

# Corporate Governance, Intellectual Capital and Financial Performance of Banks listed in Pakistan Stock Exchange

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**Abstract:** *This study aims to examine the impact of Corporate Governance (CG) and Intellectual Capital (IC) on financial performance in banks listed in Pakistan stock exchange. Due to the different scope of business, the banks are divided into two groups – Commercial banks and Microfinance & investment banks, and analyzed their data separately. We have used Generalized Least Squared (GLS) model to examine the impact of Corporate Governance and Intellectual Capital, and then impact of Intellectual capital on financial performance. The results show that Corporate Governance has significant impact on intellectual capital in both groups of banks. Board ownership has positive significant coefficient only in case of microfinance & investment banks, while Board size and Board independence significantly improve intellectual capital efficiency in case of both types of banks. Human capital efficiency significantly affects financial performance in Microfinance and investment banks, whereas commercial banks improve their financial performance through structural capital efficiency.*

**Keywords:** *Intellectual Capital, Corporate Governance, Commercial Banks, Microfinance & Investment Banks*

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## 1. Introduction

Economic and financial crises in Asia and some corporate scandals like Enron, WorldCom and Marconi bend the focus of researchers towards corporate governance. It can be concluded that performance of companies strongly depend upon their governance and a country is economically sound if all industries in that country are well managed and have good governance. Many corporations face failure due to weak corporate governance. Therefore, corporate governance attracts the attention of investors and regulators. Well organized and improved governance becomes a key factor to compete and survive in the world of competition.

Good corporate governance practices not only assure the success of individual firms but also give momentum to development of the economy of a country (Laporta et al., 2000). Therefore, countries are engaged in promoting good corporate governance and making various policies and procedures to monitor quality of governance. Many studies like Claessens (2000), La porta et al. (1993, 2000, 2002) and Wilks (2004) contributes toward identification and solution of various problems related to corporate governance. According to Shelfer (1997), governance mechanisms have become more complex with development in technology, establishment of global markets and no restrictions on ownership. Multinational ownership creates more complexity in corporate governance and increase in size of business need to involve more intermediaries, which raises more issues (Claessence, 2000). Keeping in view the corporate governance challenges and the need for regulations, different countries issued their own code of corporate governance, according to their environment and requirements.

After the Asian financial crises of 1998, governments paid special attention and introduced separate authorities to regulate corporate sector with the assistance of World Bank and management of companies. Like other countries, Pakistan also continuously focuses on the effectiveness of corporate governance. In Pakistan, a proper code of corporate governance was first time issued by the Securities and Exchange Commission of Pakistan (SECP) in 2002, which was later amended in 2012.

Corporate governance has attained much prominence in the recent literature; however, despite much attention it has been observed that companies having same governance mechanisms show different performances mainly due to their structures and policies (Thomsen, 2005). Corporate governance mechanism is directly linked with corporate policies and decisions, which influences performance (Sullivan, 2000). This performance is directly linked to the intellectual assets of an organization. However, the challenge, organizations face is related to the improvements in their intellectual assets. Firms need to know efficiency of different components of intellectual capital and its impact on financial performance.

Empirical studies conducted in developed and emerging economies show that CG has significant impact of financial performance. Most of the studies included different countries or made a pool of different sectors, this causes a serious heterogeneity in the data because different countries have different codes of corporate governance, and different sectors have different business structures. Similarly, the practices of intellectual capital are mainly seen in developed countries. There are ample studies on IC and financial performance. For the past decade developing countries are also showing keen interest towards intellectual capital. In case of Pakistan, there is dearth of literature to investigate the association of intellectual capital with financial performance. A study conducted by Makki and Lodhi (2014) in Pakistani context found that IC plays mediating role between CG and financial performance by using data of listed companies in Karachi stock exchange.

The present study investigates corporate governance, intellectual capital and financial performance of banks listed on Pakistan Stock Exchange. The study first investigates the impact of corporate governance on intellectual capital, to find out which corporate governance factor significantly affects the intellectual capital and then the study investigates the impact of intellectual capital on financial performance. These relationships are assessed by using sample of Banks listed in Pakistan stock exchange. Literature suggests three most preferred industries of Information technology, Pharmaceuticals and Banking & Finance to investigate the effect of intellectual capital on firm's performance (Vishnu & Gupta, 2014). The present study responds to the calls made by Sharbati et al. (2010), Sueyoshi et al. (2010) and Makki & Lodhi (2014),

who had suggested using single sector to reduce the heterogeneity in data and using weighted least square to control cross-sectional and time series effects. The study classified the banks into two groups that are commercial Banks and Microfinance & Investment banks. The classification improves the significance of results because the two groups have different business scope and interests. The results also visualize the effect of variation in code of corporate governance on the level of intellectual capital and financial performance in both classes of the banks.

## **2. Literature Review**

The study sheds light on corporate governance and intellectual capital and their relationship with each other and with financial performance. Due to the theoretical and descriptive nature of variables, literature review focuses on theoretical and empirical reviews.

### **2.1 Theoretical Review**

#### **2.1.1 Corporate Governance**

Before the information and technological developments, modern business concepts and modern infrastructure, most of the companies were small and family owned. There were no separate concepts for ownership, corporate governance, administration and management. But after industrialization and modern inventions, companies started expansion in their businesses and introduced new channels to make access easy to suppliers and consumers to face the global competition (Laing & Weir, 1999). This race developed the concept of “complex ownership structure” which created a separation between ownership and management (Korac-Kakabadse et al., 2001). These complexities and the subsequent occurrences of incidents in the companies provided provide a path for a formal and separate system to direct and control a company, hence the birth of corporate governance.

La-Porta (2000) referred corporate governance to all mechanisms, which assure protection to investors against sinking and theft of their funds and returns by internal management. Shah (2009) documented that corporate governance meaning and concepts vary from country to country. For example in the Anglo-American countries it refers to a system which focuses on investor’s interests, while in European countries it includes all stakeholders of a company (Goergen et al., 2005). According to modern thoughts corporate governance includes all public and private institutions, which have a common goal of governing the rights and responsibilities of management and investors. These institutions cover country corporate laws, Boards of companies, accepted and prevailing business practices and ethics, securities regulations and listing requirements of stock market.

Thus, various types of ownerships lead to concept of agency problem because of the gap between owners and management (Vinten., 2000). Good corporate governance practices assure easy access to external financing and also have the ability to effectively use these funds to boost up firm’s value (Javed, et al., 2006). In current competitive world, management needs to make decisions quickly while keeping in view all threats, weaknesses and strength of the company (Shyu, 2013). According to O’Connor and Byrne (2015) corporate governance needs vary with different levels of firm’s life cycle, therefore, firms need to have a flexible mechanism of governance to live successfully and achieve their objectives efficiently and effectively. In this regard, corporate governance acts as a front line for any organization, because each investor firstly examines the mechanism and quality of governance (Dalwai et al., 2015) and then invests in a company where board is working lawfully and ethically in the best interest of shareholders.

### ***2.1.2 Corporate Governance in Pakistan***

Pakistan had a small corporate sector at the time of its independence. Indian Companies Consolidation Act 1913 was inherited by Pakistan to control and regulate companies. Amendments were made to this act in 1949, to meet the requirements of companies and to make control effective and name was changed to Companies Act, 1913. Later, Security and Exchange Ordinance, 1969 and Companies Act, 1984 were promulgated to supervise and regulate working of companies. In 1997, a separate commission Securities and Exchange Commission (SECP) was constituted in pursuance of Security and Exchange commission Act, 1997. This Commission formally started operations on 1<sup>st</sup> January 1999. SECP started working under umbrella of Security and Exchange Commission Act, 1997, and issued for the first time comprehensive code of corporate governance in Pakistan on 28<sup>th</sup> March 2002. The Code included special amendments in Securities and Exchange Commission Ordinance, 1969; Companies Ordinance, 1984; SECP Ordinance, 1997 and assistance of other regulators like State Bank of Pakistan, World Bank, Asian Development Bank and Stock exchanges. Specific amendments related to output of code of corporate governance, were made in 2012 and 2013 in the SECP act. For better and effective control the Commission is divided in sub divisions, departments and wings. Besides SECP, there also exist other authorities, which regulate and control specific companies. For example stock exchange regulates listed companies in certain aspects; State Bank of Pakistan has authority to provide guideline for banking companies and financial institutions; National Electric Power Regulatory Authority (NEPRA) has authority to regulate companies generating or distributing electric power; Oil and Gas Development Authority provides assistance and keep control of oil and gas companies; and Pakistan Telecommunication Authority (PTA) has authority of supervision of all companies in Pakistan which provide telecommunication services.

SECP in collaboration with Economic Affairs Division of Pakistan and UNDP lunched a project in August, 2002 to make sure the implementation of code of corporate governance. In 2007, SECP in collaboration with Pakistan institute of Corporate Governance (PICG) and IFC conducted a survey to analyze corporate governance in Pakistan. The survey included financial institutions, local listed firms in stock exchange and some non-listed firms. The survey results concluded that there is a lack of awareness among companies regarding corporate governance. Therefore, to increase awareness of benefits of code of corporate governance, SECP with IFC and PICG held several training workshops for management of companies. SECP also helped by Asian Development Bank and Word Bank in improving the corporate governance standards and its implementation.

### ***2.1.3 Intellectual Capital***

The concept of intellectual capital is as old as humans in the world. Two persons possess different efficiencies and capabilities and this is the crux of intellectual capital. Initially, there was no explicit existence of the concept of intellectual capital, but modernization and globalization changed the structure of business entities and overall economy, which provided a path for discovery of intellectual capital. The origin of intellectual capital was found during exploration of comprehensive measurement of firm's performance. The base is provided by the work of Luca Pacioli in 1494 in finding the tangible assets associated with factors of production, his work identified some evidences that value of a company is not exactly equals to its sum of all physical and financial assets; however proper exploration of invisible assets is recent (Itami, 1980).

Hiroyuki Itami was the first to publish explicit ground breaking work in 1980 regarding invisible assets in Japanese corporations. The phrase “intellectual capital” is firstly used by John Kenneth in a letter to Michael Kalecki in 1969. Sveiby was the first to publish book about knowledge management in 1986 (Sullivan, 2000). After that many researchers started work on concepts, elements, measurements, classification and value of intellectual capital. Sveiby (1997) and Sullivan (1990) made contribution in intellectual capital. Stewart (1994), Pulic (1998; 2004), Mouritsen (2009), Makki and Lodhi (2009), Dumay and Cauganesan (2013) contributed towards the work on intellectual capital and concluded that classification and measurement of intellectual capital is very important for any organization. They introduced different measurement models of intellectual capital and argued the importance and usefulness of various elements of intellectual capital in decision making. Further, they highlighted that certainty in measurement is not possible, yet it is necessary because it helps in developing new managerial objects and dimensions.

Intellectual capital has no universally accepted definition. Researchers have defined and established its boundaries in their own context. However, they agree on basic elements of IC that is experience, knowledge, system, process and relations and brain power of employees come under umbrella of intellectual capital. Stewart (1991) dissolves confusion and simplify concept of intellectual capital. He documented that intellectual capital has no physical existence but contributes in value of an organization. He further explain in his book “Intellectual Capital: The New Wealth of Organization” in 1997 that intellectual capital is the sum of intellectual material, experience, knowledge, intellectual property and information that create value and give competitive edge to organization. The excess amount of market value over net book value of a company has been termed as intellectual capital (Sveiby, 1997). Some researchers associate intellectual capital to human resources while some relate it with information technology and networks (Koenig, 1997), and some referred it to as knowing capability and creativity & work efficiency of a society. A Spanish firm, Union Fenosa describes intellectual capital as a set of intangible values that develop and promote the profit generation efficiency of a firm now and in future (Union Fenosa, 1999).

These definitions focused on classification of intellectual capital. According to modern thinking, intellectual capital is a separate field, and it is impossible to isolate its boundaries but important to do classification and measures of its components as most significant factors of production are invisible (Usoff et al., 2002). The recent literature focused on identification criteria for intellectual capital (Goebel, 2015). Intellectual capital can defined broadly as, all informational sources and resources of a company or organization that may contribute profit maximization, capturing new customers, improve innovation capability, smooth communication among stakeholders and polish the employee efficiency (Giuliani, 2016).

#### ***2.1.4 Classification of Intellectual Capital***

Classification of intellectual capital is a hard challenge because the boundaries of its elements are loose and cannot be isolated from each other and have a very little inherent logic that describes their entities (Mouritsen, 2009).

Intellectual capital was taken into account by Kaplan and Norton (1992) when they developed ‘Balance Score Card’ for taking intellectual capital into account. They broadly divided intellectual capital in components; internal business operations prospective, financial prospective, learning prospective and innovation prospective. Skandia practically first time used the term ‘Intellectual capital’ in their annual report by classifying 24 indicators of intellectual

capital in five groups: Financial focus, human focus, customer focus, renewal focus and process focus (Roos et al., 2007). According to Petrash (1996) intellectual capital is the aggregate of three components human capital, organization capital and customer capital. This model provides dynamic management of intellectual capital and used by Dow Chemicals in 1996 (Johansson, 1998).

Based on these basic models many composite and integrated models of intellectual capital are formulated such as Pulic (1998), Riahi-Belkaoui (2003), Ramirez et al. (2007), Mouritsen (2009). However, their components of classification directly or indirectly come under heading of human and structural capital employed efficiency and relational capital.

## ***2.2 Empirical Review***

A number of empirical studies have analyzed the relationships of corporate governance, intellectual capital and firm's financial performance with mixed results. Some of these studies have found positive relationships while others concluded inverse relationships. These variations are caused by various factors such as structures of models & methods used and firm specific factors. Few studies discussed intellectual capital but failed to catch exact conclusion.

### ***2.2.1 Corporate Governance and Firm's Performance***

Relationship between corporate governance and firm's performance has a rich literature, but still remain inconclusive and different studies show different results. Some studies show significantly positive relationship between corporate governance and firm's performance (Bhagat et al., 2002; Javed, et al., 2006; Tornyeva & Wereko, 2012; Brown & Caylor, 2006; Gompers et al., 2003; Dittmar & Mahrt-Smith, 2007; Harjoto & Jo, 2008); while some studies found significantly negative relationship between corporate governance and firm performance (Bocean & Barbu, 2007; Lawrence & Marcus, 2004; Bhagat & Black, 2002; Drakos & Bekiris, 2010; Basyith, 2016), and other studies yielded non-significant results (Beiner et al., 2006; Abdullah, 2009; Switzer & Tang, 2009). However, majority of the research suggests better performance is the result of good governance.

Mitton (2001) explored projection of corporate governance on firm performance in five countries involved in East Asian financial crises and found that stronger corporate governance is very vital during unexpected period of economic distress. He further points out that minority shareholders protection, high disclosure quality, well managed flow of power & information and a suitable ownership structure are key challenges to Good Governance. Sound financial performance and higher market valuation and better accounting results are highly correlated with better corporate governance mechanism (Klapper & Love, 2004).

Bhagat and Bolton (2008) while investigating board independence, board ownership, board size and CEOs duality in US firms found that stock ownership of board, board size and CEOs duality were positively associated with operating performance, while board independence was negatively associated with firm's performance. Basyith et al. (2015) studied 45 blue chip firms in Indonesia and found that board ownership had negative impact on performance, while independent commissioner and audit committee had no effect on performance in Indonesian context.

Family ownership and Non-Family ownership also cause fluctuations in firm's performance. For example, Maury (2005) examined 1672 non-financial firms of Western Europe; using panel regression analysis, showed family control has non-linear positive effect on Return on Assets and Tobin's Q. Furthermore, he suggested that active family control is associated with higher

profitability than non-family firms. Family ownership reduces agency costs in organizations (Fama & Jensen, 1983). In a stable and well-regulated economy, family control improves the firm's value (Anderson & Reeb, 2003). While inversely the Family ownership may not provide legal security to minority shareholders (Maury, 2006). Yasser et al. (2011) found that there are significant differences in family and non-family controlled company's performance in Pakistan. The authors found that independent directors negatively, while directors with professional qualification and meetings frequency positively affect the firm's performance in family controlled companies in Pakistan; whereas, director qualification, board composition and professionally qualified directors have positive effect in non-family controlled companies in Pakistan.

Arora and Sharma (2016) explored relation of board structure with financial performance in Indian firms. He found that board size, outsider directors, proportion of independent directors and other corporate governance indicators have insignificant association with ROA, NPM and ROE, while board size has positive relation with Tobin's q and board independence show negative relation with Tobin's q.

### ***2.2.2 Corporate Governance and Intellectual Capital***

Literature provides evidence regarding association between corporate governance and intellectual capital. Keenan and Aggestam (2001) conceptualized the relationship of CG and IC. They argue that better IC management by directors provides competitive advantage and value creation to firms. Corporate Governance monitors and control management to minimize the agency problems by cover up and reduce the opportunistic behavior of managers (Li, et al., 2008). Effectiveness level of intellectual and knowledge, skills and experience of directors directly affects the corporate governance mechanism (Edvinsson, 2013, p.160).

Ho and William (2003) analyzed the data of listed companies of three economies (Sweden, South Africa and UK) to explore the relationship and interdependency of board structure and intellectual capital efficiency. The results show that board of directors is an important factor of human capital and intellectual capital efficiency and value added intellectual capital (VAIC) is significantly affected by board composition. An empirical analysis conducted by Cerbioni and Parbonetti (2007), found that intellectual capital disclosures has positive effect on non-executive directors proportion; whereas, board size, board structure and CEO duality have negative relationship with disclosures of intellectual capital.

A recent study by Appuhami and Bhuyan (2015) examined the relationships of corporate governance on intellectual capital in service firms of Australia. The results reveal that board composition, CEO duality and remuneration committee composition have positive significant relation with IC efficiency; while audit committee composition and board size have insignificant association with IC. IC not only increases by investment in intangibles but coordination, cooperation and competition with other organizations also provide opportunity to create and enhance IC. Collective intellectual capital with other firms improves the individual intellectual capital of firms (Vale et al., 2016).

In light of the above discussion following hypotheses are developed.

*H1: Board size has a positive impact on intellectual capital.*

*H2: CEO duality has a positive impact on intellectual capital.*

*H3: Non-Executive Directors have positive impact on intellectual capital.*

*H4: Independent Directors have positive impact on intellectual capital.*

*H5: Directors' Ownership has positive impact on intellectual capital.*

### ***2.2.3 Intellectual Capital and Financial Performance***

Intellectual capital is a vital invisible driver of firm's performance. It plays a significant role in improving overall performance of firms of various sizes and nature, but it explicitly exists in large firms. Firms surviving in developed economies have a formal shape, classification and reporting system of their intellectual capital, while small firms and majority of firms in emerging economies do not report their intellectual capital in their reports (Pulic, 1998). However, firms of developing economies show interest to have knowledge about their intellectual capital efficiency (Chen et al., 2008) and its relationship with sustainability (Akhtar, et al. 2015).

Theoretically, intellectual capital has a strong base while empirically its importance to financial performance is still questionable (Bontis, 2001). This may be due to three reasons: First, lack of appropriate measurement method for extracting absolute value of intellectual capital; second, different analyses are conducted in different contexts and time, results may vary with time, place and economical conditions that affect financial terms; third, because of time-delay effect of intellectual capital, it is necessary to investigate financial performance of firms after several years of investment in intellectual capital (Dženopoljac et al., 2016).

Most of the empirical studies on intellectual capital are conducted industrial sector wise. Vishnu and Gupta (2014) highlight three most preferred industries for empirical investigation effect of intellectual capital on firm's performance: Information Technology, Pharmaceuticals and Banking & finance.

Yong et al., (2009) conducted study on commercial banks of eight Asian countries and found that human capital with physical capital plays a role of shield during crisis. Mondal and Gosh (2012) found that IC plays a significant role in development of productivity and profitability of banks. Moreover, human capital, a major determinant of financial performance is considered in Indian banks.

Sharabati et al., (2010) conducted a survey based study of pharmaceutical industry of Jordan. They explored and analyzed the views of middle and top level managers and concluded that intellectual capital jointly contributes to business performance. An extensive study conducted by Vishnu and Gupta (2014) investigated the Indian pharmaceutical firms to define the relationships between indicators of IC and financial performance and proposed some modified VIAC<sup>TM</sup> models. Results of their study summarized intellectual capital as having positive effect on the firm's performance; however, Return on Sales (ROS) was less significantly associated with IC.

Wang et al., (2014) explored the mediating role of intellectual capital between knowledge sharing and firm's operational & financial performance of high technology Chinese firms. The study revealed that IC acted as a mediator between knowledge sharing and corporate performance; explicit knowledge sharing significantly affected human capital and structural capital; while tacit knowledge sharing influenced IC and all the components of IC significantly impacted corporate financial and operational performance. Furthermore, in mediating role of IC, sharing of tacit knowledge was found to have greater influence on financial performance, while sharing of explicit knowledge had stronger positive relation with operational performance. A recent study conducted by Cleary and Quinn (2016) also found positive significant relations between IC and financial performance of SMEs.

In conclusion of the studies, it is clear that most of the literature used three dimensional measures of intellectual capital; human capital, structural capital and relational capital and VAIC<sup>TM</sup> is frequently used measurement method for IC.

Following hypotheses are developed for relationship of intellectual capital and financial performance based on the above discussion.

*H6: HCE has positive impact on financial performance*

*H7: SCE has positive impact on financial performance*

*H8: CEE has positive impact on financial performance*

In light of the literature it can be summarized that corporate governance (CG) and Intellectual capital (IC) are significant factors to financial performance. Although there exists ample literature on corporate governance, intellectual capital and financial performance, but there are no ideal standards identified for corporate governance. There are some unobservable firm specific factors related to performance of the firm. Therefore, CG influences financial performance differently in different countries and even different sectors of the same country are influenced differently by the same code of corporate governance. Therefore, each country formulates its own code of corporate governance according to its context and betterment of corporate sector. The recent direction of research about corporate governance is to search the linkage of IC with CG and financial performance. It is confirmed that CG and IC are significant factors to financial performance; however, there is lack of empirical evidences about their structural links.

### **3. Methodology**

#### **3.1 Sample and Data**

A panel data set of 27 listed banks with time series of 2008-2015 is used for empirical analysis. However, there are more than 50 banks listed in Pakistan Stock Exchange, but in the present study only those commercial and Microfinance & Investment banks are included which operated in the mentioned period with same name. The data of variables are extracted from annual reports of the banks. Moreover, the banks are divided into two groups (commercial banks and Microfinance & investment banks), and data is analyzed separately for both the groups. Group of commercial Banks included 19 Banks, while Microfinance & investment banks included 8 banks.

#### **3.2 Econometric Model**

The study first investigates the impact of corporate governance on intellectual capital and then impact of intellectual capital on financial performance. Following expressions show the general form of the econometric model used.

##### *Corporate Governance (CG) and Intellectual Capital (IC)*

To check the impact of CG on IC, we have used the following models. The models are also used by Ho and William (2003), Appuhami and Bhuyan (2015), however, the model is modified with inclusion of control variables and replacement of different indicators of corporate governance.

$$VAIC_{it} = \alpha + \beta_1 BS_{it} + \beta_2 CD_{it} + \beta_3 NonED_{it} + \beta_4 IND_{it} + \beta_5 OwnD_{it} + \beta_6 Size_{it} + \beta_7 LV_{it} + U_{it}$$

##### **3.2.1 IC and Financial performance**

To check the impact of components of intellectual capital on each measure of financial performance following models are developed which are used by Yong et al., (2009), Mondal and

Gosh (2012) and Wang et al., (2014); however, these models are modified by adding controlled variables.

$$ROA_{it} = \alpha + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Size_{it} + \beta_5 LV_{it} + U_{it}$$

$$ROE_{it} = \alpha + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Size_{it} + \beta_5 LV_{it} + U_{it}$$

$$Tobin's\ q_{it} = \alpha + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Size_{it} + \beta_5 LV_{it} + U_{it}$$

### 3.2.2 Diagnostic Tests

Modified Wald test is commonly used for checking the heteroscedasticity in variances of residuals because it takes into account the group specific effects of panel data (Maury, 2005). Similarly, Wooldridge test is appropriate for checking the auto correlation in residuals in panel data as it considers the cross-section specific effects (Gujrati, 2004). The results of both the test show that heteroscedasticity and autocorrelation exists in the pooled data.

$$H_0: \delta_i^2 = \delta^2 \text{ for all } i$$

$$H_1: \delta_i^2 \neq \delta^2 \text{ for all } i$$

Modified Wald Test	
chi2 (28)	8833.7
Prob>chi2	0.0000

$$H_0: \text{There is no autocorrelation}$$

$$H_1: \text{There is auto correlation}$$

Wooldridge Test	
F-stat	5.3974
P-value	0.0002

### 3.2.3 Estimation Method

Keep in view the diagnostic tests of data we can easily observe that simple OLS cannot be BLUE estimator for the data. Any model of panel data is not considered same as in case of Time series data and cross section data, because it tag to have two subscripts- i and t – where i shows individual/ unit of analysis and t represents time dimension (Baltagi, 2008). The error term of Panel model consists of three components – Individual specific effects ( $\mu_i$ ), time specific effect ( $\lambda_t$ ) and other disturbance ( $v_{it}$ ).

$$Y_{it} = \alpha_{it} + \beta_{it} X + U_{it}$$

Where  $U_{it} = \mu_i + \lambda_t + v_{it}$

$\mu_i$  = Cross section effects

$\lambda_t$  = Time specific effects

$v_{it}$  = other random errors

On the basis of these unique effects of panel data, two different models are there to deal with cross-sectional effects:

1. Fixed Effect model
2. Random effect model

### **3.2.4 Fixed Effect Model**

Fixed effect mode allows different intercepts for each cross-section included in the study, which allows heterogeneity of each cross-section to have its own intercept; the word “fixed” is used because the intercept may differ across each cross-section but remains fixed over time (Gujarati & Porter, 2009). Moreover, the fixed effect assumed cross-section effect ( $\mu_i$ ) to be fixed parameter, and to avoid dummy-trap (perfect multicollinearity) the dummy variable is introduced to take one cross-section as base – that is obtaining no. of cross-section -1 dummies (Baltagi, 2008, p.14).

The equation for fixed effect with cross-sections dummy can be specified as:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + u_{it}$$

Where  $\alpha_i = \alpha_1, \alpha_2, \alpha_3, \dots, \alpha_n$ ; and n is number of cross-sections.

The fixed effect model assumes that the covariance between independent variables and cross-sectional specific effects is not equals to zero.

$$Cov(u_{it} / X_{it}) \neq 0$$

Gujarati & Porter (2009) also provide an alternative way to adjust the fixed effects by obtaining “de-meanded values or mean corrected values”. In this method fixed effect are adjusted by differencing the sample values from the sample means of each cross-section (p.599). This model can be specified as follows:

$$Y_{it} = \alpha + \beta_1 X_{it} + u_{it}$$

The fixed effect mode with dummy variables is useful in comparison of cross-sections (Ballotage, 2008) but to avoid too many factors, which reduce the degree freedom, fixed effect through difference is useful. The study is not interested in comparison of cross-sections, therefore, fixed effect mode with difference method is used.

### **3.2.5 Random Effect Model**

The fixed effect model has too much parameters (explanatory variables + dummy), which cause reduction of degree of freedom. To avoid this, cross-section effect ( $\mu_i$ ) can be assumed (Ballotage, 2008, p.17). The random effect model allows a single intercept based on mean value of all the intercepts and differences in the intercepts of different cross-section become part of error term. In more detail, the intercept of each cross section in fixed effect model is equal to sum of common intercept in random effect and  $i_f$  (random error term). This model is most appropriate when random sample is extracted from a large population. The random effect model assumes that there is no association between cross section specific effects and independent variables.

$$Cov(u_{it} / X_{it}) = 0$$

The general model of Random effect can be expressed as:

$$Y_{it} = \alpha_{it} + \beta_1 X_{it} + u_{it}$$

Where  $\alpha_{it}$  is value of intercept with mean value of all intercepts in fixed effect model. And it can be presented for each entity as:

$$\alpha_{it} = \alpha_i + V_{it}$$

### 3.2.6 Hausman test

Fixed effect and random effect models are associated with panel structured data set. It is not easy to choose which one is best for a specific data set, especially when number of cross section is greater than number of time series (Gujarati & Porter, 2009). Hausman (1978) provides test for selection of random and fixed effect model. The random effects model is appropriate for data if  $H_0$  is accepted, and fixed effect model if null Hypothesis is rejected, but the philosophy of the test is that it compare the results of OLS and De-meaned estimates (Baltagi, 2008, p.22 ). The null Hypotheses of the test is  $H_0: E(u_{it} / X_{it}) = 0$ , under random effect model where cross-section effects are part of  $u_{it}$ , The acceptance of the null Hypotheses means error term are uncorrelated with independent variable, hence independent variables do not vary with respect to cross section- and therefore random effect is appropriate, while the rejection of the test shows some independent variables correlated with error term which leads to endogeneity problem and hence fixed effect model is appropriate (Baltagi, 2008, p.72).

### 3.3. Model Specifications

Diagnostic tests confirm that data has the problems of heteroscedasticity, autocorrelation and endogeneity. Moreover, some independent variables are not linearly associated with dependent variables. Therefore, for the empirical model Generalized Least Square (GLS) and Generalized Method of Moment (GMM) are used in the study to address the above mentioned problems. GMM is only applied to combined model which includes all the components of IC and CG where endogeneity is serious problem.

#### 3.3.1 Generalized Least Square (GLS)

In field of finance and economics usually OLS estimator for coefficients considered not best because it does not take into account the groups variations; more specifically it provide no detail information about variations occurred cross-sectional wise or time series (Gujrati, 2004). Addition of weight with respect to different groups make it become BLUE estimator but now it named as “Weighted Least Square” or “Generalized Least square”. GLS includes the variances of different groups to control cross-section specific variations.

$$\sum w_t U_i^2 = \sum w_t (Y_i - \beta^1 - \beta^2 X_i)^2$$

Where  $w_t = 1/\delta_i^2$

For the study, GLS equation can be expressed as

$$Y_{it} = \alpha_{it} + \beta x_{it} + w_{it} U_{it}$$

Where  $Y_{it}$  represents the dependent variable which is financial performance and VAIC while  $X_i$  represents independent variable which are CG and IC in above mentioned equations.

### 3.3.2 Remedial for Heteroscedasticity and Autocorrelation in GLS

To adjust the heteroscedasticity problem due to cross section specific effects and autocorrelation problem due to time series effects, GLS weights are included in the model, and also taken into consideration the fixed effects and random effects of cross-sections.

$$\sum \frac{U_{i2}}{\delta_{i2}} = \left[ \frac{Y_i}{\delta_{i2}} - \beta^1 \frac{X_i}{\delta_{i2}} \right]^2$$

Table 1: Measurements

		Name of variable	Symbol	Measurement
Dependent Variable	Financial performance	Return on Asset	ROA	$\frac{\text{Net income less 187erm187rred dividend} + \text{Dep}}{\text{Book value of total Assets}}$
		Return on Equity	ROE	$\frac{\text{Net income less 187erm187rred dividend}}{\text{Total common equity}}$
		Tobin's q	Tobin's q	$\frac{\text{MV of equity} + \text{long 187erm debt}}{\text{total assets}}$
Independent variable	Corporate governance	Board size	BS	Total number of board members
		CEO duality	CD	1=CEO dual role exist 0= otherwise
		Non-executive directors	NonED	$\frac{\text{Number of non – executive directors in board}}{\text{Total numbr of members in board}} \times 100$
		Independent directors	IND	$\frac{\text{Number of Independent directors in board}}{\text{Total numbr of members in board}} \times 100$
		Directors Ownership	OwnD	$\frac{\text{no. of shares held}}{\text{Total no. of shares}} \times 100$
Intellectual Capital		Human capital efficiency	HCE	$\frac{VA}{HC}$
		Structural capital efficiency	SCE	$\frac{SC}{VA}$
		Capital employed efficiency	CEE	$\frac{VA}{CE}$
		Value added intellectual coefficient	VAIC	$HCE + SCE + CEE$
Control Variables		Bank size	Size	Ln (total assets)
		Leverage	Lv	Total debts/book value of equity

#### 4. Results and Discussion

Descriptive statistics is performed to visualize the nature, trend and dispersion of distribution of each variable to provide a snapshot of the data covering period from 2008-2015. The table 2 shows the summary of descriptive statistics of each variable.

Table 2: *Descriptive Statistics*

Variables	Commercial Banks				Micro Finance & Investment Banks			
	Mean	Maximum	Minimum	Std. dev	Mean	Maximum	Minimum	Std. dev
ROA	1.1342	34.6778	-6.1528	3.2824	-3.5616	25.11459	-34.8768	8.9179
ROE	8.2909	100.1582	198.9325	30.4689	31.3413	503.1162	1459.2242	204.7951
TOBINQ	1.9084	24.7409	0.1132	3.6306	0.9923	2.2514	0.3532	0.2803
HCE	4.9968	11.5186	0.6592	2.1298	3.0502	25.4582	-1.9538	3.9922
SCE	0.7478	0.9132	-0.5173	0.1782	-0.1862	10.5879	-8.9145	2.6099
CEE	0.7045	4.7683	0.0256	0.5543	18.4702	205.9699	-0.8086	42.0163
BS	8.5024	13	6	1.1353	7.5278	10	5	1.1003
CD	0.0264	1	0	0.1607	0.03	1	0	0.1454
NonED	59.5023	85.7143	18.1819	15.6918	58.8512	87.5	12.5	19.6658
IND	20.6733	75	0	0.1789	21.47	71.43	0	0.1947
OwnD	6.2652	67.5	0	12.4992	16.7748	81.33	0.001	18.5913
SIZE	11.4903	76.7509	0.0687	8.6612	8.4907	12.2222	5.2635	1.8009
LEV	11.49	76.75	0.07	8.66	8.7775	121.805	-12.7355	17.7827

Table 3 shows the regression results of CG and IC. Corporate governance shows stronger relationships with IC than with financial performance. It has adjusted R-square of 47% with ROA, 61% with ROE and 57% with Tobin's q in commercial banks, while 45% with ROA, 52% with ROE and 44% with Tobin's q in micro finance and investment banks as shown in table 4.7. While on the other hand CG has adjusted R-squared of 71% with VAIC in commercial banks and 70% in micro finance and investment banks. While at the sequence IC has stronger relations with financial performance than CG. These results validate the mediation effect of IC between CG and financial performance.

Board size (BS) has positive impact on VAIC in both groups of bank, but insignificant in large banks and significant in micro finance and investment banks at 5% level of significance, which indicate that board size significantly improves the VAIC in micro finance and investment banks, and accept the accept H1 in light of the results. These results are in line with the findings of William (2003) and contradictory to Cerbioni & Parbonetti (2007).

Coefficient of CEO duality (CD) is positive with VAIC but insignificant in both commercial banks and micro finance and investment banks. Hence H2 is not accepted at 5% level of significance. Same results are provided by Tseng and Lin (2010). Although literature give importance to CD in less developed countries but here the insignificant relationship may be due to existence of very few cases of duality in the data set.

Proportion of non-executive directors (NonED) and Independent director (IND) has positive and significant relationship with VAIC at 5% in commercial banks. This indicates that proportion of nonexecutive directors on board increase the VAIC significantly and is in line with the study of

Tseng & Lin (2010), who found that board independence measured by NonED and IND improve the intellectual capital of company. Board independence may create agency problems but enable effective monitoring and control system and hence improve the HCE and overall IC efficiency (Makki & Lodhi, 2014). The case is slightly different for micro finance and investment banks. Here in micro finance and investment banks, NonED has negative impact but insignificant to VAIC, which may indicate that in micro finance and investment banks, NonED cause increase in expenses but do not increase value creation accordingly. In light of these results H3 is accepted only in case of commercial banks and H4 is accepted in case of both groups of banks.

Table 3: *Regression Results (CG & IC)*

Variable	Commercial Banks		Micro finance and investment banks	
	Coefficient	Prob.	Coefficient	Prob.
C	8.194	0.000	-12.962	0.000
BS	0.089	(0.002)***	0.485	(0.021)**
CD	0.601	0.564	2.076	0.652
NonED	0.019	(0.023)**	-0.014	(0.095)*
IND	0.452	(0.010)**	2.294	(0.049)**
OwnD	-0.017	0.378	0.056	(0.008)***
SIZE	-0.258	0.127	1.419	(0.000)***
LEV	0.031	(0.015)**	0.012	0.435
R-squared		0.796		0.754
Adjusted R-squared		0.715		0.701
F-statistics		8.677		12.997
Prob (F-stat)		0.000		0.000
Hausman test (chi-sq)		17.321		36.451
P-value (chi-square)		0.009		0.001

Controlled variables show positive but insignificant impact on VAIC with combination of CG in commercial banks, while in case of micro finance and investment banks size positively associated with VAIC. The percentage ownership of directors has negative but insignificant impact on VAIC in case of commercial banks, while positive and significant in case of Microfinance and investment banks. Therefore H5 is only accepted in case of Microfinance and investment banks.

Table 4 shows the regression results of financial performance measured by ROA, ROE and Tobin's q regressed by component of IC that is human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE), of commercial banks for period 2008 to 2015. The results show that components of IC cause significant variation in financial performance. HCE has negative and statistically significant coefficient in case of ROA and Tobin's q while it has negative but insignificant impact on ROE, suggested that investment in more human capital negatively impact the financial performance measured by ROA, ROE and Tobin's q. These results are contradictory to the studies of Mondal and Gosh (2012) and Vishnu and Gupta (2014) who argue that human capital is major contributor to financial performance. This may be due to losses suffered by some banks like BOP, NIB and Bank Islami.

On the other side, SCE has positive significant and significant impact with ROA and ROE, means that invest more in structural capital improve the accounting performance. The results are consistent with Shiu (2006). Coefficient of SCE is negative with financial performance measured by Tobin's q, at 5% level of significance, suggest that SCE improve the accounting performance but declines the market value. Most of the commercial banks focus to improve their accounting performance with improvement in SCE, and negative relationship with Tobin's q is support by data set itself that average SCE get increase from 2008 to 2015 while average value of Tobin's q touch peak in 2011 and 2012 and then show slight decrease to 2015. Keep in view the results H6 is not accepted while H7 is accepted at 5% level of significance in case of commercial banks.

Table 4: Regression Results (IC &amp; FP for Commercial Banks)

Commercial Banks						
Variable	ROA		ROE		Tobin's q	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-9.488	0.003	-12.171	0.000	1.312	0.034
HCE	-0.193	(0.047)**	-3.393	(0.093)*	-0.079	(0.004)***
SCE	3.163	(0.002)***	21.444	(0.000)***	-0.275	(0.003)***
CEE	19.614	(0.001)***	24.200	(0.001)***	12.974	(0.006)***
Size	0.691	(0.000)***	13.264	(0.001)***	0.027	0.564
Lv	-0.063	(0.001)***	-2.618	(0.002)***	-0.001	0.163
R-squared		0.726		0.719		0.684
Adjusted R-squared		0.680		0.662		0.609
F-statistics		19.448		6.243		30.860
Prob(F-stat)		0.000		0.000		0.000
Hausman test (chi-sq)		2.498		23.321		31.324
P-value (chi-square)		0.777		0.000		0.000

Results provide evidence that CEE is most effective component of IC that contribute in financial performance measured by ROA, ROE and Tobin's q. Coefficient of CEE is positive and significant at 5% level of significance with all the indicators of financial performance, which emphasize that higher value of CEE enable banks to have higher ROA, ROE and Tobin's q, and hence H8 is accepted.

To summarize, it may be concluded that the commercial banks focus to improve their performance by using policies that enhance SCE and CEE and make it easier to access by customers and brings automations by investing in technological capital, which is a part of SCE. HCE is a significant contributor that develops the other two components of IC (Jardon & Martos, 2009) but in the current study, the negative impact may be due to losses of some banks for some years that impact inversely HCE by placing lower value of value added against larger human capital.

The results also provide evidence that controlled variables (size and leverage) also have significant relations with financial performance indicators ROA and ROE but insignificant association with Tobin's q. Size shows positive significant effect with ROA and ROE which shows that larger the size, larger will be ROA and ROE with combination of components of IC. Inversely, Leverage (Lv) has negative significant coefficient with ROA and ROE, which may be due to use of more debt, the banks also have higher interest expense.

Table 5 shows the empirical results for financial performance of micro finance and investment banks regressed by components of IC HCE, SCE and CEE. In micro finance and investment banks the results are different as of commercial banks. The coefficient of HCE is positive with all indicators of financial performance, suggesting that HCE is an important component to improve financial performance in micro finance and investment banks. These results are supported by the studies of Jardon and Martos (2009), Phusavat et al. (2011). The coefficient of HCE is positive with ROA and significant at 5% level of significance. Similarly, HCE has positive impact on ROE which is significant at 10% level of significance. At the same time, HCE has positive and significant coefficient in case of Tobin's q, which shows that increase in HCE, tends to improve the market performance of micro finance and investment banks.

*Table 5: Regression Results (IC & FP of Microfinance and Investment Banks)*

<b>Micro Finance and Investment Banks</b>						
<b>Variable</b>	<b>ROA</b>		<b>ROE</b>		<b>Tobin's q</b>	
	<b>Coefficient</b>	<b>Prob.</b>	<b>Coefficient</b>	<b>Prob.</b>	<b>Coefficient</b>	<b>Prob.</b>
C	-4.654	0.520	0.389	0.992	1.591	0.000
HCE	0.615	(0.013)**	0.947	(0.077)*	0.009	(0.004)***
SCE	-0.174	0.463	0.684	0.163	0.021	0.269
CEE	14.402	(0.002)***	21.885	(0.002)***	-0.550	(0.005)***
Size	0.389	0.635	13.181	(0.000)***	-0.090	(0.001)***
Lv	-0.042	0.239	-8.310	(0.001)***	0.000	0.938
R-squared		0.473		0.601		0.656
Adjusted R-squared		0.410		0.511		0.579
F-statistics		2.098		6.716		8.513
Prob (F-stat)		0.004		0.000		0.000
Hausman test (chi-sq)		20.320		9.550		15.164
P-value (chi-square)		0.000		0.039		0.010

In case of micro finance and investment banks, SCE has insignificant relationship with all of three indicators of financial performance. This shows that micro finance and investment banks do not focus on SCE on improving SCE; it may be due to the small financial resources. In light of the above results H6 is accepted while H7 is not accepted. CEE has positive and significant impact on all three indicators of financial performance ROA, ROE and Tobin's q at 5% level of significance, which means that CEE is a major component of IC to contribute in financial performance. CEE has positive significant relationship with financial performance in both classes of banks, and therefore H8 is accepted.

Size of bank (size) has positive but insignificant relation with ROA and positive significant relation with ROE, suggesting that banks have more assets and higher accounting performance. While the coefficient of size is negative significant with Tobin's q at level of 5%. Another control variable leverage (Lv) has negative relationship with all three proxies for financial performance that is use of more debts negatively influences the financial performance, which may indicate that the micro finance and investment banks have lower ability to utilize the debts and suffer only its expenses.

## 5. Conclusion

The core objective of the study was to investigate the relationship of corporate governance (CG), intellectual capital (IC) and financial performance (FP) in banks listed in Pakistan stock exchange. The data of 27 banks are used for empirical analysis. Due to difference in nature and scope of business the banks are divided into two groups: Commercial Banks and Microfinance & investment banks and the results are extracted separately for each group. GLS technique is applied to estimate the model. Results show that corporate governance has significant and positive impact on intellectual capital in both groups of banks, however, there is difference in significant factors of corporate governance for each group. At the same time intellectual capital also has significant positive impact on financial performance. Micro finance and investment banks are found to take the advantage of Human Capital Efficiency (HCE), while large banks improve their performance with the help of Structural Capital Efficiency (SCE). Capital Employed Efficiency (CEE) is found to be a significant factor in both groups of banks.

Board independence is concentrated factor in view of intellectual capital and hence financial performance. In the banking sector, board independence tends to have a higher intellectual capital and hence better performance. Those banks which maintain higher ratio of independent directors will have better financial performance. Board independence increases expenses of a company but enable a good controlling system to formulate policies and procedures to reduce the agency problems between management and owners. Similarly, Board ownership also shows significant association with intellectual capital.

The findings also validate and contribute towards Stakeholders theory, which takes into account all types of relational networks of a company. It has been seen that corporate governance improves the IC efficiency and structural capital efficiency. Hence, it is most significant factor in commercial banks. Structural capital is the combination of Relational capital and Organizational capital; therefore, we can say that large banks improve their performance by investing more in relational capital and give importance to all parties associated with the company. The structural capital efficiency management also makes it easy to approach outside resources, which support Resource Dependency Theory.

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