mediation effects were assessed using the estimates of the indirect effects and 95% bootstrap confidence interval (CI).

H6: Mediating Variable: Financial Performance between Intellectual Capital and Firm Value.

The outcomes suggest that the moderating impact of intellectual capital on firm value via

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financial performance is very small and positive (Indirect Effect = 0.0002). The 95 percent bootstrap interval, on the other hand, is only -0.0002 to 0.0011 but this also covers zero. This means that the indirect impact is not statistically significant. Therefore, H6 is not supported.

H7: Competitive Advantage as Intermediary between Intellectual Capital and Firm Value.

The mediation analysis further depicts that the financial influence of IC on FV via competitive advantage is in the negative (Indirect Effect = −0.0023). The 95 percent bootstrap confidence interval correspondingly runs between -0.0070 to 0.0017 again contains 0.00, indicating the non-significant indirect effect. Thus, H7 is not supported.

Table 3 Mediation Analysis Results

Hypothesis	Indirect Effect	CI Lower	CI Upper	Decision
H6: IC → Financial Performance → Firm Value	0.0002	-0.0002	0.0011	Not Supported
H7: IC → Competitive Advantage → Firm Value	-0.0023	-0.0070	0.0017	Not Supported

5.1: DISCUSSION

Impact of the Intellectual Capital on the Firm Value.

According to the findings of the research that the IC has statistically significant impact on the firm value. The coefficient is negative, but it is significant at the 1 per cent level. Therefore, H1 is supported. This result raises the idea that intellectual capital is a key factor in affecting the value of firms, but the negative correlation can be attributed to measurement, scale, or context diffidence of the sampled firms.

Impact of Intellectual Capital on Financial Performance.

According to the regression outcome of the experiment, that showed that the IC is not significant in the FP. The model has a very low percentage of variance in financial performance which implies low explanatory power. Thus, H2 is rejected. This means that intellectual capital cannot solely be used to directly explain changes in the financial performance of firms and that other operational or contextual aspects might be more eminent.

Intellectual Capital Impact on Competitive Advantage.

According to the regression outcome of the study, there was high link between IC and CA by implication having high significance value and strong and positive. Thus, there is a very strong support to H3. This finding underscore intellectual capital as a strategic asset that is extremely vital in competitive positioning of firms.

Financial Performance Impact on Firm Value.

According to the regression outcome of the research showed that FP does not have a significant impact on value of a firm. The model has a low explanatory power implying that financial performance does not explain more than 1 percent of the firm's value variation. Hence, H4 is rejected. This observation indicates that financial performance gains do not always lead to an increase in firm value in the sampled setting, perhaps because of market inefficiency or because of investor perceptions.

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Competitive Advantage Impact on Firm Value.

According to the regression outcome of the research, it was shown that the competitive advantage is statistically significantly impacting the firm's value. This is not because the relationship is not statistically strong, even though the coefficient is negative. Accordingly, H5 is supported. This indicates that competitive positioning can have a strong effect on firm value, although the negative relationship could be caused by industry-specific effects or scaling of measurement.

How Intellectual Capital influences Firm Value based on Financial Performance.

According to the regression outcome of the study, it was revealed that the indirect influence of IC on the FV based on financial performance is a very small and positive one (Indirect Effect) but the width of the 95 percent bootstrap confidence interval lies between 0.0002 to 0.0011 and it includes the value of zero. It means that there is no statistically significant indirect effect. Therefore, H6 is not supported. This result indicates that intellectual capital can affect financial performance or firm value in isolation, but financial performance is not an important transmission mechanism through which intellectual capital can influence firm value in sampled firms.

Competitive Advantage on the Impact of Intellectual Capital on Firm Value.

Judging by the regression outcome of the research revealed that the mediation analysis further showed that the negative indirect effect of IC on FV via competitive advantage is negative. The associated bootstrap ninety five percent interval is -0.0070 to 0.0017, again, containing zero, indicating that the indirect effect is not significant. Thus, H7 is not supported.

Though the direct relationship between intellectual capital and competitive advantage is found to be strong as has been recorded above, competitive advantage is found to have no significant role in facilitating the impact of intellectual capital on firm value.

5.2: IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

5.2.1: Implications

There are many important implications that this study would have on managers and policymakers.

The value of investing in intellectual capital should be since managers are mostly interested in enhancing competitive advantages, and this value increases the value of firms more when they are used to developing strategic positions than in short-term financial performance. The competitive advantage is a major value driver that needs to be addressed through the alignment of innovation, knowledge management and differentiation strategies with long-term objectives. With the negligible importance of financial performance in the increase of the firm value, managers are to pursue the balanced approach, including intangible holdings and traditional financial pointers.

5.2.2: Future Research, Limitations and Recommendations.

Despite several limitations, this study has a wide array of boundaries that can be overcome in future studies. We failed to compare industries like oil, sugar and textile, if the IC dimensions have varying roles in firm value in such firms. We would therefore suggest testing and comparing the significance of the IC dimensions in different industries. In addition, we evaluate the mediating effect of the two variables between the dimensions of IC and firm value. This research considered three dimensions of IC that are HC, SC, and RC only. Although, the existing literature (e.g., Andreeva and Garanina, 2016; Inkinen, 2015) proposed five dimensions, the additions of organizational capital and customer capital were proposed. Thus, all these magnitudes can be tested to provide communicated perceptions. Besides, we did not test the role of other mediated variables in the context of this study, such as individual performance, empowerment, and the interplay of performance and competitive advantage. Although, existing

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literature has asserted that there are other determinants that may affect the association of IC and firm value. In fact, a great number of studies test IC and its dimensions. More studies on intellectual capital within the context of commercial banks in Pakistan are likely to expand on the research period so that the effect of intellectual capital on the value of the firm is more uniform and the true picture of the situation. The findings of this study, however, can be deemed helpful to commercial banks in Pakistan, and further efforts can be undertaken to enhance the efficiency of Intellectual capital of banks, which can potentially raise the firm value of such banks. Thus, this study should also be subjected to more research in this field.

5.2.3: Conclusion

Depending on the findings of the analyses and discussions made, conclusions can be gained, i.e. (1) IC has a substantial impact on firm value, this finding indicates that IC is influential and that it is relevant when it comes to increasing the value of commercial banks in Pakistan. (2) The findings of the regression denote that IC does not have a substantial impact on financial performance, in this case, commercial banks have not been able to optimally govern and build their intellectual property. (3) The results indicate that the link between intellectual capital and competitive advantage is strong, positive and significantly high. These findings underscore intellectual capital as a strategic resource that is crucial in boosting the competitive position of the banks. (4) The discussion indicates that financial performance is not a significant factor in the value of banks. This result indicates that financial performance gains may not necessarily lead to high bank value in sampled situation perhaps because of market inefficiencies or investor perceptions. (5) The findings indicate that competitive advantage is statistically significant in the firm's value. This implies that competitive positioning has considerable impact on firm value though the negative value might be due to industry specific phenomenon or measurement scale. (6) The findings indicate that the indirect effect on the value of a firm via the financial performance by intellectual capital is minute and positive. This observation implies that though financial performance or firm value might be subjected to intellectual capital without the other, financial performance is not a significant channel of transmission of intellectual capital on firm value in the sampled firms. (7) The mediation analysis also shows that the indirect effect of intellectual capital on the firm value via competitive advantage is negative. Although it is observed that intellectual capital and competitive advantage have a strong positive direct relationship as seen above, competitive advantage is not significant in mediating the impact of intellectual capital on the firm value.

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