INTELLECTUAL CAPITAL AND FIRM´S PERFORMANCE: A CASE OF TEXTILE COMPANIES

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I Madeeha Mushtaq hereby state that my mphill thesis titled Intellectual Capital and Firm's Performance is my own work and has not been submitted previously by me for taking any degree from Pakistan Institute of Development Economics or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw my MPhil degree.

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Dedication

I dedicate this research thesis to all the people who were being part of this effort especially the respected supervisors Dr. Nadeem Ahmed Khan and Dr. Saud Ahmed Khan, my beloved parents, husband, and daughter.

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I offer my humble gratitude to Him, Who is the One and Only, the Creator of the heavens and the earth, and the Lord of all worlds, the Almighty ALLAH, the infinite and the everywhere. All thanks to Him, Who provided me with excellent health, a desire to work, great instructors, and the chance to contribute a little portion to the world's field of knowledge. The most modest and profound duty is likewise given, with great respect and regard, to The Holy Prophet Muhammad (PBUH), the founder of Islam, the perfect being in this universe, who will eternally be a beacon of flawless guidance and wisdom for mankind.

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Abstract

The main objective of the research is to pinpoint the influence of intellectual capital components and intellectual capital index on firm performance. Human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) are the intellectual capital components and the sum of these entire components is the index of intellectual capital (VAIC). The firm performance is measured by return on assets (ROA), asset turnover (ATO), and price to book value (PBV). The panel data from 25 companies for 11 years (2010-2020) has been used to test the impact of intellectual capital components and index on firm performance. The generalized method of moments has been used to test the hypothesis. The results are showing that the intellectual capital index (VAIC) has a positive influence on firm performance measured by return on assets (ROA), assets turnover (ATO), and price to book value (PBV). However, HCE and CEE have a positive influence on return on assets and assets turn over and in the case of firm performance measured by PBV only CEE has its positive impact on firm performance and the remaining components are showing no influence on firm performance. The study is also beneficial for policy makers and management to enhance the firm performance by making the strategies for intellectual capital. The limitations and future direction of the study have also been discussed in detail.

Keywords: Human capital efficiency, Capital employed efficiency, Structural capital efficiency, Intellectual capital index, and firm performance

Table of Contents

LIST OF TABLES

List of Abbreviations

IC	Intellectual Capital
VAIC	Value-added Intellectual Capital
HCE	Human Capital Efficiency
SCE	Structural Capital Efficiency
CEE	Capital Employed Efficiency
VA	Value added
D	Depreciation
A	Amortization
OP	Operating Profit
HC	Human Capital
ATO	Asset Turnover
ROA	Return on Asset
PBV	Price to Book value
FP	Firm Performance
GMM	Generalized method of moments

Chapter 1

Introduction

1.1 Background:

Intellectual Capital (IC) may be defined as the value attributable to the knowledge base of the human resource of a firm, their skill set, experience, or proprietary information that may provide a competitive advantage to the firm. Intellectual Capital may also include a firm's strategies, corporate culture, and intellectual property. Therefore, IC may be referred to as the ‘knowledge-based equity’ of an organization (Campisi and Costa, 2008; Petty and Guthrie, 2000).

In today's competitive environment, where companies tend to depend more on 'knowledge assets' than physical assets, Intellectual Capital is critical for the development of corporate value (Hamzah & Ismail, 2008). IC now holds the same importance as tangibles. This importance led to the introduction of the phrase – Knowledge economy.

Organizations improve employee abilities via training, research, and development, according to the OECD (2008). Additionally, they spend in relationships with customers and suppliers, as well as in technology and information systems. Such expenditures in information technology are growing at the cost of physical and financial resources. This change in investment behaviour is due to a growing emphasis on experience and understanding economies (Stewart, 2002; Zeghal & Maaloul, 2010).

The widening disparity between a company's book value per share has shifted focus to the value that is absent from financial statements. According to different academics,

IC is the unseen value that might not be shown in financial accounts and that enables companies to achieve a competitive edge (Chen et al., 2005; Edvinsson and Malone, 1997; Lev and Radhakrishnan, 2003; Lev and Zarowin, 1999; Lev, 2001; Ruta, 2009; Yang et al., 2009; Lin et al., 2009). Additionally, financial records are limited in their ability to describe company worth, while the development of intangible resources is regarded as a source of economic value, not only the capability to produce tangible products. (Chen et al.,2005).

Traditionally, physical assets like property, companies, technology, infrastructure, and natural resources were utilized to enhance performance. Whenever these resources of financial capital grew limited or more difficult to acquire, managers shifted their focus to obtaining a competitive edge despite having less tangible extra money on the side. In other words, managers were required to do more with fewer resources and to prioritize operating better, not harder. Thus was created the knowledge-based economy was. The knowledge-based economy promotes a business model centred on wealth generation through the development, deployment, and use of businesses' intangible assets. Learning, expertise, proprietary information, trademarks, character, and customer relationships are the pillars of intellectual capital that promote business success (Janoevi and Denopoljac, 2014). Businesses in sectors such as software, finance, pharmaceuticals, banking, and hospitality rely heavily on intellectual capital to generate income.

In this study, the Textile composite segment of the industry has been considered. The reason is the significant position held by the textile industry in the export market and its importance in the country’s economy. Pakistan is Asia's eighth biggest textile exporter. It is the fourth biggest producer of cotton and the third-largest consumer. It accounts for 46% of overall industrial output and employs 40% of the working force.

Textile has traditionally been a labour-intensive industry that requires a large supply of inputs like water and energy. Besides, the industry is exposed to price fluctuation in raw materials like cotton and man-made fibre. Despite a sustained demand, the textile industry struggled for improved margins due to exposure to price risk in raw material and overall input cost. To enhance profitability, the industry looked towards technological advancement to reduce manufacturing costs and bring efficiency in the consumption of inputs. Over the period, textile players started investing in the knowledge and skill set of their human resources to enhance intellectual capital and reap the benefit of higher performance, operationally and financially. With this investment in Intellectual capital, the industry found ways to improve production processes and cut their costs. At the same time, a better skill set and employee knowledge helped them to add value in other important business aspects like supply chain, marketing, etc.

As the world economy is moving towards a knowledge-based economy, the concept of Intellectual Capital (IC) is getting more attention progressively. Intellectual Capital has now attained recognition as an important corporate asset, which has exhibited a significant impact on profitability. IC has justified the gap between the market value and book value of a company. This means that the intangible value of intellectual capital is as potent for growth/profitability as the tangible assets employed by a firm.

Various studies have determined positive and important relation between value-added intellectual coefficient and profitability measures like Return on Assets (ROA) and Return on Equity (ROE). It means by increasing the performance of IC in organizations will increase their profitability.

1.2 Problem Statement

Intellectual Capital has attained a level of great importance in the competitive world, especially in the fast-growing industries. There is a need that the significance of Intellectual capital on a firm's performance to be measured in quantitative terms, especially in the manufacturing industry like Textiles.

The textile industry enjoys an established presence and a sustained demand level, however, it is exposed to shocks like volatility in raw material price, high demand for energy, and ecological impact. There is a possibility that such inherent risks are effectively offset through investment in Intellectual capital in a textile concern, in addition to the tangible resources.

1.3 Research Gap

Most research on Intellectual capital is concentrated on the developed world while emerging economies still struggle to fully comprehend the idea of 'knowledge-based' economic impact. We consider it important for this study to explore Intellectual capital as a financial performance indicator for the largest industrial segment of an emerging economy like Pakistan. Textile despite being the largest export sector is prone to a lot of risk factors and for sustainable growth/profitability, ways must be found to keep the industry competitive against global players like India, China, and Bangladesh. Considering Intellectual capital as a potent intangible resource, our study makes an important contribution by finding the significance of IC on selected companies in the textile sector through quantitative means.

A popular research model of 'Value-added Intellectual Capital' (VAIC) (Pulic, 1998) is being used in the study which is also a first for the textile industry. Further, our

study will provide insight into the significance of various components of Intellectual capital in this largest industrial segment of Pakistan.

1.4 Significance of the Study

Intellectual capital is yet to be recognized as a resource strong enough to boost financial performance in a developing country like Pakistan. In such economies, growth is considered as a direct factor of tangible resources employed in the business like land & building, plant/machinery, etc. The results of our study may establish the importance of Intellectual capital as an intangible resource that may turn around a struggling business. Financial statements would then have relevant disclosures on Intellectual capital as a mandatory item in the interest of all stakeholders, to gauge the 'true value' of the firm. With a specific focus on the largest industrial segment of the country, the thesis is a first to determine the significance of Intellectual capital on the financial performance of selected firms. The study could serve as a building block for other manufacturing and services industries to find out the significance of investment in Intellectual capital to ensure sustained profitability and competitiveness.

There will be a growing impact on the global economy from Pakistan's geographic location, which necessitates research into some emerging areas. This will not only benefit the research community as a whole by exploring how Intellectual capital impacts corporate performance similarly and differently in other countries, but it will also add to the existing body of knowledge.

Findings from this study can be useful in particular for the Textile composite industry to understand the effectiveness of their investment in Intellectual capital and identify those areas where this intangible resource could be helpful to bring cost-effectiveness, innovation, and sustained profitability. Textile manufacturing companies that compete

in the highly competitive export market would like to align their production methods and processes with international standards by investing in Intellectual capital. This will also help address environmental concerns related to excessive use of water resources in production and possible damage to the environment. Alignment with the global benchmark standards for ecological concerns requires upgrading the knowledge base and skill set of employees.

1.5 Objective of the Study

The main objective of this study is to examine the relationship between Intellectual capital employed at a firm and its financial performance. The performance will be measured in terms of the firm's productivity, performance, and capital efficiency. For this purpose, a sample of the top twenty-five companies in the Textile composite segment is being used. The sample has been selected with the understanding that these companies compete globally in the textile export market and require to invest in their intellectual capital to stay abreast with the innovative trends and to ensure a competitive edge for the production method, measures for cost reduction, and effective marketing of products.

Chapter 2
Literature Review

2.1 Intellectual Capital – Theoretical Background

2.1.1 Resource-Based View

The Resource-based view considers various resources owned by a firm as the main strength behind the firm's ability to compete and perform. The resources under this view include both tangible and intangible assets owned by a firm, which are used effectively and efficiently to achieve organizational goals. These resources also help to strategize following their underlying strength. The asset base provides the competitive advantage necessary to ensure sustainable financial performance.

The intangible assets attract more investigation as strategic resources though being latent in nature, whereas the role of physical assets is quite understandable (Itami and Roel, 1987; Mahoney and Pandian, 1992; Grant, 1991). Physical assets like property, plant, machinery, technology is generally considered substitutable and can be purchased and sold as per business requirement. While intangible assets are valuable, rare, and non-substitutable. The rarity and inimitability are the strongest characteristics of the intangible assets of a firm (Godfrey and Hill, 1995). The intangible assets are strategic in nature and capable of generating those competitive advantages that are sustainable over a while. At the same time, intangible assets possess the strategic depth to ensure financial performance (Barney, 1991). While many intangible assets may qualify as strategic assets, however, few qualify to the

strict criteria of competitive edge and sustainability like intellectual capital in particular (Hall, 1992, 1993).

2.1.2 Stakeholder View

The Stakeholder view highlights the presence of stakeholders rather than shareholders to account for (Donaldson and Preston, 1995). This means that corporations have obligations not only towards the shareholders as generally understood, but they are responsible to a few others covered under the 'stakeholder' notion. These groups having a "stake" in the business may include shareholders, employees, customers, suppliers, lenders, the government, and society in general. A wide sense of stakeholder may include any group that can affect the achievement of objectives of a firm, or on the contrary is affected by the achievement of a firm's objectives (Freeman and Reed, 1983, p.91).

By any definition of stakeholder, there is largely a consensus that the accounting profit is limited to a measure of shareholder's return, while value-added is a better measure created by the stakeholders, for the stakeholders (Meek and Gray, 1988). Value-added is the increment in wealth produced by a firm's resources before they are distributed among shareholders, creditors, management/employees, and the government. The stakeholder view calls for the use of the value-added (gross or net) as a more accurate measure of the aggregate wealth created.

The value-added report that envisages the value-added measure, has found a certain degree of acceptance in various business jurisdictions, including Britain, France, Germany, the USA, Japan, Korea, and South Africa.

2.1.3 Organizational Learning Theory

Organizational learning theory (Njuguna, 2009) recognizes the internal process of continuous learning inside the organization as an underlying factor for innovation in product and process. The theory can also help understand the external environment such as the change in the customer demand and consumer preferences for products or services.

For capital investment in learning, the Organizational learning theory emphasizes appropriate investment in research and development as a key element for innovation and modernization in a product and service for any firm to stay competitive in business (Nadeem et al. 2017, Goh, 2003).

2.1.4 Resource Dependence Theory

Compared to other theories, resource dependence theory is a relatively older theory that describes an organization as an open system that is dependent on the possibilities provided by the external environment. As a result, to comprehend the performance of an organization, it is necessary to comprehend the ecological context in which the organization operates. The Resource Theory stresses the variety of a firm's resources, as well as the existence of skills within those resources. (Salancik and Pfieffer, 1978).

According to Abeysekera, (2010); Nadeem et al., (2017) as a result, the theory shows that investing in human resources and process learning is critical because they connect internal organizational resources like human resources to the external environment.

Presently, the world economy is growing at a breakneck pace, driven by advancements in business technology, and this urges the strong competition in the field of innovation that results in forcing many businesses to rethink their business models. The banking system must've been capable of sustaining in the face of competition, which means that companies in the sector must transition from being primarily labour-based businesses to becoming primarily knowledge-based businesses. The prosperity of a company is dependent on transformative creativity and knowledge capitalization, which go hand in hand with the development in the economy that has features which use in knowledge of management and scientific economy (ANIK et al., 2021). According to Solikhah et al. (2020), several business owners have an awareness that their competing ability doesn’t solely depend on the possession of assets that are materialistic but also on innovative technology, organizational management, information systems, and human resources that they possess available at their disposal. In the changing world importance of intangibles is increasing day by day. Corporations are focusing on enhancing their human capacity by investing in human capital. Such an investment may provide a conducive environment for innovation in products and services that a company would offer to its client, thus gaining a competitive edge (Roots et al, 2012).

Furthermore, Wang (2011) stated that it is becoming increasingly crucial for today's businesses to have intellectual capital as part of their overall portfolio of intangible resources, including skills, images, and intellectual property. Recent years have seen an increase in interest in intellectual capital research on a global scale, which has sparked much debate over its impact on corporate performance and employee behaviour. According to the most recent study conducted by the Organization for Economic Cooperation and Development (2006), intellectual capital is a critical driver of innovation and core value in the new economy, as it enables companies to understand

the value creation process and to also incubate expertise to counteract uncertainty regarding the future success of research and development (Kim and Kumar, 2009).

The researcher Gunawan (2017) has shown that Intellectual Capital (IC) affects the performance financially of financial firms that are described in the list on the IDX (International Depository for Exchange). Wibowo and Sabeni (2013) asserted that, in the future, information commoditization (IC) will show development and become the concern source because traditional measurement in accounting will no more be able to analyze the facts and figures for the company., IC is crucial throughout the firm's ability to compete. Moreover, the researchers Rahman, Sobhan, and Islam (2020) discovered that it has a statistically significant and positive relationship with corporate performance and intellectual capital disclosure. In addition, the impact of intellectual capital on a firm’s value has gained a lot of attention from researchers but a consensus has not been achieved on an ideal procedure to measure it (Pulic, 2004). The model proposed by the Public has received wide appreciation and facilitated research in the area, however, some researchers have modified it for a better fit.

The financial performance of a knowledge-based corporation is influenced by factors other than its financial or tangible assets. Intangible assets, which can be referred to as intellectual capital, have a substantial impact on aspects including such competition and the ability to generate value-added. Intellectual capital, including structural, labour, and intellectual capital, are important parts of the process of adding value to a company's operations. The assessment of a company's success rate by an investor concerning its share price is referred to as corporate value (Sujoko&Soebiantoro, 2007). Moreover, a Significant impact of intellectual capital on select measures of financial performance was also found in a study covering financial institutions in Srilanka. The study was conducted by Kehelwatatenna and Gunaratne in 2010. Investors’ response to

intellectual capital was also investigated vide Market / Book value ratio. In a similar study conducted on banks in the USA by Reed et al (2006), it was found that particularly in banks, investment in technology is taking precedence on human capital as technology is fast changing the banking space in the developed world. Decision-makers in banks tend to invest in technology as compared to intellectual capital to add value to their offering and ensure the seamless process flows. As a result, the worth of this corporation can serve as a standard that helps to determine whether either company is profitable or not.

Whereas the improvement in the performance of finance is accomplished through the improvement of corporate governance. After conducting a research study, Baki (2001) discovered that there is a favourable association between financial performance and corporate governance. Similarly, according to the findings of Al-Beshtawi et al. (2014)'s research, the application of corporate governance principles, including the formation of an audit committee, improves corporate governance. Additionally, the researchers Solikhah and colleagues (2020) demonstrate, that audit committee size, and frequency for the meeting of the audit committee are held and confession for intellectual capital have a positive impact on the value of the market.

The literature review has indicated three distinct dimensions of intellectual capital. These include human capital, structural capital, and customer capital. Most studies covering manufacturing companies have covered these three dimensions. A study covering Malaysian manufacturing companies by Bontis et al. (2000) has indicated that human capital has a larger impact on a firm's profitability as compared to a company involved in providing services. Whereas structural capital and customer capital exhibit more or less identical impacts on a firm's financial performance in both manufacturing and services industries.

2.2 Empirical Literature

2.2.1 Human Capital:

It consists of the skills and information that are acquired by employees and they take these with them at the time of leaving the firm (Cater and Cater, 2009); intangible capital such as this cannot be preserved by the company. For the RBV, Wright and colleagues (1994) believe that firms can acquire an unfair advantage for competition by the use of the human capital reservoir, furthermore, these enterprises examined the resources that are available to adopt an appropriate strategy. Subramaniam and Youndt (2005) explained that human capital is the most valuable supply a company may have in an era in which the knowledge and abilities of people are required to achieve a lasting competitive advantage over the competition. The relevance of human capital as a significant driver for the productivity of a firm is explained in greater detail in HC theory, which also examines the possession of employees of requisite knowledge and skills to meet the expectations and needs of their professions. Innovation and progress are critical in industries like banking and pharmaceuticals, where firms fight for market share through innovation and development. Employees with inventiveness and problem-solving abilities are in high demand at these companies. In addition, it was found in a study by Veltri (2009) that human capital has a moderating effect while studying the relationship of intellectual capital on a firm's performance. This study carried out a meta-analysis and discussed elements of intellectual capital and their possible impact in greater detail.

Additionally, Hsu and Wang (2012) suggest that the performance of a firm is improved as its personnel continues to enhance their abilities and their knowledge. This is because HC concentrates on the value-added to the company for success, as opposed to other approaches. HC contributes to organizational efficiency in a variety of ways, including

decision-making, which is enhanced when people possess the necessary skills and knowledge. Luthans and Youssef (2004) argue that when personnel possesses such inventive abilities, a company may better meet the needs of its clients. The researchers Roos and colleagues (1997) categorize human capital into two kinds of skills and expertise. The loyalty of employees, professionalism of employees, personal traits that are experienced are examples of the first group of abilities that belong completely to workers and cannot be held by the organization. Workers can pool their talents in the second set of abilities, which includes creativity, teamwork, an affirmative work atmosphere, and know-how, among others. Following the literature, and in this study, it is defined that "human capital is skill creativity, the sum of knowledge and employees personal values contribute to both intangible and tangible assets for a firm and it can further be improved by similar seminars and training."

2.2.2 Structural Capital:

Intangible capital (IC) forms a significant part of IC that stays with a company even after its employees leave. SC is comprised of rules, processes, databases, systems, and other infrastructural services that allow human capital to properly function. SC is divided into three categories. Hobley and Kerrin (2004) stated that strategic corporate citizenship is comprised of processes, procedures, and systems that enable the workers to make effective use of sources, talents, and knowledge in the pursuit of wealth generation. According to the writers, it converts the input of the firm into final products and acts as a unique source of the firm that can be purchased and maintained by the firm after it has been established and legally protected. The firms that have strong Sc will provide an opportunity to their employees to properly utilize the knowledge and expertise to attain the competitive advantage (Florin et al., 2002). In contrast, a company with a weak SC is unable to meet its performance objectives (Widener, 2006).

Today’s economies that are based on knowledge are characterized by enterprises' struggles to differentiate themselves on an innovation and quality basis. As a result, it is vital to invest in SC, which enables HC to fully exploit the abilities and creativity of its employees, hence increasing the performance of the company. Researchers describe structural capital as that of the *"total of one-of-a-kind processes that corporations acquire via research and development and subsequently safeguard through patents and other intellectual property rights."*

2.2.3 Customer Capital:

According to the literature, the capital client is referred to as the relational of capital that is explained and it linked the corporation with its employees including partners, investors, suppliers and customers, distributor and others (Cabrita & Vaz, 2005; Roos et al., 1997; Hormiga et al., 2011). It is believed that customer capital is a part of intangible capital (IC) that helps to improve the external ties of a company; selling, advertising, and advertising expenditures are significant sources of accumulating customer capital. The term "community-centeredness" (CC) refers to the sum of acts inside communities that are linked with the distribution of resources with the assistance of social structure (Bontis 2001; Cañibano et al., 2000; Hsu & Wang 2012). Instead, CC can be defined as the sum of implicit resources of a firm that are developed and implemented as a result of the firm's interactions with other individuals and businesses.

Furthermore, firms with a strong capital customer can build an additional relationship with a partner, which strengthens their interdependence with the partners they have. As a result of interdependencies, social transactions help to build trust, which can occasionally take the place of specific agreements (Dyer & Singh, 1998). Employees gain new values and abilities as a result of these exchanges, which will contribute directly to the firm's ability to generate money in the future. Following the literature,

we describe CC as *"the sum of shared values, strategic alliances, and interactions with all stakeholders that leads in an inflow of knowledge that will help better comprehend the external demands" and "the process by which the company's worth is maximized."*

2.2.4 Innovation Capital:

When a corporation has innovativeness in terms of product development, technology, and distribution channels, it is referred to as having innovation capital (INVC). Technology research and development (R&D) is the key expenditure that leads to innovation capital, which is critical in increasing proximity to suppliers. The researchers Romijn and Albaladejo (2002) suggest that a company's investment in research and development should be sufficient to generate innovation capital. It should be noted that the phrases innovation capital and structural capital are occasionally used interchangeably in the literature.

2.2.5 Social Capital:

According to Nahapiet and Ghoshal (1997), social capital (SC) is a collection of resources that a corporation has amassed via ties with other individuals or with the broader community. SC is the outcome of human ties built on trust and socialization, and it contributes to the firm's competitive advantage as well as the general welfare of the community in which it exists (Nahapiet & Ghoshal, 1998; Cohen & Levinthal, 1990). Bueno and colleagues (2004) conclude that SC is important to the effective evolution of IC.

Furthermore, it is argued by Hsu and Wang (2012) that the relation between the firm and its external environment is related to the firm performance and its pursuit of the performance optimum on the behaviour of managers that build strategies that respond to achieve the competitive advantage and be used to replace the majority of capital

resources that based physical such as plants and plants (Boulton et al., 2000). Service sectors such as insurance, banking, and telecommunications are becoming increasingly essential since their value creation depends so much on the knowledge and ability of their personnel. This enhances the need for effective assessment and management of IC in these businesses (Boulton et al., 2000). According to Rangone et al. (1997), IC measurement is critical since it is a primary driver for creating value based on knowledge of economies. However, the present accounting metrics that are based on the industry are inadequately equipped to serve the realities (Bandt, 1999).

Over the past decade, numerous research projects have been conducted to investigate the prevalence of IC and its association with the performance of firms that are based financially. One such study was conducted by the University of California at Berkeley. Pek (2005) examined the IC performance in Malaysian banks based on data from 2001 to 2003 and discovered that the efficiency of the HC part of IC is significantly better than the efficiency of the other two components of IC, namely the SC and capital utilized. According to Pek (2005), the majority of Malaysian domestic banks failed to demonstrate any increase in terms of Favorable business over the course of the study. Foreign banks, on the other hand, scored higher on efficiency measures than domestic banks. According to the findings of the study, investment in IC produces a higher rate of return than investing in physical assets.

While intellectual capital (IC) is becoming more essential as countries transition to a knowledge- and technology-based economy (Canibano et al., 2000), a standardized definition the intellectual capital (IC) remains unknown (Zambon, 2004). However, accounting literature indicates that the following rationale is often used. Edvinsson, (1997) explored in their "Annual report of Intellectual that the firm Skandia from Swedish has categorized the technology of intellectual capital into different factors,

such as information possession, the experience of practical, technology of organization, the relationship of customer and also the skills of professional. Additionally, Vergauwen et al. (2007) classified the characteristics of IC components into three categories: human, internal structural, and relational capital. Personnel capital (HC) is described as the skills and education of employees as well as their effectiveness and efficiency, to enhance a company's output. Additionally, Guthrie and Petty (2000) claimed that this kind of internal intellectual capital (IC) reflects the rules of the company's effectiveness, processes, and work environment, as well as its teams of research and development, have produced innovation. The internal capital structure subset of intangible capital that is created inside an organization. As a consequence, according to Bontis (2001), some of the factors of internal capital structure such as strategy, patents, and identities of the brand. By contrast, relational capital includes relationships with some other entities, such as customers and suppliers.

Additionally, Bozzolan et al., (2003) state that the disclosure of conventional accounting does not reflect the way of the shift from reliance on the component of IC. According to Zambon (2004), annual financial statements should contain "any event that is reasonably expected to affect a company's current financial position or future performance." While it is conceivable that integrated circuits satisfy this criterion, disclosure of integrated circuits is complicated by additional recognition criteria. Additionally, in Australia in Australia the record should be on the balance sheet, IC must comply with the definition and recognition criteria set out in AASB 138, which may be read here. Thus, among other requirements, the asset must be "split or divided from the business" the expected future economic benefits would probably go to the entity," and "the asset's cost may be properly evaluated."

Additionally, research on IC has been conducted on several occasions. Bontis (1998) asserts that the IC has an impact on the Malaysian company's services, products, and performance. Based on their research on different kinds of public businesses, Kuryanto & Syafruddin (2008) concluded that IC has not significantly impacted the success of the organization. In this case, financial success is measured in terms of return on equity (ROE), earnings per share (EPS), and yearly share returns (ASR). Likewise, Ulum (2008) performed a study on 30 banking firms during three years (2004-2006) with three years of observation. The financial performance metrics utilized include profitability, return on operating assets (ROA), revenue to total asset ratio (ATO), and revenue growth (GR). Also, in the findings of his study, Ghozali provides proof that in the three years of observation from 2004 to 2006 IC (VAIC, TM) has an impact on the performance of the financial business. It is important to note that IC has a major impact on an organization's profitability (Artinah, 2011; Suhendah, 2012).

Additionally, Suhendah (2012) discovered that the technology of Intellectual capital has a positive impact on the organization's profitability and a negative impact on the organization's productivity. It also analyzed that Intellectual capital has a significant impact on the value of the market. Indonesian businesses that went public between 2005 and 2007 were the subjects of the research. ATO measures Productivity, while market capitalization measures profitability. Profitability is assessed by return on assets, Productivity by ATO, and market value is measured by market capitalization (MB). Multivariate regression analysis was used to conduct the study. Rachmawati (2012) and Faza&Hidayah (2014) discovered that intellectual capital has a favourable impact on the return on assets (ROA) of banks. Moreover, the study performed by Rachmawati (2012) focused on banking businesses that were registered with Bank Indonesia between 2006 and 2009. A straightforward linear regression analysis was performed in

the investigation. According to academics, human capital (HC), structural capital (SC), and customer capital (CC) are the three major components of IC, which are defined as follows: Bontis & Keow (2000), Shih (2010), Chang-lin (2010), and Uzliawati & Djati (2015).

Furthermore, in an organization, HC denotes a collection of individual knowledge represented by its workers, which exists inside the company. Human capital (HC) is a combination of genetic inheritance, learning, expertise, and a good attitude toward one's life and one's profession. Specifically, SC is defined as any non-human repository of knowledge in an organization, including databases, organizational charts, process manuals, business plans, procedures, and everything else that relates to the firm's profitability being greater than its material worth, as defined by Bontis et al. (2000, 2000). Moreover, a company's commercial knowledge (CQ) is inherent in marketing channels and client relationships that it builds over the course of its operations. According to Komnenic, Tomic, and Pokrajèi (2011), increasing the efficiency of the use of tangible assets (VACA), human capital (VAHU), and structural capital (STVA) has the potential to improve the degree of profitability of a company's operations. In addition, efficiency in asset utilization shows a company's capacity to keep production cost components as low as feasible to enhance profitability while maintaining profitability. The effective use of human capital results in a rise in employee productivity at work, allowing the business to generate the greatest amount of output, which has a positive influence on the company's profitability.

Furthermore, effective use of structural capital demonstrates an improvement in the capacity of the business's structural capital to create additional value for the company, which has the potential to influence the company's profitability by improving its profitability. IC has a substantial impact on profitability. Faza & Hidayah (2014) has

conducted the research and showed that has a favourable impact on the intellectual capital on return accounting profit assets and may add value to a company's return on assets. Moreover, based on the theory, it is possible to infer the following stated hypothesis: A favourable impact of VACA on business profitability may be seen, as can a positive effect of VAHU on company profitability, and a positive effect of STVA on company profitability can also be observed. Additional to this, Productivity measures the efficiency with which the organization uses or exploits all of its resources to produce money. Organizations that want to improve their Productivity may do so by using information and communication technology (IC).

Additionally, the increased efficiency of VACA demonstrates the company's capacity to raise the number of utility assets held in the manufacturing process as a result of its increased efficiency. A rise in the efficiency of VAHU indicates a shift in staff performance in the direction of higher levels of productivity for the business. According to Shiri and Mousavi (2015), intellectual capital has a statistically significant impact on Productivity. Management, capital market analysts, borrowers, and investors may all benefit from using IC as a decision-support tool in their decision-making. Moreover, productivity is a term that may be used to describe the combination of the qualities of efficiency and effectiveness. Productivity requires sufficient resources and must be utilized effectively. In-process activities and resources must contribute to the creation of value in the final product or service.

Besides, to measure IC, several models have been devised (Xu& Wang 2018). Tobin's Q, (2) economic value added (EVA) and market value added (MVA), (3) Skandia Navigator (Edvinsson&Kivikas 2007), (4) Intangible Assets Monitor (Sveiby 1997), (5) Balanced Scorecard (Kaplan & Norton 1996), (6) Value Added Intellectual Coefficient (VAICTM) (Pulic 2000), and (7) Technology broker (Annie 1996) are some

of the methods that have been developed. Moreover, when compared to alternative measurements of intellectual capital, the majority of the researcher has used the model of VAICTM model for the effective comparison through nation and companies it's just because of its simplicity (Sardo&Serrasqueiro 2018) and because it is inexpensive. In addition, the findings are drawn on financial information that has been audited. A firm's IC efficiency is determined by measuring the efficiency of its capital employed (CEE), human capital employed (HCE), and structural capital employed (SCE). The VAICTM model is used to calculate a firm's IC efficiency (SCE). Therefore, CEE is a measure of how much value a business generates from a single monetary unit of investment in either financial or physical capital. HCE is a measure of how much value a business generates from a single monetary unit of investment in human resources.

Furthermore, the amount of capital that a business can generate via SC is measured by SCE. There are still certain limits to the VAICTM paradigm. Firstly, this approach relies on historical data from financial statements, which measures past IC rather than future value generation (Dzenopoljac et al., 2017). Second, certain critical components of IC (for example, risk capital and innovation capital) are overlooked in this approach. Moreover, RC was included in the VAICTM model by Vidyarthi (2019) and Nimtrakoon (2015) to solve this restriction. Additionally, some academics believe that the expenditures of research and development (R&D) should be recognized as a proxy for the efficiency of innovation capital (Chen et al., 2005). Additionally, it is erroneous to assume that the salary and wages shown on the income statement accurately represent the whole cost of employment (Iazzolino & Laise 2013). Finally, it is assumed that both the initial and final inventories are zero.

Additionally, many theories emphasize the significance of information and communication technology (IC) for the performance of institutions, which is important

for the long-term viability of businesses. For example, the resource-based view and the knowledge-based view both assert that intangible resources, in addition to tangible resources, are critical factors in achieving a sustainable competitive advantage and improving the performance of an institution. Hussain et al. (2018) stated that the resources of intangible are essential factors to achieve the institution's performance and as well as in competitive advantage. Moreover, following up on his previous statement, Bontis (1998) said that once managers understand the importance of IC, they will seek to expand IC since it has a good effect on performance. Nadeem et al. (2017) claimed that institutional collaboration (IC) improves the performance of institutions regardless of their location or size, and their research validated this perspective by finding a positive connection between institutional collaboration and performance. In addition, Curado et al. (2013) said that IC is a strong predictor of future banking success. Previously, a significant body of literature has shown a favourable connection between IC and performance (Kehelwalatenna & Premaratne 2014, Maji & Goswami 2016, and Oppong & Pattanayak 2019).

Additionally, Haris et al. (2019) stated that the strong relationship between IC and performance is contingent on the efficient management of intangible resources, which are notoriously difficult to manage. As a consequence, Haris et al. speculate that the connection between IC and performance may be nonlinear. They continued by stating that if management fails to increase efficiency via investments in human capital and structural capital, profitability will suffer. Additionally, as a consequence of their study, the researchers discovered an inverted U-shaped relationship between VAIC and profitability. They concluded from their study that Pakistani financial institutions are capable of generating value and retaining customers via their intellectual and quantitative investible funds and only to a limited degree. However, Britto et al. (2014)

previously used the VAIC technique to find a nonlinear relationship between IC and performance. The VAIC and MVAIC are used as main and secondary measures, respectively, to evaluate IC performance in his study.

However, as part of an effort to better understand the efficiency of IC and its impact on financial performance in a developed country, Clarke et al. (2011) evaluated the VAIC of publicly traded companies in Australia from 2004 to 2008. They discovered a positive relationship between the VAIC of publicly traded companies and the financial performance of the firms. The findings of the study also indicated that present investments in the different components of IC may result in returns in future eras. The authors analyzed the influence of a lag year expenditure in IC on the firm's financial performance in the current year and discovered a favourable association. IC was evaluated for its ability to mediate the relationship between capital invested and the financial performance of a corporation, according to the findings of the study. According to Clarke et al. (2011), IC cannot function in isolation; rather, it must be accompanied by other factors such as financial capital to be effective. Yet the authors conclude that, if proper investment in IC is undertaken in any particular year, it can have a major impact on the financial performance of a company both in that year as well as in subsequent years.

Furthermore, the importance of the knowledge economy has increased in recent years, and previous studies have investigated the impact of IC on PFP. For example, Bontis et al. (2000) found that three components of the knowledge economy, namely (1) human capital; (2) structural capital; and (3) customer capital, have quite a favourable connection with PFP in a Malaysian sample. the researcher Riahi-Belkaoui (2003) examined a sample of multinational corporations in the United States and discovered that IC might considerably boost return on total assets. Based on research conducted in

the Indian software industry. Ghosh & Mondal (2009) discovered that a two-component IC (human capital and structural capacity) had a beneficial impact on business profitability. Waseem et al. (2018) demonstrated that three IC aspects (human, relational, and technological) have a statistically significant positive effect on the organizational performance of large textile enterprises in Pakistan in their study of the country.

In the Chinese context, researchers Lu et al. (2021) discovered using data from publicly traded companies in the computer industry, that a three-component IC (human, physical, and structural) made a favourable contribution to PFP. The 4-component IC (people, innovation, process, and customer) demonstrated a favourable influence on enterprise value creation in the Chinese pharmaceutical manufacturing business, as validated in (Xing-li, 2013). According to Xu and Wang (2019), the performance of IC in China and South Korea was examined using the VAICTM and Modified VAICTM models. They discovered that personal, interpersonal, and structural capitals have all been significantly associated with the profitability of textile enterprises.

Additionally, the textile and garment sector in Pakistan is a pillar of the country's economy. Pakistan's textile industry is the country's largest manufacturing sector, accounting for 8.5 per cent of the country's gross domestic product. The textile sector accounted for around 60% of the nation's total export profits, contributes 46% of total manufacturing, and accounts for more than 40% of all bank loans used in the manufacturing sector. Employed workers account for 38 per cent of the country's overall labour force (Tanveer & Zafar, 2012). This sector is thriving and requires further investigation to improve the companies that are involved in textile production in Pakistan (Firoz, 2021). The importance of a sector necessitates an in-depth investigation that is required at both the industrial and corporate levels.

Furthermore, the textile industry is a long-standing fixture in the worldwide industrial category. Its ability to produce products using advanced and innovative technologies, while stressing competitiveness in its organizational structure and business processes, is critical to its continued success (Padilha and Gomes, 2016).

The culture of an organization has been one of the aspects that might stimulate creative thinking. Even though it has an impact on the behaviours of employees, organizational culture may have an impact on their recognition of innovation as a crucial aspect of the company's growth, thereby increasing the company's dedication to innovation. Organizational culture too is considered to be a predictor of innovation because it can either support or hamper the development of new ideas. Furthermore, organizational innovation must be accompanied by the establishment of an appropriate organizational structure (Gomes et al., 2015).

In particular, Malinowska-Olszowy (2013) asserted that I.C. plays a critical role in the textile industry's long-term viability and expansion. To do this, textile firms must place a strong emphasis on the execution of I.C. plans as well as the development of new skills and capabilities in today's competitive market environment (Malinowska-Olszowy, 2013).

According to the Pakistan Economic Survey 2014-15, the industrial sector contributes 20.30 per cent to GDP, with the manufacturing sub-sector accounting for 65.4 per cent of total contribution to GDP in the industrial sector (Ministry of Finance, 2015a). The textile industry in Pakistan is the most important industrial sector in the country, and it provides the greatest number of employment opportunities for trained, semi-skilled, and unskilled labourers. It contributes an 8.5 per cent share to GDP, makes up more than 60 per cent of exports, and employs more than 40 per cent of the industrial sector's workers (Ministry of Finance, 2015b). Aspects of the textile business include four primary

processes: ginning, spinning, weaving, and the production of clothes. Despite its significant contribution to the economy, the textile industry has continued to face several challenges, including volatile cotton and yarn prices, a scarcity of modern machinery, inconsistent crop production, a scarcity of skilled labour, and the most visible, load shedding of natural gas and electricity supplies (Sadiq, Nosheen, & Akhtar, 2020).

Numerous research has empirically used VAIC as a proxy for IC. Firer and Williams (2003) examined the connection between IC and conventional metrics of business performance using the VAIC method. They utilized a sample of 75 publicly listed businesses in South Africa, however, the empirical evidence did not show any connection between the three components of value-added efficiency and the three outcome characteristics (profitability, productivity, and market value). Their results indicate that South African businesses rely heavily on physical assets and place a low premium on structural capital, whereas the market seems to respond adversely to enterprises that focus only on human capital development. In general, Firer and Williams' (2003) results indicate that physical capital remains the most important underlying resource for business success in South Africa, despite attempts to expand the country's IC base.

Chen et al. (2005) examined the connection between IC, market value, and financial performance using an empirical approach. They analyzed a wide sample of publicly-traded Taiwanese businesses using Pulic's (2000a, b) VAIC. Their research demonstrated the critical role of information technology in enhancing company profitability and sales growth. The empirical findings indicate that investors value businesses with a higher IC efficiency more highly; and that organizations with a higher IC efficiency achieve a greater level of growth and profit expansion in the

global and subsequent years. Chen et al. (2005) found that IC is a huge strategic resource since it is favourably correlated with the selling price and financial performance of the firm.

In addition, in many other pieces of research, mostly in developed and emerging markets, Public (2000a, b) established the VAIC method. Muhammad and Ismail (2009) have attempted to study the efficiency and performance of IC in the Malaysian financial industry based on data for 2007 from 18 firms. It was discovered that the banking industry was the one most dependent on IC, followed by insurance and brokerage firms. It has also been shown that IC is related to business success (evaluated by efficiency and ROA) though, on the other hand, the market value was found to be more generated by capital utilized (physically and financially) in Malaysia's financial sectors than by IC. This latest result of Muhammad and Ismail, 2009, was consistent with the earlier research carried out in the same nation during the years 2001 to 2003 (Goh, 2005), which showed that Malaysian banks, evaluated by conventional economic metrics, had low IC coefficients.

Samiloglu (2006) performed another research in the Turkish banking industry to ascertain the existence of a substantial connection between VAIC and market to book value ratio. Between 1998 and 2001, the author analyzed the financial accounts of banks registered on the Istanbul Stock Exchange. The findings showed that no connection existed between both the predictor variables (MV/BV) and the independent factors (VAIC and its three components).

Furthermore, Gan and Saleh (2008) investigated the connection between IC and corporate performance of technology-intensive companies listed on Bursa Malaysia, examining whether value creation efficiency (as measured by VAIC) can be justified by current value, profitability, and productivity. Gan and Saleh (2008) found that

although VAIC may account for profitability and productivity, it cannot account for market value. Shiu (2006) discovered a strong positive connection between VAIC, profitability, and market value, as well as an inverse relationship with productivity, incomparable research conducted in Taiwan. Tseng and Goo (2005) discovered a favourable connection between IC and company value in an empirical analysis of Taiwanese businesses.

Appuhami (2007) examined the relationship between value generation efficiency and the financial gains made by investors on their stock investments. This study made use of data gathered from publicly traded businesses on Thailand's stock market, and it followed the VAIC methodology. According to the findings of the empirical study, a firm's internal control (IC) has a statistically significant positive connection with its investors' investment income on stocks.

Puntillo (2009) analyzed the connection between efficiency in value creation and market assessment and performance by utilizing data from 21 banks borne in Milan, Italy, in a study performed with the VAIC in the traditional west economy. Except for the connection between the capital efficiency utilized (a component in VAIC) and various measures in the company's performance, the results could not demonstrate positive significant associations between the variables examined.

Finally, Mohiuddin et al (2006) utilized VAIC for exploratory research to evaluate IC performance during the period from 2002 to 2004 of 17 business banks in Bangladesh. All 17 sample banks were found to have relatively greater efficiency of human capital than some other investment expenditures.

Mavridis and Kyrmizoglou (2005) utilized data from the banking industry in one research carried out in Greece and concludes that there is a positive connection

between added value and physical capital, but particularly among value-added and human intelligence.

Shaneeb and Sumathy (2021) conducted a study about intellectual capital impact on the Indian textile industry of financial performance with the help of using model Value-added intellectual capital co-efficient (VAIC). For this study, the researchers explored profitability, productivity, and return on equity as the proxies for measuring a firm's financial performance. Shaneeb and Sumathy (2021) used the method of VAIC and was applied it to a sample of 81 textile companies. Moreover, the result of this study examined that the ratios of profitability such as ROE and ROA and productivity (ATO) were 0.098%, 0.052%, and 1.132%. The lowest ROA value is - 0.428 in the 2017-18 timeframe. This may be the explanation for the textiles industry's poorest performance in 2017-18 and may be due to the Indian Government's introduction of the Goods and Service Tax (GST) in July 2017. In addition, the study also indicates that intellectual capital has a mean value of 4, 95. Comparative components of intellectual capital imply that the value produced in the industry is generated by people and not employed capital and structural capital.

Furthermore, Sadiq et al. (2020) accompanied a study about intellectual capital's impact on the governance of the textile industry. They utilized the quantitative correlation methodology for this research to examine the connection between both the corporation governance indicators and the intellectual capital performance of the company. Moreover, they utilized a systemic sampling method to get the sample, which is 50% of the population. Total assets are classified into two categories by the value of the (size-based categorization). The group above the medium is referred to be big enterprises (86 businesses); below the median are small enterprises (86 companies) based on size. In addition, secondary statistics are taken from company annual reports.

The extensive nature of the composite CG index computation and VAIC restricted the authors from examining the data from 2010 to 2014 for five years. Data from 12 businesses are not accessible; thus, 74 companies are included in the final sample for analysis. Consequently, the results of this research indicate that the Corporate Governance Index has a significant but unfavourable effect on intellectual capital performance in the textile industry. Besides, most of the prior research in corporate governance literature has been favourable, although few studies have shown substantial adverse effects, such as Bebchuk et al. (2004). The significant element implies that corporate governance plays a key part in the industry's success, while a negative sign suggests that numerous obstacles are preventing this industry from demonstrating a good and developing condition. Also, the oil crisis, Pakistani rupee depreciation, political instability, the absence of qualified work, effective management, state-of-the-art technology, or non-conformity with governance norms may have detrimental effects on the performance of intellectual capital.

Additionally, Deep and Pal Narwal (2014) research analyzed the connection between intellectual capital and Indian Textile Sector financial performance indicators over a period of 10 years from 2002 to 2012. For this research, the CMIE prowess database utilized Corporate Annual Reports, notably the profit and loss statements and balances of chosen businesses for the corresponding years. The VAIC technique is used for the measurement of the intellectual capital of businesses. Moreover, the findings indicate that the values of all variables are the medians, minimum, maximum, and standard deviations. The mean VAIC is approx. 4.38, indicating that for every One Rupee employed, Indian textile firms have made 4.348 Rupees. The MB is around 0.47, which indicates that investors do not exceed the book value of total assets in sample businesses. The ROA and ATO amount correspondingly to about 0.016 and 1.036. In

addition, the correlation coefficient and its significance are calculated to provide an initial assessment of whether there is any connection between the independent and dependent variables. The results show that ROA (1% meaning level), MB (1% meaning), and SALES (5% meaning) are linked substantially and favourably to VAIC and that they are adversely related to DER (at 1 per cent significance level). Results indicate a favourable link between intellectual capital efficiency and profitability and the company's market value.

Furthermore, Xu and Wang (2018) experimentally examine the influence of IK on the Korean manufacturing industry's financial performance and sustained growth. The data gathered from 390 manufacturers listed on the Korean Capital Market from 2012–2016 are used for multiple regression models. The analytical results demonstrate that IC has a favourable effect on financial performance and sustained corporate growth. Furthermore, the performance and sustainable expansion of enterprises are linked positively to physical, human, and relation capital (RC). Moreover, the greatest influential factor was identified in RC. Finally, creative capital gathers extra structural capital information (SC), which severely impacts Korean manufacturing businesses' performance. Therefore, the results increase IC's understanding of corporate value creation and sustained benefits in emerging markets.

Besides, Pal and Suriya (2012) conducted a study to compare the performance of Indian pharmaceutical and textile industries with their intellectual capital. The study also tries to explore the relationship between liquidity and profitability and market valuation for intellectual capital efficiency. Moreover, empirical research using data gathered from the CMIE Prowess database was conducted. A chosen sample of 105 pharmaceuticals firms and 102 textiles companies was computed to determine VAIC. Models of association and Ordinary least square multiple regression analysis are utilized for

analytical panel data. In addition, the findings of this study analyzed that both sectors have favourable relationships between profitability and intellectual capital, but there is no substantial connection between intellectual capital and productivity or market value. However, despite the increasing significance of intellectual capital, its reflection in the financial performance of a chosen sample of businesses is not proportionately found to be high.

Additionally, Sivalogathasan and Wu (2015) directed a study to show how the organizational motivation and organizational features between the intelligent capital and the capacity for innovation in the textile and apparel sector are mediated and moderated in Sri Lanka. Moreover, to gather data in the textile and clothing sector in Sri Lanka, a structured survey based on the questionnaires with 42 items was utilized. This study employed the revised version of the questionnaire. Modifications have been made to guarantee that the construction is relevant to Sri Lankan research. In Sri Lanka, there have been 450 questionnaires issued. There were returned a total of 304 completed questionnaires. In addition, this was deemed excellent, with a response rate of 67 per cent. The research broke down the questionnaire by dividing it into four concept variables: intellectual capital, motivation, characteristics, and creativity, but the design of the questionnaire followed the detailed measurement technique. Likewise, the result of this study has shown that the positive and disorders mediating effect on connections between intellectual capital and innovative capacities of the motivation of organizations are favourable. Moreover, Visual examination indicates that when companies are highly motivated, there is a positive connection between intellectual capital and innovation capacity, and the relations between intellectual capital and innovation capacity are negatively affected by low organizational motivation. Finally, the beneficial influence on the connection between intellectual capital and innovation skills

by organizational motivation indicates that it may mediate positively about the capacity of innovation.

Furthermore, Oppong et al. (2019) conducted a study to investigate the influence of the efficiency of IC on changes in the insurance company of productivity in Giana. This study used the method of the VAIC model to measure the efficiency of IC. While the research used Value Added Intellectual Coefficients as a measure of IC effectiveness via a panel of 33 assurance firms between 2008 and 2016, the Malmquist Productivity Index is used to quantify changes in Insurance Companies' productivity. The Generalized System Method of Moment (GMM) applies in evaluating the impact of IC on production due to its power over indigenousness and heteroscedasticity. Moreover, this study has Strong empirical results on productivity analysis that revealed that insurers' productivity improved at three-year intervals out of the total study year, according to the findings. The findings of a panel regression showed that insurance company productivity is strongly influenced by IC, as well as by human capital and capital utilized. In addition, this study has a possible limitation to the research's generalizability that it is restricted to insurance companies operating in Ghana; certain companies were excluded from the study as a result of mergers and acquisitions that decreased the final sample size. However, the results aid in the validation of the IC concept and, as a result, educate managers and policymakers on the use of IC as a source of competitive advantage.

Additionally, Chowdhury et al. (2018) conducted a research study on the Bangladeshi Textile industry, and this article aims to examine the relationship between intellectual capital (IC) and financial performance, intending to provide insights into the effect of IC on developing market financial performance. Moreover, for this study between 2013 and 2017, the researcher gathered data from 34 Bangladeshi textile companies. Using

descriptive statistics and multiple regression methods, we investigated the IC efficiency, as measured by the value-added intellectual coefficient (VAIC) model, and its effect on financial performance, as measured by return on assets (ROA), return on equity (ROE), and asset turnover (ATO). The study is conducted using secondary data extracted from yearly reports. In addition, the results show the influence on the financial performance of the VAIC components and also revealed different connections with fluctuations in economic indicators. The VAIC components substantially affected productivity results, with both productivity and profitability being controlled by tangible capital. It was also observed that structural capital has substantial impacts on human capital on ATO and ROA, which indicate that all financial performance metrics will not have a major influence.

At the same time, the researchers Sardo and Serrasqueiro (2017) conducted a study in Europe, and this study aimed to find out the relationship between the intellectual capital, performance of financial and value of market of European firms. For this study, the researchers collected the data for the period between 2004 and 2015, the dynamic estimator for GMM systems (1998) and the influence of lagged explanatory factors in financial performance and market value was used for an extensive sample of non-financial listed companies from 14 countries in Western Europe. Moreover, IC is a key resource in the value generation of companies, as seen in the findings. Capital is a significant component in the prosperity of businesses. Results demonstrate that the effectiveness of capital utilized has a favourable short-term influence on the financial success of companies. IC components may not have an immediate influence on the market value of companies. Structural capital influences the financial performance of companies positively over the long term. The data also show that the concentration of ownership and ownership participation restrict the IC performance of companies. In

addition, this study adds to the field of industrial relations research by examining a large sample of businesses throughout Western Europe using econometric modelling. GMM system (1998), given that the impact of IC on companies' financial performance takes time to manifest and therefore must be quantified, the influence of delayed explanatory factors on performance was evaluated using dynamic panel estimators, more precisely the dynamic estimator.

Chapter 3

Data and Methodology

3.1 Data and Variable Discription

The main purpose of this study is to investigate the possible impact of Intellectual capital on the market value and financial performance of Textile Composite companies listed on the Pakistan Stock Exchange (PSX). A sample of large twenty-five companies has been taken in the Textile composite segment for the study. The purpose of the study is to collect the data from the textile industry and therefore all 25 listed companies are part of this study.

These companies have export orientation and are likely to understand the importance of Intellectual capital and its importance in ensuring continued acceptable performance.

Data for this quantitative study has been collected from several sources including financial reports, corporate websites, and Pakistan Stock Exchange sources. Data is collected in panel data format since data is two-dimensional where each member in the selected group has a large number of respective observations over the period from the year 2010 to 2020.

Our study is based upon a model proposed by Pulic (1998), referred to as **Value-added Intellectual Coefficient "VAIC"** which has been popular with researchers in the field due to its relatively simple relationship model and data requirement. VAIC model is defined by the following relationship:

$$VAIC = HCE + SCE + CEE \qquad (3.1)$$

Where HCE stands for Human Capital efficiency, SCE refers to Structural Capital efficiency and CEE as Capital Employed efficiency. Various components of VAIC will serve as independent variables in the study.

Human capital is defined as the economic value of a worker's experience, knowledge, training, and skill level.

Structural capital refers to the non-infrastructure resources that provide support to human capital to function. This may include intellectual property, technological footprint, brand value, and other intangibles.

Capital employed is defined as the financial capital invested in the business like the book value of the firm.

To measure a firm's performance, the number of financial indicators are considered in various previous studies. Considering the manufacturing segment and in light of the literature review, we have selected the following financial indicators (ratios):

i) **Asset Turnover (ATO):** This is a financial ratio that measures the efficiency of a firm by using its assets in generating revenue/sales. As per Investopedia, it is calculated by dividing Annual Sales by Average Assets carried in the books of the firm.

ii) **Return on Asset (RoA):** This financial ratio measures the profitability of assets of a firm in percentage terms in generating revenues. The ratio is calculated by dividing Net profit (at the bottom of the Profit Loss statement) by the assets of the firm.

iii) **Price / Book value (P/B):** The price Book ratio is a popular means to compare a firm's market capitalization to its book value. It is calculated as suggested

by Investopedia by dividing the firm's stock price per share by its book value per share (BVPS).

The above mentioned financial ratios serve as the dependent variable in our model. The effect of each component of the VAIC model is worked out on these respective financial indicators to determine the significance of the former on the financial performance of the selected companies.

3.2 Estimation Model and Panel Data Analysis

The empirical formula that determines the relationship between a firm's financial performance with Intellectual capital is described as follows:

$$FP_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \mu_{it} \quad (3.2)$$

$$FP_{it} = \beta_0 + \beta_1 VAIC_{it} + \mu_{it} \quad (3.3)$$

Where, FP represents various indicators of performance including RoA, P/B and ATO. Independent variables i.e. VAIC, HCE, SCE, and CEE. U represents the error term.

Estimation is conducted through the Generalized Method of Moments (GMM) statistical method which is recommended for Panel data analysis.

3.2.1 Generalized Method of Moments (GMM)

The data is cross-sectional in nature with regard to time. When our model has an endogeneity issue, we utilize the generalized method of moments (GMM). The endogeneity issue arises for three reasons:

1) Omitted Variable biasedness
2) Biasness of simultaneity
3) Error of measurement

Our explanatory variable connects with the error term for these three reasons. Concerns regarding bias resulting from endogeneity as a consequence of our model's dynamic nature led us to use the Generalized Method of Moments (GMM) method, which produces robust findings (Chan and Hameed (2006) Liu, and Hou, (2019)). In our scenario, there are many possible solutions to the endogeneity issue. To begin, synchronicity may have an impact on economic policy, which in turn affects our independent variables. Second, there is a possibility that certain unobserved omitted factors, such as structural and institutional features, are associated with our independent variables and model synchrony. Third, there is a potential of measurement error in our main variables, which may result in an endogeneity issue in our model (Arestis and Phelps (2016)). Due to the presence of endogenous variables, our OLS estimators become biased and cease to be BLUE. The regression model has the following generic form:

$$Y_{it} = X_{it}\beta + \varepsilon_{it} \quad (3.4)$$

Where

$$E(X_{it}, \varepsilon_{it}) \neq 0$$

We propose instrumental variables to resolve this endogeneity issue. These instrumental factors are chosen in such a way that they are strongly linked with the explained variable and not with the standard error.

$$Y_{it} = X_{it}\beta + Z_{it}\alpha + \varepsilon_{it} \quad (3.5)$$

Z_t is an instrumental variable where:

$$E(Z_{it}, \varepsilon_{it}) = 0$$

The generalized moment method (GMM) imposes fewer constraints on the distribution of the given model. GMM is also relevant when the moment circumstances exceed the parameters and provides the most significant result in models using the IV method (Wooldridge, 2010). To determine the indigeneity of our model, we utilize a weak instrument test. For the estimate of common cross-section regression, I the following model (equations) I used:

3.2.2 Unit-Root Test

URTs from a time series deal with a non-static unit root hypothesis; i.e., the hypothesis of a series is a process of integrated order 1. (Aydin and Pata 2020). The alternative is that in the event we evaluate a trend below zero, the time series is weakly stationary or trend stationery. But the process gets explosive if μ1>1. It's another option. This study focused on AR(1), intercept, and linear models. The Augmentation Dickey-Fuller(ADF) URT treats ARMA(p,q) models as an AR(1) model with extra components of differences and may then utilize the crucial data of a Dickey-Fuller built using an AR(1) model after basically stripping out these additions.

Null URT Hypothesis

The null hypothesis is defined by the model AR(1) xt = f 1xt−1+ μt where μ1=1, unless as otherwise stated. This is a non-stationary process of I(Güriş 2019). This is rare in statistics, in which we normally consider that the multiplier is 0 under the null as in a t-test for a linear regression model coefficient. The μ1=1 is selected as a null because many time-series have unit roots in finance and economics. In a 1-dimensional state-

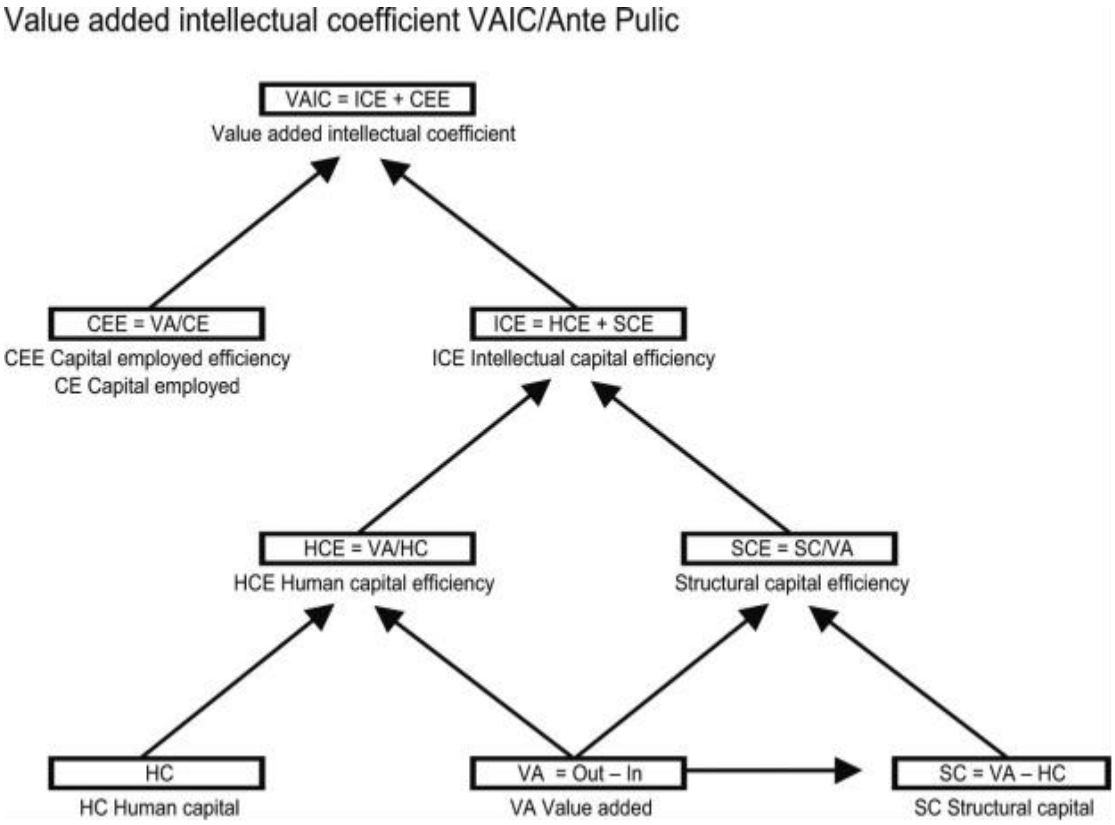
space model such as a representation, if the null hypothesis in AR(1) is modified to accept an interception and a linear trend as follows:

$$X_t = \theta_1 X_{t-1} + \varepsilon_t \quad (3.6)$$

$$Y_t = \beta_0 + \beta_{2t} + X_t \quad (3.7)$$

$$\theta_1 = 1$$

3.3 Independent Variables: VAIC Framework



The VAIC model developed by Pulic is used to determine a firm's intellectual capital. VAIC analyses financial statements to determine the overall efficiency of the IC and the asset worth of a business. This paradigm is critical for managerial decision-making. VAIC has been utilized as an indication of VA by IC coefficient in many pieces of research (Mavridis, 2004; Kamath, 2008; Joshi et al., 2013; Purohit and Tondon, 2015). The financial report data are processed, and the values produced make cross-sectional

company data simple to use and compare. Additionally, it may be utilized by stakeholders to get insight into the firm's intangible assets. VAIC is equal to the sum of CEE, SCE, and HCE in Pulic's approach. VAIC is calculated in three steps:

The first procedure is to have a company determine the VA. VA is used to evaluate an organization's successful use of information technology (IC), allowing the organization to categorize the additional value produced by the resources. The goal is to maximize value or worth using scarce physical and intangible resources. The following equation is used to determine VA:

$$VA = D + A + OP + HC \quad (3.8)$$

Where D represents depreciation, A represents amortization, OP represents operating profits, and HC represents total employee costs. The second stage is to determine the Excellent and outstanding of IC, which is a combination of the HCE and SCE:

$$ICE = HCE + SCE \quad (3.9)$$

HCE is a proxy for the HC's VA efficiency, according to Ramrez et al. (2017). It quantifies the relationship between VA and HC, which would be defined as the amount of VA generated per monetary unit invested in workers:

$$VA = HCE = HCE \quad (3.10)$$

HC is the number of money workers make in pay and benefits. HC and capital are utilized to serve as proxies for tangible and intangible resources, respectively, in a firm's resource allocation.

When it comes to performance and competitiveness, a firm's internal resources are critical. This is following the resource-based approach (Riahi-Belkaoui, 2003; Chen

et al., 2005). There's a big distinction between VA and HC, and that's SC. SCE assesses SC's VA efficacy. The results are as follows:

$$SC = VA = SCE \tag{3.11}$$

The efficiency of the company's PC is calculated in the model's third section. CEE assesses the relationship between VA and CE and makes recommendations. This is based on the work of Pulic (2000, 2005) and Chen et al. (2005), and is illustrated in Equation (4), which measures the contribution of capital utilized as a proxy for VA efficiency:

$$VA/CE = CEE \tag{3.12}$$

Where CE denotes working capital in the business in the past and is computed as the proportion of the total liabilities and intellectual properties, respectively. This means that the VAIC approach places a strong focus on determining the proportional contribution of intellectual, physical, and economic centre to the production of value:

$$VAIC = ICE + CEE \tag{3.13}$$

Or:

$$VAIC = SCE + HCE + CEE \tag{3.14}$$

Chapter 4

Estimation Results and Interpretation

4.1 Descriptive Statistics

Table 4. 1 Descriptive Statistics

Descriptive Statistics							
	ROA	**ATO**	**PBV**	**HCE**	**SCE**	**CEE**	**VAIC**
Mean	0.0430	1.1257	1.0073	19.2660	0.9360	0.5188	20.7207
Median	0.0398	1.0885	0.5703	15.3932	0.9361	0.3448	16.6016
Maximum	0.2457	3.0728	28.8833	77.3542	4.7741	10.2241	78.8419
Minimum	-0.2562	0.0067	0.0003	-2.3222	0.2409	-0.4923	-0.9865
Std. Dev.	0.0633	0.5441	2.2341	14.0913	0.2698	0.9178	14.0622
Skewness	-0.4902	0.6817	8.6818	1.3153	11.7900	7.2456	1.3349
Kurtosis	6.8107	4.5179	99.9153	4.7256	164.3872	65.4008	4.7860

The above-presented table is showing the results of descriptive statistics for all variables used in the study. The results are showing that return on assets has an average value i.e. 0.0430, which means the average return on assets of selected companies is 4.3%. The variation in return on assets is shown by the standard deviation (SD) i.e.

0.0633, which indicates that the values of return on assets may change from average values up to 0.0633. The results are also indicating that the minimum return on assets is found -0.2562 and the maximum return on assets is 0.2457.

The average value of ATO is 1.126, which reflects that on an average assets turnover of the selected companies is found to be 1.126, which may change from average with the value 0.544 as per the indicated standard deviation. The minimum and maximum average asset turnover are found at 0.0067 and 3.0728. The results further indicate that the average value of price to book (PBV) is 1.0073, which may change up to 2.2341. The results are showing that the maximum and minimum value of PBV is found 0.0003 and the maximum is 28.88. Moreover, the results show that on average Human capital employed (HCE) is 19.266 with a standard deviation of 14.0913. The average value of Structural capital (SCE) is 0.9360 and variation is found as 0.2698. The average value of CEE is 0.5188 with a standard deviation of 0.9178. The maximum and minimum values of all independent variables are also presented in the table.

The averagely intellectual capital index (VAIC) is found as 20.72 with a value of the standard deviation of 14.0622. The results further indicate that minimum and maximum values of all variables are also mentioned in the above table. The skewness for all variables has been mentioned in the above table, which indicates that all variables except return on assets (ROA) are positively skewed. The value of kurtosis is indicated that the curves for all variables are leptokurtic.

4.2 Correlation Analysis

Table 4. 2 Correlation Matrix

	ROA	ATO	PBV	HCE	SCE	CEE	VAIC
ROA	1.0000						
ATO	0.3156	1.0000					
PBV	-0.0536	-0.1008	1.0000				
HCE	0.4209	0.2522	-0.1414	1.0000			
SCE	-0.1917	-0.0361	-0.0683	0.0616	1.0000		
CEE	-0.0578	0.0509	0.8461	-0.0832	-0.0985	1.0000	
VAIC	0.4143	0.2553	-0.0878	0.7978	0.0745	-0.0200	1.0000

The above table is showing the results for correlation analysis. The results are indicating that all independent variables have a weak correlation to each other, which means no serious issue of multi-co-linearity is there. ROA has a negative relationship with PBV, SCE, and CEE and a positive relationship with ATO, HCE, and VAIC. ATO has a negative relationship with PBV and SCE, whereas it has a positive relationship with HCE, CEE, and VAIC. The results are further indicating that HCE has a positive relationship with SCE (r = 0.0616) and VAIC (r = 0.7978), but has a negative relationship with CEE (r = -0.0832). SCE has a negative relationship with CEE (r = -0.0985) and positive with VAIC (r = 0.045). CEE has a negative relationship with VAIC (r = -0.0200).

4.3 Panel Unit root test (Stationarity of data)

The below-presented table shows the results for the panel unit root test, which indicates that the Null hypothesis that data for ROA is non-stationary is rejected. As, the value of CIPS fall in the critical region, which shows that data for ROA is stationary at level I(0).

Table 4. 3 Unit Root Test

S.No	Variables	CIPS values	Critical Region		Status
1	ROA	-6.236	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	
2	ATO	-4.335	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	
3	PBV	-4.635	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	
4	VAIC	-5.383	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	
5	HCE	-5.358	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	
6	SCE	-4.934	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	
7	CEE	-4.297	1%	-2.96	Stationary at level
			5%	-2.76	
			10%	-2.66	

In the case of ATO, the results are indicating that the value of CIPS falls in the critical region, which shows that the data for ATO is stationary. Moreover, the results are also demonstrated that the value of CIPS also falls in the critical region in the case of PBV, which confirms the stationary of PBV. Unit root test is applied to check the stationary of the data and all variables are stationary at level, which indicates the application of regression.

The results for VAIC also show that the value of CIPS falls in the critical region, which confirms the acceptance of the alternative hypothesis that data is stationary. Similarly, the results of unit root tests performed for HCE, SCE, and CEE are demonstrating that the values for CIPS for all these variables fall in the critical region, which confirms the stationary of the data for these variables. In a nutshell, all variables are stationary at level I(0) and regression analysis can be carried out for further analysis.

4.4 Testing of Hypothesis (Generalize Method of Moments - GMM)

4.4.1 Impact of Components of Intellectual Capital on Firm's Performance

a) Dependent Variable – Return on Assets (RoA)

Table 4. 4 Dependent Variable: ROA

Dependent Variable: ROA				
Method: Panel GMM EGLS (Cross-section weights)				
Variable	**Coefficient**	**S.E**	**t-Statistic**	**Prob.**
C	0.2714	0.3036	0.8939	0.3724
HCE	0.0018	0.0006	2.7498	0.0065
SCE	-0.2977	0.3447	-0.8635	0.3888
CEE	0.0221	0.0080	2.7644	0.0062
R-squared	0.6463	**Adj R-Square**		0.6033

The above presented table is showing the results for Generalized Method of Moments (GMM) in which the influence of various components of Intellectual capital, i.e. HCE, SCE, and CEE on return on assets (ROA) has been captured. The value of the R-square is 0.6463, which indicates that the model is showing 63% explanatory power of the model. The statistical method GMM has been applied to test the hypothesis and to address the problem of endogeneity. The instrumental variables are taken the lag of the dependent variable and all independent variables to remove the problem of endogeneity.

The co-efficient of HCE is positive and significant as the co-efficient of HCE is 0.00118, where the p-value is less than 0.05 i.e. 0.0065. Thus these results demonstrate

that HCE has a positive and significant influence on return on assets (ROA). If one unit of HCE is increased then 0.0018 unit of return on assets is increased and vice versa. On the other hand, the co-efficient of SCE is negative but insignificant with a p-value greater than 0.05, which indicates that SCE has no impact on return on assets (ROA).

When we look at the component CEE, the results further indicate that the co-efficient of CEE is 0.022 with a p-value less than 0.05. The co-efficient of CEE is positive and significant, which indicates that the impact of CEE on return on assets is positive. If one unit of CEE has increased then 0.022 units of return on assets (ROA) is increased.

b) **Dependent Variable – Asset Turnover (ATO)**

Table 4. 5 Dependent Variable: ATO

Dependent Variable: ATO				
Method: Panel Generalized Method of Moments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	1.0321	0.3023	3.4136	0.0008
HCE	0.0181	0.0056	3.2135	0.0015
SCE	-0.3670	0.2782	-1.3190	0.1885
CEE	0.0562	0.0203	2.7694	0.0061
R-square	0.8470	**Adj R-square**		0.8283

The above presented results are showing the influence of various components of Intellectual capital, i.e. HCE, SCE, and CEE on the financial indicator - assets turnover (ATO). The explanatory power of the model is 84.70% as the value of R-square is 0.8464. The Generalized Method of Moments (GMM) has been applied to find out the results and to address the problem of endogeneity. The instrumental variables are taken as the lag of the dependent variable and all independent variables to remove the problem of endogeneity.

The co-efficient of HCE is positive and significant as the co-efficient of HCE is 0.0181 with a p-value less than 0.05 i.e. 0.0015. Thus these results demonstrated that HCE has a positive and significant influence on assets turnover (ATO). If one unit of HCE has increased then 0.0181 units of assets turnover (ATO) is increased and vice versa. The co-efficient of SCE is negative but insignificant with a p-value greater than 0.05, which indicates that SCE has no impact on return on assets (ROA).

The results are further intimate that the co-efficient of CEE is 0.056 with a p-value less than 0.05. The co-efficient of CEE is positive and significant, which indicates that the impact of CEE on assets turnover (ATO) is positive. If one unit of CEE has increased then 0.056 units of assets turnover (ATO) is increased.

c) **Dependent Variable – Price to Book value (P/B)**

Table 4. 6 Dependent Variable: PBV

Dependent Variable: PBV				
Method: Panel GMM EGLS (Cross-section weights)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.9591	0.3676	2.6088	0.0098
HCE	-0.0045	0.0033	-1.3752	0.1706
SCE	-0.3793	0.4446	-0.8531	0.3946
CEE	0.9608	0.2919	3.2919	0.0012
R-squared	0.8694	**Adj R-Square**		0.8528

The above presented results are showing the influence of various components of Intellectual capital, i.e. HCE, SCE, and CEE on the financial ratio, price to book value (P/B). The explanatory power of the model is 86.93% as the value of R-square is 86.93. The Generalized Method of Moments (GMM) has been applied to find out the results and to address the problem of endogeneity. The instrumental variables are taken as the lag of the dependent variable and all independent variables to remove the problem of endogeneity.

The co-efficient of HCE and SCE is negative but insignificant with a p-value greater than 0.05, which indicates that both HCE and SCE have no impact on the price to book ratio. The results further indicate that the co-efficient of CEE is 0.9610 with a p-value

less than 0.05. The co-efficient of CEE is positive and significant, which indicates that the impact of CEE on PBV is positive. If one unit of CEE has increased then 0.9610 units of PBV is increased.

4.4.2 Impact of Intellectual Capital Index (VAIC) on Firm's Performance

d) Dependent Variable – Return on Assets (RoA)

Table 4. 7 Dependent Variable: ROA

Dependent Variable: ROA				
Method: Panel GMM EGLS (Cross-section weights)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.0142	0.0058	2.4475	0.0152
VAIC	0.0014	0.0003	4.1186	0.0001
R-squared	0.7073	**Adj R-square**		0.6746

The above presented results are showing the impact of the intellectual index (VAIC) i.e. combination of its components i.e. HCE, SCE, and CEE on firm performance measured by return on assets (ROA). The explanatory power of the model is 70.7%. Generalized Methods of Moments (GMM) has been applied to check the impact of VAIC on return on assets (ROA). The instrumental variables are taken as the lag of the dependent variable and independent variable to remove the problem of endogeneity.

The results are showing that VAIC has a co-efficient 0.00142 with a p-value less than 0.05, which means VAIC has a positive influence on return on assets (ROA). If one unit of VAIC has increased then 0.00142 units of return on assets is increased.

e) **Dependent Variable – Asset Turnover (ATO)**

Table 4. 8 Dependent Variable: ATO

Dependent Variable: ATO				
Method: Panel GMM EGLS (Cross-section weights)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.6166	0.0335	18.4083	0.0000
VAIC	0.0224	0.0023	9.8114	0.0000
R-square	0.8992	**Adj R-square**		0.8879

The above-presented results are showing the impact of the intellectual index (VAIC) i.e. combination of HCE, SCE, and CEE on firm performance measured by assets turnover (ATO). The explanatory power of the model is 89.9%. Generalized methods of moments have been applied to check the impact of VAIC on assets turnover (ATO). The instrumental variables are taken as the lag of the dependent variable and independent variable to remove the problem of endogeneity.

The results are showing that VAIC has a co-efficient of 0.0224 with a p-value less than 0.05, which means VAIC has a positive influence on assets turnover (ATO). If one unit of VAIC has increased then 0.00224 units of assets turnover is increased.

f) Dependent Variable – Price to Book value (P/B)

Table 4. 9 Dependent Variable: P/B

Dependent Variable: P/B				
Method: Panel GMM EGLS (Cross-section weights)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.5946	0.0465	12.7843	0.0000
VAIC	0.0214	0.0024	9.0750	0.0000
R-squared	0.8860	**Adj R-square**		0.8728

Generalized Method of Moments (GMM) is applied to check the impact of Intellectual capital index (VAIC) i.e. combination of components HCE, SCE, and CEE on firm performance measured by price to book value (PBV). The instrumental variables are taken as the lag of the dependent variable and independent variable to remove the problem of endogeneity.

The explanatory power of the model is 88.6%. The results are showing that VAIC has a co-efficient 0.0214 with a p-value less than 0.05, which means VAIC has a positive influence on firm performance measured by PBV. If one unit of VAIC is increased then PBV is increased by 0.021 units.

4.5 Results Discussion

The intellectual capital influenced the firm performance and the results are supported by the previous studies. Using an empirical method, Chen et al. (2005) investigated the relationship between IC, market value, and financial performance. They used Pulic's (2000a, b) VAIC to assess a large sample of publicly listed Taiwanese companies. Their findings proved the importance of information technology in increasing firm profitability and sales growth. The empirical findings show that investors place a higher value on enterprises with more IC efficiency and that organizations with higher IC efficiency achieve higher levels of growth and profit expansion in the global and future years. Chen et al. (2005) discovered that IC is a significant strategic resource since it is positively connected with the firm's selling price and financial performance.

Furthermore, Public (2000a, b) implemented the VAIC approach in many additional pieces of research, especially in developed and emerging markets. Muhammad and Ismail (2009) tried to investigate the efficiency and performance of IC in the Malaysian financial industry using data from 18 businesses in 2007. The banking industry was shown to be the most reliant on IC, followed by insurance and brokerage industries. It has also been demonstrated that IC is associated with company performance (as measured by efficiency and ROA), although the market value was discovered to be produced more by capital employed (physically and monetarily) in Malaysia's financial sectors than by IC. This recent conclusion of Muhammad and Ismail, 2009, was consistent with a prior study conducted in the same country from 2001 to 2003 (Goh, 2005), which revealed that Malaysian banks had low IC coefficients when measured using standard economic indicators.

Chapter 5

Conclusion

Our quantitative study envisaged the effect of Intellectual capital on selected companies listed on the Pakistan Stock Exchange (PSX) in the largest industrial segment of Textile composite manufacturing.

For this purpose, we employed an Index for measuring Intellectual capital – VAIC as proposed by Dr Ante Pulic. By applying this model, we measured the possible effect in two ways:

a) Respective impact of various components of the index i.e. Human Capital efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE) on selected dependent variables, i.e. financial indicators;
b) Impact of VAIC index as a whole on selected financial indicators.

To measure the impact on the financial performance of the selected Textile composite companies, we opted for three financial indicators/ratios in light of the literature review, i.e. Return of Assets (ROA), Asset Turnover (ATO), and Price to Book value (P/B).

Data was collected through financial statements of the selected companies and the Pakistan Stock Exchange's website. For bi-dimensional requirements, we used Panel data format to cover 11 years period from 2010 – 2020 for the companies in the sample under multiple financial observations. Subsequently, the Generalized Method of Moments (GMM) statistical technique was employed which is recommended for Panel Data analysis.

Our estimation reflected interesting results as we found out that Intellectual capital has significance for the textile industry as it directly affects its financial performance. The

textile industry of Pakistan is the largest industrial segment of exports as textiles account for 60% of aggregate exports of the country. It is of paramount importance that the industry remains competitive with global players in terms of cost-effectiveness, innovative product line, and efficient supply chain.

It appears from our quantitative results that the industry players (top 25 companies in the textile composite segment) understand and recognize the importance of Intellectual capital as a potent intangible resource that could provide them with a competitive edge in addition to the usual tangible assets.

Our estimation results about individual components of the VAIC index indicate that the investment in human capital has a significant and positive impact on the two financial indicators i.e. return on assets and asset turnover. This means that investment in the knowledge base, experience, and skill set of human resources pays for the efficiency of assets of the selected textile companies. The tangible assets like land, buildings, and machinery yield better revenues when the company invested in human capital. However, human capital efficiency (HCE) did not bore a significant impact on the price to book ratio. This reflected that the perceived market value of the selected textile companies does not get affected by the human capital a company has invested in.

When it comes to Structural capital which pertains to intellectual property, proprietary business strategy, brand value, etc, our results show that it does not have a significant impact on the selected financial indicators. The efficiency of tangible assets employed by the textile companies remains unaffected by the structural capital these companies would possess. Structural capital efficiency (SCE) also does not reflect any effect on perceived market value, as the related p-value comes out to be insignificant for the price to book value ratio.

Estimated results of the index, VAIC as a whole indicate positive and significance on the three financial indicators used as dependent variables for the study. Even the market value is impacted positively by the Intellectual capital of the companies under our study.

This can be concluded clearly from our results that Intellectual capital exhibits its significance on the financial performance of the textile composite companies in our sample. Like any large industrial sector which has a strong export orientation, textile companies in Pakistan realize the benefit of investing in Intellectual capital. They understand the potency of Intellectual capital, especially human capital to stay competitive in the international market, to align themselves with the global standards, and to avail benefits from technological advancement related to processing and overall business management.

5.1 Practical Implications

The results of the study are helpful for the management of the textile companies to formulate strategies to enhance the impact of Intellectual capital, as the relationship is positive and significant. Investing in Intellectual capital could be a recipe for a sustained growth model.

The study is also useful for the policymakers to develop relevant policies, so industry in general and textile companies in particular gain access to this important intangible resource. By investing in Intellectual capital, these textile companies can stay competitive and profitable and earn foreign exchange for the country through the export market.

Moreover, the study is helpful for the investors that if companies are investing in intellectual capital, then in future companies are expecting to increase their profitability.

Therefore, the investors may get benefits in future by investing in these particular companies.

5.2 Limitations of the Study

A lot of work has been carried out in the study but there always remains space to do more work. The study also has some limitations, first of all, the sample size could have been increased. However, a larger sample size would require more processing time in collating financial data, which is available through financial statements of the individual companies. As the period is taken in the study comprised 11 years, therefore sample size was restricted to the top twenty-five companies only. Besides, only large companies who are plying in the export market are expected to realize and invest in Intellectual capital.

5.3 Future direction of the Study

For any future study, the manufacturing sector other than textile can be taken into account. Comparison can be made between competitive countries in the export market, especially against whom Pakistani exporters are competing like India, China, and Bangladesh.

Besides, in future studies, other financial indicators can be used to measure the impact of Intellectual capital, for instance, return on equity, etc. Also, there is an alternate index MVAIC (Modified Value-added Intellectual Coefficient) which can be used as well.

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Appendix

Textile Composite Companies listed on Pakistan Stock Exchange (PSX)

	Companies	**Market Capitalization (PKR in billions)**
1	Interloop	57.34
2	Feroze 1888	36.36
3	Nishat Mills	30.57
4	Kohinoor Textile	20.96
5	Gul Ahmed Textile	20.94
6	Sapphire Textile	18.24
7	Azgard Nine	14.95
8	NishatChunian	11.39
9	Sapphire fibres	16.50
10	Mehmood Textile	7.88
11	Artistic denim	7.85
12	Zahidjee textile	3.95

13	Masood textile	3.91
14	Faisal Spinning	3.90
15	Bhanero Textile	3.00
16	Blessed Textile	2.57
17	Crescent Textile	1.95
18	Reliance Weaving	1.71
19	Towellers Limited	1.42
20	Fateh Textile	0.93
21	Ahmed Hassan Textile	0.65
22	Shams Textile	0.48
23	Khyber Textile	0.36
24	Kohinoor Industries	0.26
25	Hafiz Limited	0.14

Note: Market capitalization ranging from 0.14 to 57.34 is due to a huge difference between the number of shares outstanding i.e; 1,200,000 and 869,400,000 for Hafiz Limited and Interloop Limited respectively.