

## **Strategic Resources and Firm Performance: An Application of the Resource Based View**

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### **Abstract**

*Under the influence of the framework that defines the Resource Based View, the purpose of this paper is to examine the contribution of the strategic resources (intellectual capital) that create value for the firm. More specifically, we assess the effect of intellectual capital on operating, financial and stock market performance of the firms listed in the personal goods sector of Pakistan Stock Bourse, for the period of 2005 to 2014. The notion of intellectual capital is measured by intellectual capital efficiency, and the “value added intellectual coefficient” method proposed by Pulic (1998), which comprises of capital employed efficiency, human capital efficiency, and structural capital efficiency. The results depict that intellectual capital has a significant, positive effect on operating and financial performance of the firms, while capital employed resources have an insignificant, and mixed effect on operating and financial performance of the firms. This means that the more the firms will accumulate intellectual capital resources, the higher will be their operating and financial performance. Capital employed resources have a significant, positive effect on stock market performance of the firm, and intellectual capital also affects stock market performance, but this relationship is insignificant in nature. The accumulated effect of all the resources (physical & intellectual) shows a positive relationship with the performing areas of the firm in the sector.*

**Keywords:** Resource based view; intellectual capital, capital employed efficiency, human capital efficiency, social capital efficiency.

**JEL Classification:** J24, L25, O34.

### **1. Introduction**

The Resource Based View (RBV) is the outcome of the exertions of numerous researchers (Amit & Schoemaker, 1993; Eisenhardt & Martin, 2000; Henderson & Cockburn, 1994; Wernerfelt, 1984). Barney (1991), among others, argued that firm resources, including all assets, capabilities, organizational

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processes, firm attributes, information, knowledge, etc., generate a sustainable competitive advantage. These resources are controlled by firms that enable the firm to conceive, and implement strategies that improve its efficiency and effectiveness (Daft, 2012). These capabilities are bundled into tangible and intangible assets, and a sustainable competitive advantage can be generated by valuable, rare, imperfectly imitable and non-substitutable resources (Barney, 1991). It is assumed by the Resource Based View that the available stocks of resources, whether in the ownership or control of the firm, and the potentiality of the firm to deploy these resources, are heterogeneously dispersed and improperly moveable (Amit & Schoemaker, 1993).

The Resource Based View states that the strategic resources are bound to enjoy returns that are greater than the average, preserving the sustainable competitive advantage to the firms having these resources (Peteraf, 1993; Wernerfelt, 1984). The explicit type, size and nature of these strategic resources define the profitability of a firm (Amit & Schoemaker, 1993). To assimilate, synchronize, and activate those resources and capabilities effectively, a firm needs to possess tacit knowledge that is rooted in the firm's internal procedures (Grant, 1991). Specific knowledge of the firm is reflected as a significant strategic strength that would be positively linked with greater levels of performance, (Bierly & Chakrabarti, 1996; Nonaka & Takeuchi, 1995; Teece, 1998). From this perspective, a new concept of strategic importance in the context of strategic management, i.e. The Knowledge-Based View of a firm, is initiated.

Referring to the studies conducted by Leonard and Sensiper (1998), knowledge is the information which is related, executable and based, at least somewhat, on experience. Due to the inclusion of circumstantial material, mounted experience, values, and expert understandings (Davenport & Prusak, 1998), knowledge decreases ambiguity (Uit Beijerse, 1999). Polanyi (1966) and, Nonaka and Konno (1998) deduced that knowledge is the most influential and powerful capability of a firm. A new, knowledge-based economy was a phenomenon that was attributed by Stewart (1997) and Zeghal (2000), in terms of an investment in employees, research activities, building customer relationships and administrative system. In the context of the knowledge based view, intellectual capital was referred to as the resources that were associated with knowledge, and were supposed to be the key drivers for superior firm performance (Sardo & Serrasqueiro, 2017; Curado, Henriques & Bontis, 2011; Díaz-Fernández, González-Rodríguez & Simonetti, 2015; Subramaniam & Youndt, 2005; Teece, 2000). The importance of Intellectual Capital (henceforth IC), for value creation, was also extended by Sveiby (1997) and Lynn (1998).

Kenneth Galbraith presented the concept of IC for the first time in 1969 (Bontis, 1998) however, there is still a need to establish a generally accepted definition, or categorization of IC (Bhartesh & Bandyopadhyay, 2005; Canibano, 2000; OECD, 2006). Considering its significance, the constituents of IC were defined, and categorized in the late 1990s. Stewart (1997) defined IC as “packaged useful knowledge”, whereas, Edvinsson (1997) expanded the definition of IC to “knowledge that can be converted into value”. Succeeding these authors, Zéghal and Maaloul (2010) describe IC as being the “totality of entire knowledge a firm is capable to use, in the course of steering business to create value – a Value Addition for the firm”. Sheikh, Sheikh and Sheikh (2004), Sheikh and Sheikh (2004) took IC as a “knowledge that can be transformed into value or intellectual matters, like intellectual property”. Value generated on the bases of knowledge refers to the extent of observation that a probable customer possesses. The research work led by Edvinsson (1997) and Stewart (1997) was aimed towards a standardized categorization of the constituents of IC. Conferring to their ideas of classification, IC is classified into human capital (henceforth HC), and structural capital (henceforth SC). The first category of IC, i.e. HC, refers to knowledge and expertise in the form of the qualifications and abilities of firm personnel. This knowledge moves with the employees, wherever they go and perform their duties; and whatever is leftover in the form of knowledge, after employees moves out of the firm, is referred to as the second constituent of IC, i.e. SC. This is primarily associated with business intelligence, data bases, transformational methods, models and various forms of techniques used for interaction between a firm and its stakeholders. As per the ideas presented by Ashton (2005), the mentioned classification is the one which is often referred to, and used in the literature. Empirical theories state that a firm can enjoy a competitive advantage, if it holds efficient strategic resources. Initially, the capital employed (physical and financial), was only considered to fall in the category of strategic resources. However, over a period of time, when the Resource Based Theory came under discussion with the scholars, HC and SC, under the umbrella of IC, were also regarded as strategic resources, and necessary for obtaining the competitive advantage. (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984)

Based upon the above literature, components of strategic resources under the Resource Based View are categorized into three categories: physical capital resources, human capital resources and organizational capital resources (Barney, 1991; Becker, 1964; Tomer, 1987; Williamson, 1975) whereas, as per the IC based view, strategic resources only include human capital resources and structure capital resources (Reed, Lubatkin &

Srinivasan, 2006; Riahi-Belkaoui, 2003). Therefore, the IC based constituents are in accordance and consistent with the Resource Based View. Pulic (1998, 2000, 2004) alongside other associates at the Austrian IC Research Center, augmented the significance of the IC, by building a technique to quantify firms' IC, which is now generally called the "Value Added Intellectual Coefficient" (VAIC) (Ozkan, Cakan, & Kayacan, 2017). The scheme was further advanced by Bornemann, Knapp, Schneider and Sixl (1999). The productivity and efficiency of the value addition in firms' total resources is effectively monitored and evaluated by this technique (Bornemann et al., 1999; Pulic, 1998). This method is regarded as a robust approach to calculate the contribution of each of the strategic resources – physical, financial, human, and structural – which add value to the firm. This method assumes that a firm is not a constant system, rather a dynamic and ever varying system, where employees are considered a prime resource for creating value for the firm.

Firms equipped with knowledge intensive resources are more competitive, as compared to those which do not have access to such resources. The global scenario of production is thriving on heavy competition, and is rapidly changing due to the achievements in terms of the technological advancements, and new competitive concepts that are a result of intensive research and development. Firms in the developed nations have consistently focused on knowledge based production, while this phenomenon is comparatively less followed, and studied in developing countries. Although developing economies usually do not focus aggressively on establishing knowledge intensive resources, they are now, somewhat seeking to acquire strategic resources through knowledge, perhaps because of the global, competitive pressure. The scientific studies focusing on the knowledge-performance relationship in the developing world context can add value to the policy debates in these countries. This study investigates this very relationship for an important developing country; Pakistan. To achieve sustainable growth, Pakistan is bestowed with all the required strategic resources (natural and man-made), with respect to the manufacturing, trading and servicing industries. Out of the thirty five listed sectors, the largest contributory sector, and exporter in the national exchequer of Pakistan is the textile sector. Despite its contribution with respect to the production of cotton, and the products associated with it, the number of firms, employment, and potential growth, this sector is ignored by the government and policy makers, when it comes to recognizing the role of knowledge in its performance. The core objective of this study is to bridge this gap, by analyzing the productivity of intellectual capital resources, in

adding value to the performance of the firms, (operating, financial and stock market performance) in the textile sector of Pakistan.

The remaining layout of the paper is as follows. Section 2 provides the literature review, and the hypotheses construction. Section 3 discusses the measurement of variables used in this study. Data sets and the descriptive statistics are reported in section 4. Section 5 discusses the regression results, and section 6 concludes the paper.

## **2. Literature Review**

The Resource Based View is at the heart of the research studies discussing the associations between firm resources and achievement of competitive advantage (Alexy, West, Klapper & Reitzig, 2018; Newbert, 2008). Carter and Toms (2010) argue that resource based view is a complete and consistent theory of firm behavior. Carter and Toms (2010) empirically studies the associations between value, rareness, competitive advantage, and performance by taking a sample of 664, micro and nanotechnology firms from 2003 to 2004. The results suggest that value and rareness are significantly linked to competitive advantage, and this competitive advantage, in turn, is related to the performance of the firm.

The empirical works show that human capital accumulations, and investments, can considerably affect organizational performance (Hitt, Biermant, Shimizu & Kochhar, 2001). But the literature available, provides fewer theoretical and experimental direction showing how human capital losses (resource depletion) can adversely impact the organizational performance. The Resource Based View scientists stress upon the building of human capital in order to reap competitive advantages, but they overlook the dangers associated with the efforts of resource accumulation (Shaw, Park & Kim, 2013). Analyzing the Resource-based standpoint on the interactions between human capital losses, investments and workforce productivity, Shaw et al. (2013) discover that when investments in employees are high, the adverse effect of human capital losses on firm's productivity is relatively weak. The relationship is insignificant when the investment in human resources are low, human capital losses.

Kamboj, Goyal, and Rahman (2015), taking the response from Indian managers, belonging to various sectorial firms, assert in their empirical studies, that marketing and operational capabilities of a firm have a significantly affirmative impact on its financial performance. Moreover, investigating the mediating role of competitive advantage and supply chain

management on the above mentioned relation, they find a significant and positive mediating role. Measuring the mediating role of intangible capabilities between corporate responsibility, and financial performance on 599 firms, from 28 countries, Surroca, Tribó and Waddock (2010) strengthen the Resource Based View framework, by elaborating that socially responsible firms are more capable and profitable, as compared to the ones that are irresponsible in this aspect. In the context of non-profit organizations, Bontis, Bart and Kong (2007) analyze the suitability of the Resource-Based View, industrial organization, balanced scorecard, knowledge-based view and intellectual capital, on the non-profit sector, and conclude that IC is more operational as compared to other strategic management notions especially when it comes to achieving sustained strategic advantages.

Empirical work mostly illustrates that IC significantly increases the value addition (hereafter VA) created by a firm, and hence is significantly related to its performance (Pucci, Simoni & Zanni, 2015). The investigation of Pulic (1998) on Austrian organizations reports a high connection between VA and IC, while it is low between VA, and capital utilized (physical and financial assets). This relation advocates the concept, in a new, knowledge-based economy, that IC is an important cause of value creation for the firms. Stewart (2002) concludes that the capacity of the resources in a firm determines the direction of its performance, when it comes to generating VA. In a study conducted by Riahi-Belkaoui (2003) on IC as a vital asset to deliver VA for the US worldwide firms, a significant connection between IC, and prospect execution is featured. The outcome of the study of Chen, Zhu and Yuan Xie (2004) specifies that firms with more emphasized IC, are more competitive as compared to other firms, and also more lucrative in the sight of investors. After using statistics from 150 publicly operated firms in Singapore, the work of Tan, Plowman and Hancock (2007) endorsed the previously mentioned relationship between IC, and firm performance, although the input of IC, in firm performance, varies from industry to industry. Conversely, the work of Firer and Williams (2003), on 75 publicly operated firms in South Africa reveal that IC is adversely linked with the customary tools of analysis which pertain to performance, while the relationship between capital employed (physical and financial), and the measures of performance, is affirmative. The effect of IC is found to be positive and insignificant for firm performance, according to the past data, while it is found to be significant for the more recent years' performance (Hasan & Miah, 2018). Conducting the study on Gulf cooperation council countries' firms, findings support the effect of intellectual capital on accounting based performance, while negating the relationship with market based performance (Hamdan, 2018). Hsu and Wang (2012) have found the

effect of dynamic capability on the components of IC, and display its partial effect on enhancing firm performance by analyzing pooled data of 242, high tech firms, from 2001 to 2008.

## **2.1 Operating Performance Model**

Many researchers have advocated that the operating performance of a firm can be maximized by investing in IC (Bounfour, Bismuth & Tojo, 2008; Nimtrakoon, 2015; Ramond & Casta, 2007; Sydler, Haefliger & Pruksa, 2014; Z. Wang, Wang & Liang, 2014). Financial surplus, or monetary edge, which is basically the difference between revenue and generation costs, is called operating profitability.

Kamukama, Ahiauzu, and Ntayi (2011) stressed upon the competitive benefits of scholarly capital (i.e., IC), when it comes to the financial execution in Uganda's microfinance foundations. Similarly, Ling (2013), taking a valid questionnaire from a sample of 146 Taiwanese firms, established a positive relationship between IC, and business performance; similar results were found by Hejazi, Ghanbari and Alipour (2016). Cheng, Lin, Hsiao, and Lin (2010), analyzed the six-value creating interactions between the four constituents of intellectual capital, and suggested that there exists a significant relationship between intellectual capital and firm performance. Zéghal and Maaloul (2010), carried out their investigation, which pertained to the role of VA as an indicator of IC, and its effect on firm performance, by focusing on 300 UK, high tech, traditional and service based concerns. They concluded that IC has affirmative positive effect on the various indicators of firm performance.

Nakamura (2001) argues that if organizations spend in IC, the achievement of these firms will permit them to diminish their manufacturing costs. Production costs can decrease largely due to skillful human capital, and an efficient method of R&D. Moreover, while assessing the impact of IC, from Gu and Lev's (2011) work, it was revealed that there was another technique that was developed, and later on proposed, on the financial idea of "production function". This approach mirrored that there are three sorts of assets: physical, financial and scholarly, which lead to the creation of an organization's operating execution. The DTI (2006) study explains that the value invested in physical, financial and intellectual resources, in a value making framework, and the capability of these resources to produce VA, determine the company's operating performance.

In their model of IC valuation, Gu and Lev (2011) propose that the physical, financial and intellectual resources produce value for the

effective operating performance of a firm. Their idea was based on a new methodology which revolved around the economic notion of the "production function". Mickey and Goo (2005), by employing the IC view, Resource Based View, and the financial perspective, via questionnaires and secondary data, observe that IC, and corporate performance have a positive relationship. Based upon the above literature, the following hypothesis is proposed to be tested:

**Hypothesis 1:** Intellectual capital has a positive effect on operating performance.

## 2.2 *Financial Performance Model*

Profitability, which is a statement of the limit of enriched venture, in order to influence a positive level of profit, can be named as the finance related execution. Numerous creators infer that IC affects an organization's financial execution (Hejazi et al., 2016; Ozkan et al., 2017; Sydlar et al., 2014; Wang et al., 2014). Considering the asset based hypothesis, Chen et al. (2004) prescribe that, IC increases the value of financial performance of a firm. This hypothesis is additionally pooled by Youndt, Subramaniam and Snell (2004), who demonstrate that IC concentrated firms are more focused as compared to other firms, and are, subsequently, more prosperous as well.

Muhammad and Ismail (2009), making use of the data for eighteen companies of the financial sector of Malaysia, signify the positive relationship between knowledge based resources, and firm performance, and, hence, make a calculated revelation that the banking sector invests more in IC, as compared to other firms or sectors. Murale, Jayaraj and Ashrafali (2010), by analyzing Indian firms, postulate that human capital (main component of IC) has the most significant influence on a firm's value creation activities, and stock market performance. By the value-creation of human capital, firms can effectively increase their performance. Cheng et al. (2010) advocate a significant, positive relationship between the various constituents of intellectual capital, and a firm's financial performance. Tan et al. (2007) validated the same results, based on 150 publicly traded companies in Singapore. Zéghal and Maaloul (2010) comprehensively measured and asserted upon the affirmative contribution of traditional factors of IC, in creating value with respect to the financial area of performance, among UK high tech, traditional and service based concerns.

However, Riahi-Belkaoui (2003) and, Firer and Williams (2003) predict that the financial performance is determined by strategic resources,

and a sustained competitive advantage is achieved by using intellectual, physical, and financial capital as well. Sydler Sydler et al. (2014), used monetary proxies for human, structural and relational capital, and longitudinal data, for 69 publicly-traded pharmaceutical, and bio-tech companies, and also augmented the idea that IC does not create expenses, rather IC creates assets which offer improved returns. Based upon the above discussion, the following hypothesis is proposed to be tested:

**Hypothesis 2:** Intellectual capital has a positive effect on financial performance.

### *2.3 Stock Market Performance Model*

A few researchers depict that the failure to consider IC in financial proclamations is a gaping hole between an organization's market and book esteem (Lev, 2001; Skinner, 2008). The market-to-book ratio is a representation of this gap. This growing gap also signifies that IC, as a gauge of worth of a firm, needs to be recognized by the potential investors. In this situation, as proposed by Firer and Williams (2003) and Bontis, Wu, Chen, Cheng and Hwang (2005), firms with greater investment in IC are placed at a higher value by the investors, especially if the marketplace is efficient. This supposition is additionally shared by Youndt et al. (2004) and Skinner (2008), who express that the financial specialists in securities exchange give more significance to IC related firms, as compared to the others. However, Zeghal (2000) and DTI (2006) consider that in a highly creative environment, venture capitalists are not restricted to the financial expertise only, but consider take into consideration the intellectual capital as well. In other words, the organizations with reputation of persistently creating VA through IC are chosen for the portfolios.

In a study based on 4,254 Taiwanese listed companies during the period 1992-2002, Chen, Cheng and Hwang (2005) found that IC, and the capital employed have a positive impact on the market value, as well as on the current and future financial performance. Murale et al. (2010) studied Indian firms, and concluded that the stock return can be created by investing in human capital (one of the main components of IC). Cheng et al. (2010) analyzed a positive effect of the elements of intellectual capital, on market performance of a firm. Zéghal and Maaloul (2010) analyzed the relationship between IC, and stock market productivity, and revealed a positive input of conventional factors of IC in the UK's high tech firms' operating, financial and stock performance. Sydler et al. (2014) studied the longitudinal data for publicly-traded pharmaceutical and bio-tech

companies, and summarized that the financial and market profitability can be shaped by focusing on human, structural and relational capital. These are permanent economic resources for the firm to attain sustainable growth. Based upon the above literature, the following hypothesis is proposed to be tested:

**Hypothesis 3:** Intellectual capital has a positive effect on stock market performance.

### 3. Variables

#### 3.1 *Dependent Variables*

The operating, financial and stock market performance are used as dependent variables, and proxied by the operating income to sales (OIS), return on assets (ROA) and the market to book value of net assets (MB), respectively. OIS is the ratio of the income generated, through the operation to total returns (Lev, 2004; Zéghal & Maaloul, 2010). ROA is the proportion of the net pay that is accessible to regular investors (i.e., income after premium and expenses) in order to book the estimation of total resources (Bontis et al., 2005; Ozkan et al., 2017). MB is the proportion of the aggregate market capitalization (i.e., market value per share into outstanding shares) in order to book the estimation of net resources (i.e., total resources less aggregate liabilities) (Firer & Williams, 2003; Sougiannis, 1994; Zéghal & Maaloul, 2010).

#### 3.2 *Independent Variables*

Intellectual capital is going to be taken as the independent variable for the purpose of this study. This variable is measured by using two proxies: Intellectual Capital Efficiency (ICE), and Value Added Intellectual Coefficient (VAIC). The former is used to check the accumulated contribution of primary components of IC (HC and SC) in VA, and the latter is used to measure every single resource that aids to crop VA. The coefficients of VAIC are the efficiencies of all the resources, and their VA ability.

As defined by Firer and Williams (2003), the following steps are laid down in order to facilitate the measurement of VAIC and its components:

- According to DTI (2006) and Riahi-Belkaoui (2003), the VA is determined as follows:

$$VA = OUTPUT - INPUT$$

Output signifies the total incomes, and incorporates the estimation of all the items and administrations that are sold in the market; inputs consist of all the expenses incurred for operating a firm, excluding the employees' costs, which are not observed as costs.

- Capital Employed Efficiency (CEE) measures the contribution of capital employed (physical and financial) in VA. As argued by Pulic (2004) and others, IC itself cannot produce value. So, it is crucial to consider the physical and financial capital in order to gather a complete understanding of the sum of VA that is produced by a firm's resources. This coefficient reveals how much new yield has been made by one unit of asset contributions, to capital utilized. This efficiency can be measured as follows:

$$CEE = \frac{VA}{CE}$$

- Human Capital Efficiency (HCE) measures the influence of human capital in VA. Human Capital resources contain knowledge, qualification, training, experience, and intuition of the employees of a firm. According to the strategic compensation concept, employees are compensated on the basis of every contribution they make towards the growth of the business. At the time of hiring, they are compensated with a periodic salary which is based upon their qualification and experience, and later on, they are also compensated with monetary benefits on every contribution they make in the form of skill enhancement through training, and bringing or pitching in new ideas through research work. Firms take care of their employees, not only while they are working, but also after they retire, in the form of retirement benefits. All these investments in the employees are mentioned in the annual financial reports of the firms, in the form of either employee cost, or salary and other benefits. Many scholars (e.g., Pulic, 2004; Lajili & Zeghal, 2006; Wyatt & Frick, 2010, etc.) regard employee cost as the best indicator to measure human capital. Hence, this paper also follows this tradition. The HCE is measured as follows:

$$HCE = \frac{VA}{HC}$$

- Structural Capital Efficiency (SCE) measures the involvement of structural capital in VA. According to Pulic (2004) and several other scholars, subtracting HC from VA obtains SC. SC is not a self-reliant capital, and the efficiency is calculated as:

$$SCE^1 = \frac{SC}{VA}$$

- Intellectual Capital Efficiency (ICE) is to check the contribution of primary components of IC (HC and SC) in VA, by using the following mathematical expression:

$$ICE = HCE + SCE$$

- Value Added Intellectual Coefficient (VAIC) is to quantify every single resource that aids in cropping VA, and is measured with the following formula:

$$VAIC = ICE + CEE$$

### 3.3 Control Variables

To enrich our analysis, we use size (SIZE), age (AGE) and financial leverage (FL) of the firm as the control variables. The size of the firm affects all types of firms (high-tech, traditional and services) (Dženopoljac, Janošević & Bontis, 2016), and all types of performances (operating, financial and stock market), with industry-specific differences intact (Zéghal & Maaloul, 2010). We measure the size of the firm as the log of book estimation of the aggregate resources (Riahi-Belkaoui, 2003). The older the firm, the more mature it is in its performance and hence, tends to perform better. We use age as a control variable, in order to represent this impact. The age of the firm is measured as the difference between the year of the information gathering, and year of the initiation of the business (Autio, Sapienza & Almeida, 2000). Financial leverage denotes the overall liability reported to the firm, which reflects its capacity to attract external financial resources (Bhardwaj, 2018; Goel, Chadha & Sharma, 2015; Lestari & Riyadi, 2018; Malshe & Agarwal, 2015; Sodeyfi, 2016).

It can be observed that our investigation centers around the impact of the intellectual capital (ICE and VAIC) on firm execution. More specifically, in order to analyze the performance effect of intellectual capital of the firms, regression models (given in subsequent section) are constituted in two ways: (1) Taking ICE as an independent variable, and

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<sup>1</sup> Note that HCE and SCE are not calculated in the same way. To calculate both in the same way, the underlying assumption is that by increasing one efficiency, another will be decreased, which is illogical. The logical argument is to perceive that both efficiencies increase in order to increase the contribution of IC in VA.

CEE, size, age and financial leverage as the control variables; (2) Taking VAIC as an independent variable, and size, age and financial leverage as the control variables. CEE is dropped as a control variable, when VAIC is used as an independent variable, only to avoid redundancy, because it is the component of VAIC.

#### **4. Data and Descriptive Statistics**

The data used in this study consists of all the firms listed in the personal goods sector on the Pakistan Stock Exchange (PSX), Pakistan, and also takes into consideration ten years of accounting data, specifically for the years between and including 2005 to 2014. The accounting data is extracted from the audited annual reports of the firms, which are downloaded from the official websites of the respective firms that are included in this study. Data for the stock market performance is obtained from the data portal of the Pakistan Stock Exchange. The personal goods sector is chosen by keeping in view the contribution of this sector in Pakistan's economy. The original data is screened by the following criteria. We have not incorporated the firms with a negative book value of equity, and negative HC or SC values, as suggested by Firer and Williams (2003) and Shiu (2006). The firms for which the information is missing (inaccessibility of yearly reports because of mergers, repurchase, suspension, delisting) are also not included in the study. PSX enlisted 33 sectors, comprising of 557 firms. The personal goods is a representation of all the textile units, and the largest sector with respect to the number of firms. There are 179 firms that are accumulated in the personal goods sector of PSX. After screening the firms, we have been left with 99 firms, with a totaling of 990 observations.

**Table 1: Descriptive Statistics**

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>S.D.</b>
<b>OIS</b>	968	0.0409	0.4403
<b>ROA</b>	976	0.0328	0.1968
<b>MB</b>	977	0.8201	3.5401
<b>CEE</b>	915	0.8054	5.5592
<b>HCE</b>	917	2.334	6.2363
<b>SCE</b>	919	0.2255	5.1812
<b>ICE</b>	917	2.5582	8.2109
<b>VAIC</b>	94	3.3661	9.9624
<b>AGE</b>	989	30.4105	14.7821
<b>SIZE</b>	977	7.6299	1.1926
<b>FL</b>	977	0.7442	0.2932

The summary statistics of all the variables used in the study are reported in Table 1. Recall that OIS calculates the operating profitability of a firm, and hence, the mean of the said ratio is 0.041, which means that the firms considered in the study do not enjoy good profitability during the period of consideration of the data. It can also be observed that the trend of the profit over the period might be very volatile as the standard deviation is much higher than the mean value. Although the mean value of ROA (i.e., 0.032877) is low, it indicates that the firms in the sector are generating positive returns when it comes to utilizing all types of resources. How speculators do contrast market esteem per share, with book esteem per share, is specified as MB. The mean estimation of MB shows that the market estimation of the value is in abundance of the book estimation of the value of test firms, and investors give more weightage to the firms in the sample for investment purposes, and they are willingly paying 1.155 times more for the market price of shares, as compared to the book value of the shares. The CEE average indicates that the firms in the sample are generating a 0.81 value, by investing one dollar in their physical and financial resources. HCE is contributing more to the firms than the cost of human capital is absorbing. By comparing the contribution of ICE and CEE, it is observed that the intellectual capital resources are adding more value to the sample firms than the capital employed in physical and financial resources.

## 5. Regression Analysis

To address our research objectives, the following equations relating to the operating, financial and stock market performance are modeled:

$$OIS = b_{0o} + b_{1o}ICE + b_{2o}CEE + b_{3o}AGE + b_{4o}SIZE + b_{5o}FL + \mu \dots \quad \text{Model 1)}$$

$$ROA = b_{0r} + b_{1r}ICE + b_{2r}CEE + b_{3r}AGE + b_{4r}SIZE + b_{5r}FL + \mu \dots \quad \text{Model 2)}$$

$$MB = b_{0m} + b_{1m}ICE + b_{2m}CEE + b_{3m}AGE + b_{4m}SIZE + b_{5m}FL + \mu \dots \quad \text{Model 3)}$$

$$OIS = c_{0o} + c_{1o}VAIC + c_{2o}AGE + c_{3o}SIZE + c_{4o}FL + \mu \dots \quad \dots \dots \dots \text{(Model 4)}$$

$$ROA = c_{0r} + c_{1r}VAIC + c_{2r}AGE + c_{3r}SIZE + c_{4r}FL + \mu \dots \dots \dots \quad \dots \text{(Model 5)}$$

$$MB = c_{0M} + c_{1M}VAIC + c_{2M}AGE + c_{3M}SIZE + c_{4M}FL + \mu \dots \dots \dots \quad \dots \text{(Model 6)}$$

Since we have panel data, we avoid using the straightforward ordinary least square (OLS) method for the regression analysis. To get more

accurate results, we choose between the fixed-effect and random-effect models, after applying the Hausman test (The results of the Hausman test are reported in appendix in Tables A1-A6). The Hausman test preferred the fixed effect model for all types of models used in this study.

In the multiple regression analysis, it is desirable that the predictors should not be collinear. Therefore, before performing the analysis, we investigate the possibility of multicollinearity. In this regard, the Variance Inflation Factor (VIF), and Tolerance are used to check the existence of multicollinearity. The values of VIF and Tolerance, for all regression models, are reported in Table A7. We do not find the issue of multicollinearity in all our regressions.

Furthermore, we must recall that two proxies (ICE and VAIC) were used to measure the intellectual capital. **Table 2** reports the results when ICE is used as independent variable. Throughout the table, CEE, AGE, SIZE and FL are used as controls.

### ***5.1 Results for Operating Performance (Model 1)***

The results of the effect of ICE on operating performance (OIS) are reported in column 1 of **Table 2**. The significance of the F statistics reveal that the model as a whole is a good one in nature. The regression coefficient depicts that the ICE has a critical, beneficial outcome on the working performance, which supports the previously mentioned  $H_1$ . This result is consistent with the results of various scholars such as Chen et al. (2004), Riahi-Belkaoui (2003), Tan et al. (2007), Muhammad and Ismail (2009), Zéghal and Maaloul (2010), Casta, Ramond and Escaffre (2006) and, Wang, Wang, Cao and Ye (2016). The Control variables (CEE, AGE, SIZE and FL) have a mixed influence on the operating performance of the firms. CEE and age (Autio et al., 2000) and FL leave slightly negative effects on the operating performance of the firm in the personal goods sector, with an insignificant effect of CEE and FL, and a significant effect of age (consistent with Casta et al. (2006) and, Zéghal and Maaloul (2010)). Firm size has a significant and positive effect on the performance, as shown by Riahi-Belkaoui (2003), among others.

Pakistan is one of the developing nations of the world. These nations typically do not possess enough strategic resources to be able to enjoy a sustainable competitive advantage. In spite of this, they are paving their way towards success. Although, the personal goods sector of Pakistan is viewed as a capital intensive one, the impact of scholarly capital, on working

execution, is critical and positive for this part. The likely interpretation here is that they have understood that the world economies have shifted their focus on knowledge based production, rather than merely centering their efforts on quantity. That is why they are now investing in knowledge intensive resources. The significant, positive relationship between ICE and OIS might indicate that the said sector has acquired and invested in knowledge concentrated resources, and hence, has been enjoying good profitability. CEE and OIS of the firms in the said sector have a negative, though insignificant relationship. This negative coefficient is somewhat surprising, since the physical resources of the firm in the personal goods sector, because of the very nature of this sector, are very important factors of performance. However, the negative coefficient of CEE does not have a significant importance, since the relationship is statistically insignificant.

**Table 2: Regression Results: ICE as Independent Variable**

Independent Variables	Operating Performance (Model 1)	Financial Performance (Model 2)	Stock Market Performance (Model 3)
ICE	0.006252** (0.001338)	0.014314** (0.000588)	0.000031 (0.010658)
CEE	-0.000636 (0.001372)	0.000568 (0.000875)	0.427067** (0.015865)
AGE	-0.017908** (0.003330)	0.016700** (0.001986)	-0.077870* (0.035999)
SIZE	0.130071** (0.025808)	-0.146019** (0.014963)	0.0639491 (0.271232)
FL	-0.027577 (0.044626)	-0.176015* (0.027931)	-4.859041** (0.506304)
<b>F Statistics</b>	11.47**	180.76**	166.35**
<b>No. of obs.</b>	904	914	914

Standard Errors are shown in parentheses;

\* and \*\* represent significant at 1% and 5% respectively

## 5.2 Results for Financial Performance (Model 2)

Column 2 of **Table 2** reports the results when the financial performance (ROA) is taken as a dependent variable. Again, the significance of the F statistics validates the model. The results show that ICE has a constructive and important impact on the financial execution of the firms in the personal goods sector, which supports the claim made in H<sub>2</sub>. This outcome is consistent with studies such as, Firer and Williams (2003), Zéghal and Maaloul (2010), Riahi-Belkaoui (2003), Z. Wang et al.

(2014), Nimtrakoon (2015), Ozkan et al. (2017) and Tan et al. (2007), that report a constructive outcome of intellectual capital on firm execution. The influence of firm age, and CEE, on ROA is positive, significant and insignificant respectively. Whereas, the financial performance is negatively associated with the firm size and financial leverage of the firms, and the relationship is statistically significant at a 1% level. The ROA of the firm constitutes of the earning power of the total resources owned, or used by the firm. The significant relationship between ICE and ROA reveals that the personal goods sector of Pakistan gives importance to intellectual resources in order to yield optimal ROA. As the ICE comprises of HCE and SCE, the financial performance of the firms in the personal goods sector can further be enhanced by focusing on employees and the structural resources of the firms in this sector. The importance of human capital in this sector is established by the fact that it employs more than 20% of the total Pakistani labor force. In addition to using cotton bales in production, the personal goods sector has advanced its operations by instilling technological progression in the availability of raw material, by introducing man-made fibers to be used for blended fabrics, such as bed sheets. This shoes a glimpse of the importance of SCE. The significant, positive effect of ICE, and the importance of HCE and SCE suggest that the firms in this sector should focus more on the development of these factors, solely for the purpose of performing better for better performance.

### **5.3 Results for Stock Market Performance (Model 3)**

The Operating performance and the financial performance (ROA) are the internal performance criterion, whereas stock market performance is considered to be a measure of external performance. Column 3 of **Table 2** depicts the results with stock market performance as a dependent variable. The value of the F statistics appears to be statistically significant at a level of 1%. The coefficient of the independent variable shows that there is a positive, but insignificant relationship between ICE, and the stock market performance of the firms. This means that the result does not support H<sub>3</sub>. This finding corroborates the study of Zéghal and Maaloul (2010). CEE and SIZE have positive effects on the performance, whereas, age and financial leverage is negatively affecting the performance. The impact of CEE, AGE and FL on MB appear to be significant. The results of CEE are in accordance with the works of Shiu (2006), Bontis et al. (2005) and Firer and Williams (2003).

The above-mentioned relationships show how investors in the stock market of Pakistan visualize the strategic resources to be important assets

for a firm. The results indicate that the investors give significant importance to the physical and financial resources (CEE), than to the intellectual resources. Maturity of the firm adds value, albeit negatively, to its stock market performance, even if this relationship is not statistically significant. Such firms are more willing to pay for those firms which are heavily equipped with capital employed resources, in lieu of the knowledge-related resources. The information is available easily, and quickly, for all the actual, and potential investors. Most of the investors trade shares on speculations. News about the Pakistani and international markets play a very vital role when stockbrokers are recommending a share for trading. There are very few investors who trade shares on the basis of fundamental and technical analysis, and this phenomenon might lead them to invest in those firms whose capital employed is more substantial than their intellectual capital.

Summarizing the regression results in **Table 2**, the ICE significantly, and positively effects the operating and financial areas of the firms, while the CEE has an insignificantly mixed influence on operating and financial zones of the firms. This means that the more these firms will accumulate intellectual capital resources, the higher will be their operating and financial performance. This study validates the importance of intellectual capital resources with respect to firm performance, and also agrees with various scholarly works like Barua and Whinston (1998), Tanriverdi and Venkatraman (2005), Zeglat and Zigan (2013), Bontis et al. (2005), Hitt et al. (2001), Wang, Tsui, Zhang and Ma (2003), Grant (1997). CEE has a significantly affirmative influence on stock market performance of the firm, while the ICE also positively affects the market performance, but the relationship is statistically insignificant. The addition of knowledge based resources (whether in the form of human or structure) in the operating processes of firms in the ginning process, where raw cotton is converted into fine cotton, in the spinning process, where purified cotton is converted into yarn, and in the clothing process, where yarn is converted into cloth and garments, enhances the operating and financial capability of the firms in the personal goods sector of Pakistan. The textile products of Pakistan are famous all over the world due to their cotton and yarn quality. If further research and development, technological advancement and employee training and development are added in the operating processes, the personal goods sector of Pakistan would achieve more success and competitive advantage. The relationship between ICE and stock market performance of the listed companies in the personal goods sector of Pakistan is positive, but statistically insignificant, meaning that the investors in the stock market of Pakistan do not appreciate investments in ICE intensive firms as compared to making investments in CEE intensive firms.

So far, we have discussed the impact of intellectual capital on different performing zones, measured by using ICE as a proxy for intellectual capital. Another important measure of intellectual capital, which is obtained by adding ICE with CEE, is VAIC. The subsequent analysis will observe the effect of VAIC on different firm performance measures. Throughout the **Table 3**, the analysis on the significance of model as a whole shows that the model is a good model.

#### **5.4 Results for Operating Performance (Model 4)**

Column 1 of **Table 3** describes the outcomes of the analysis on the OIS-VAIC relationship. The F-statistic reveals that the model as a whole is a valid one. Recall that the apparatuses of VAIC are physical capital, financial capital and intellectual capital resources. Keeping this in mind, the VAIC has a significant, positive effect on the operating performance of the firms, hence supporting the hypothesis H<sub>1</sub>. The results depict that the higher the VAIC, the higher will be the operating performance of the firms. Age and FL of firms are affecting the firm performance negatively, with a significant and insignificant relationship, respectively. The Size of the firms has a significant positive influence. Results are statistically significant at a 1% level. The positive effect of VAIC infers that the personal goods sector of Pakistan should focus on the increment of accumulation of the strategic resources. Theoretically, it seems that increasing of age adds maturity in the performance of the firms, but the results reveal a different outcome. This may be due to some other factors of the economy of Pakistan, which affect the operating outcome negatively. The likely explanation of the significant effect of the six models is that the personal goods sector of Pakistan is capital intensive, which requires large capital goods to be installed for a positive working efficiency. The larger the firm is, the better is its operating performance.

#### **5.5 Results for Financial Performance (Model 5)**

Column 2 of **Table 3** reports the results of the impact of VAIC on money related performance. Again, the F-statistics appear to be significant. The VAIC affects the financial profitability of the firms in a positive manner, and the relationship is highly significant, which means that our second hypothesis, H<sub>2</sub>, is being supported. Contrary to model 4, the age of firms has a significant, positive effect and the size of the firm has a significant, negative effect on the financial performance of a firm. The relationship between FL and ROA appears to be significant and negative.

The personal goods sector of Pakistan possesses physical properties, human capitals and structural possessions, which constitute of VAIC. According to the results, on the basis of these resources, value is being added in the financial performance of the firms. The maturity also adds value in the monetary performance of the firms. The VAIC, and age increment the earning energy of the organizations, as demonstrated in the table, whereas the acquisition of more resources (SIZE), and FL over the period created negative value for the firms in the area pertaining to the financial performance of the firms. This may be due to the internal problems, especially the shortage of utilities, and raw material at economical price, which are being faced since the last decade.

### **5.6 Results for Stock Market Performance (Model 6)**

The Stock exchange performance of the organizations is computed on the basis of fluctuations in the market capitalization of the stocks. The results of the analysis of the VAIC-stock performance relationship are reported in column 3 of **Table 3**. Consistent with all previous regressions, the model as a whole appears to be a good model for performing the regression analysis. The outcomes demonstrate that there is a positive, and significant connection between the intellectual coefficient and the securities exchange execution of the organizations, hence, supporting the hypothesis, H<sub>3</sub>. Recall that ICE alone is an insignificant determinant of MB in **Table 2**. The likely explanation of the significance of VAIC here is that it is a combination of ICE and CEE, and CEE came out to be highly significant in the previous regression on MB. This significance of CEE may lead to the significance of VAIC. The coefficient of AGE demonstrates that if firms achieve more age, their stock value plummets. This may be very difficult to justify. However, the personal goods sector of Pakistan has been suffering from various problems related to the availability of economical inputs. This may shake the advantage of becoming a mature firm. Stakeholders of the firms often voiced their concerns in order to get access to a bailout package for the restoration of those firms which were about to shut down, or had already shut down their operations. The size of the firms bring significant, positive changes in the stock performance, and the financial leverage brings significant, negative changes in the stock performance.

**Table 3: Regression Results: VAIC as Independent Variable**

Independent Variables	Operating Performance (Model 4)	Financial Performance (Model 5)	Stock Market Performance (Model 6)
VAIC	0.002894** (0.000969)	0.010018** (0.000533)	0.131489** (0.011114)
AGE	-0.017788** (0.003355)	0.018274** (0.002177)	-0.126038** (0.045325)
SIZE	0.124954** (0.025961)	-0.174514** (0.016259)	0.935896** (0.338434)
FL	-0.028327 (0.044959)	-0.201305** (0.030606)	-4.085158** (0.637101)
<b>F Statistics</b>	10.91**	152.32**	55.20**
<b>No. of obs.</b>	904	914	914

Standard Errors are shown in parentheses

\* and \*\* represent significant at 1% and 5% respectively

The stock market of Pakistan is considered a weak form of an efficient market which operates on the basis of rumors, and firm specific internal politics, but the results indicate that the investors of PSX give significant weightage to VAIC. They might consider VAIC a value added resource in their wealth maximization process

It is obvious from the results that VAIC has a positive, significant contribution in the operating, financial and stock market actions of the firms, which are in line with the empirical findings of various authors such as Kamboj et al. (2015), Surroca et al. (2010), Firer and Williams (2003), Mickey and Goo (2005), Muhammad and Ismail (2009), Hsu and Wang (2012), Zéghal and Maaloul (2010), Kamukama et al. (2011), Sydler et al. (2014), Ling (2013), Nimtrakoon (2015), Ozkan et al. (2017) and DTI (2007). This also postulates that there must be a focus on the practical significance of the value added intellectual coefficient. Comparing the results of **Table 2 and Table 3**, the impression of the independent variable, and the control variables on different performance measures of the firms shows an inconsistent mixture which is shown in **Table 2**; however, the results become steadily significant and consistent in **Table 3**. The cumulative effect of VAIC is completely positive and significant.

## 6 Conclusion

In the contemporary age, knowledge is supposed to be a supreme strategic resource in accumulating benefit for the firm. Under the paradigm

of the knowledge based view of the firm, the firms armed with knowledge concentrated resources are more competitive, as compared to the firms which do not have them. The firms in developing countries can also enhance their competitive advantage by focusing on these knowledge-oriented resources.

One of the most important resources associated with knowledge is perceived as intellectual capital. Although highly desirable, the intellectual capital-firm performance phenomenon is still less studied in developing countries such as Pakistan, and this was the primary motivation which led to carrying out this research study. More specifically, the objective of this study is to assess the effect of intellectual capital on the operating, financial and stock market performance of the firm.

ICE (a proxy for intellectual capital) has a significant, positive effect on both the operating and financial performance of the firms, while CEE has an insignificant, negative impact on the operating performance, and an insignificant, positive impact on the financial performance of the firms. This means that the firms in the personal goods sector, listed in PSX, that enjoy greater operating and financial benefits are those which accumulate more intellectual capital resources. The analysis of the stock market performance model show different results: the effect of ICE becomes insignificant, and CEE has a significant and positive effect on stock market performance.

Human capital stands for the knowledge, qualifications and abilities of the personnel and the firms' compensation of their staff in an appropriate manner. Structural capital refers to the knowledge which remains with the organization after its staff members leave for their homes. VAIC comprises of both CEE, and ICE. According to the results, VAIC has a positive effect on all the performance measures of the firms. According to the composite effect of VAIC, the regression results suggest that the more firms invest in physical and intellectual resources, the more profitability they enjoy in all three areas of performance.

This study contributes to the research on intellectual capital in many ways. In the larger context of things, the results support the previously argued positive role of intellectual capital on firm performance. Moreover, this study extends the empirical literature by analyzing the intellectual capital-firm performance relationship in a relatively less researched area: Pakistan. Other than that, the study is helpful in understanding the role of strategically critical factors of firm growth and

profitability. The results are important for managers/decision makers to have a confident direction in deciding the optimal knowledge-oriented resource allocation, and in investing firm sources to acquire such optimal resources, which are still ignored in the developing world.

The results of the study imply that firms in emerging markets such as Pakistan (only manufacturing companies are included in the sample) need to focus more on intellectual capital resources, as compared to physical and financial capital resources, in order to increase their operating and financial performance. Operating performance mainly relates to the operating profit margin of the firm, and financial performance refers to the net profit available for all stockholders, generated using all the assets of the firm. By keeping in view the results of the stock market performance model, investors in Pakistan may give more importance to those firms which invest more in physical and financial resources, as compared to those that invest more in intellectual capital resources. Firms need to shift their focus towards developing knowledgeable individuals, by making investments in the form of financial benefits, training for the adoption of more advanced approaches of working, and providing better working conditions. Accountants can adopt the VAIC approach to disclose the value addition items in the form of value added statements, or as a part of the financial statement analysis. Other than that, the stock market investors can make decisions regarding investments in a more efficient manner by comparing the value added capital employed resources, and value added intellectual capital resources using the stock market performance model.

It must be noted that no study comes without certain conditions and limitations. Some limitations, and the future courses of action are as follows. Only a single structural approach (i.e., VAIC) is used in this study to evaluate the relationship between intellectual capital components and the firm performance indicators. More methods can be incorporated in order to validate the concept in which the effect of intellectual capital on firm performance can be analyzed. Secondary data sources are used widely in the study. For future studies, primary data sources can be incorporated to further elaborate, and operationalize the concept in more detail. The efficiency of IC is limited to two components, i.e., Human Capital and Structural Capital. Structural capital can further be elaborated into various capital components, which contribute in value addition. Only one sector, i.e., personal goods, is sampled in the study for analysis. More sectorial studies and comparative analysis can be carried out as well.

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*Appendix*

**Table A1: Hausman Test for Model 1**

Dependent Variable: OIS				
Independent Variables	Coefficients			
	Fixed-Effect	Random-Effect	Difference	S.E.
ICE	0.006252	0.0066765	-0.0004241	0.0003725
CEE	-0.000636	-0.0000251	-0.0006109	0.0004033
AGE	-0.017908	-0.0003957	-0.0175123	0.0032638
SIZE	0.130071	0.0287296	0.1013422	0.0243459
FL	-0.027577	-0.0513746	0.0237975	0.0323695
Prob>chi2	0.0000			

**Table A2: Hausman Test for Model 2**

Dependent Variable: ROA				
Independent Variables	Coefficients			
	Fixed-Effect	Random-Effect	Difference	S.E.
ICE	0.0143148	0.0151746	-0.0089222	0.0012029
CEE	0.0005683	0.000585	-0.0012211	0.0010626
AGE	0.0167003	0.0011471	-0.1906854	0.0033001
SIZE	-0.1460191	-0.0309146	0.1609864	0.0251848
FL	-0.176015	-0.1312619	0.1036847	0.0396641
Prob>chi2	0.0000			

**Table A3: Hausman Test for Model 3**

Dependent Variable: MB				
Independent Variables	Coefficients			
	Fixed-Effect	Random-Effect	Difference	S.E.
ICE	0.0000315	0.0039318	-0.0039003	0.0024004
CEE	0.4206747	0.4270866	-0.0064119	0.0037014
AGE	-0.0778704	-0.0109193	-0.0669511	0.0348652
SIZE	0.0639491	-0.043955	0.1079041	0.2480712
FL	-4.859041	-3.111247	-1.747794	0.3320326
Prob>chi2	0.000			

**Table A4: Hausman Test for Model 4**

<b>Dependent Variable: OIS</b>				
<b>Independent Variables</b>	<b>Coefficients</b>			
	<b>Fixed-Effect</b>	<b>Random-Effect</b>	<b>Difference</b>	<b>S.E.</b>
<b>VAIC</b>	0.0028949	0.0033996	-0.0005048	0.0002771
<b>AGE</b>	-0.0177808	-0.0003533	-0.0174275	0.0032892
<b>SIZE</b>	0.1249549	0.0291506	0.0958042	0.0245070
<b>FL</b>	-0.028327	-0.0571269	0.0287999	0.0327718
<b>Prob&gt;chi2</b>	0.000			

**Table A5: Hausman Test for Model 5**

<b>Dependent Variable: ROA</b>				
<b>Independent Variables</b>	<b>Coefficients</b>			
	<b>Fixed-Effect</b>	<b>Random-Effect</b>	<b>Differences</b>	<b>S.E.</b>
<b>VAIC</b>	0.0100188	0.0105747	-0.0005559	0.0000264
<b>AGE</b>	0.0182744	0.0012426	0.0170318	0.0021259
<b>SIZE</b>	-0.174514	-0.0333195	-0.1411945	0.0151386
<b>FL</b>	-0.2013052	-0.1532942	-0.048011	0.0214292
<b>Prob&gt;chi2</b>	0.000			

**Table A6: Hausman Test for Model 6**

<b>Dependent Variable: MB</b>				
<b>Independent Variables</b>	<b>Coefficients</b>			
	<b>Fixed-Effect</b>	<b>Random-Effect</b>	<b>Difference</b>	<b>S.E.</b>
<b>VAIC</b>	0.1314898	0.1375442	-0.0060544	0.0026992
<b>AGE</b>	-0.1260381	-0.014875	-0.1111631	0.0441569
<b>SIZE</b>	0.9358962	0.0848217	0.8510745	0.3136316
<b>FL</b>	-4.085158	-2.211391	-1.873767	0.4429846
<b>Prob&gt;chi2</b>	0.0000			

**Table A7: Variance Inflation Factor and Tolerance**

<b>Independent Variables</b>	<b>VIF</b>	<b>Tol.</b>	<b>VIF</b>	<b>Tol.</b>	<b>VIF</b>	<b>Tol.</b>
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>	
ICE	1.02	0.98	1.02	0.98	1.02	0.98
CEE	1.00	0.99	1.00	1.00	1.00	1.00
AGE	1.03	0.97	1.03	0.97	1.03	0.97
SIZE	1.12	0.89	1.11	0.90	1.11	0.90
FL	1.09	0.92	1.10	0.91	1.10	0.91
	<b>Model 4</b>		<b>Model 5</b>		<b>Model 6</b>	
VAIC	1.01	0.99	1.01	0.99	1.01	0.99
AGE	1.03	0.97	1.03	0.97	1.03	0.97
SIZE	1.12	0.89	1.11	0.90	1.11	0.90
FL	1.08	0.92	1.09	0.92	1.09	0.92

**Abbreviations**

CE	Capital Employed
CEE	Capital Employed Efficiency
FL	Financial Leverage
HC	Human Capital
HCE	Human Capital Efficiency
IC	Intellectual Capital
ICE	Intellectual Capital Efficiency
MB	Market to Book Value
OIS	Operating Income to Sales
PSX	Pakistan Stock Exchange
RBV	Resource Based View
ROA	Return on Asset
SC	Structural Capital
VA	Value Added
VAIC	Value Added Intellectual Capital Coefficient
VRIO	Valuable, Rare, Inimitable and Organization