



# **The Influence of Intellectual Capital on Financial Reporting Quality and performance of Enterprises: An empirical study on EGX listed firms**

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**Abstract:**

**Purpose:** This study investigates the influence of intellectual capital (IC) on firms' both financial and market performance as well as its impact on the financial reporting quality (FRQ).

**Design /Methodology /Approach:** The study uses a sample of 52 listed companies on the Egyptian stock market covering the period from 2014 to 2019. The study applies the modified value-added intellectual coefficient (MVAIC) to measure the efficiency of the IC. Eventually, the study tests the hypotheses through multiple regression analysis and panel data.

**Findings:** The study reveals that the MVAIC significantly influences the financial performance as well as the market performance. The study also shows a significant impact of the MVAIC on the FRQ.

**Research Limitations:** The main limitation of the study comes from the inability of the researcher to tackle the separate impact of each component of the intellectual capital efficiency and the limited sample size due to the inconsistent disclosure of the needed data.

**Practical implications:** The findings of the study may help stakeholders, and managers in managing their IC resources efficiently, and effectively.

**Originality/Value:** This study develops the prior studies by giving prospects for encouraging companies on developing their IC. The current study is the first study to examine the impact of the IC on FRQ among the Egyptian listed firms using the MVAIC.

**Key words:** Intellectual capital, financial performance, market performance, financial reporting quality.

**Paper type:** Research paper

## 1.Introduction

The shift from the traditional economy to the new knowledge-based economy (KE) has led intangible resources to alter the tangible ones by the time (Ahangar, 2011; Lev et al., 2005; Zou et al., 2011). It has become essential to find a new source of competitiveness that is built upon knowledge to provide companies with a sustainable competitive advantage to continue, and to be unique in the market. So, investment in physical resources has no longer become a technique that the companies could be weighed with. Within the context of the KE, Investment in the intangibles became the fundamental value maker for companies (Zeghal et al., 2010), Knowledge resources were described as key factors for maintaining a sustainable competitive advantage for the firms (Ting et al., 2009).

Additionally, the importance of intellectual capital (IC) has been illustrated by the KE as a knowledge capital that encompasses a set of intangible assets mainly related to personnel know-how, competencies, skills, past experiences, information systems, databases, patents, brands, and customer relationships (Ahangar, 2011; Ahmadi et al., 2012). IC is considered as one of the production factors even the most important (Ogbonnaya, 2019). According to Volkov et al. (2007), Ahmadi et al. (2012); Bhasin (2012)Pentilde et al. (2012); Sardo et al. (2018) firm's IC resources are its real fortune for its perceived role in growth opportunities, corporate sustainable competitive advantage, and market value (MV) based on the previous studies checked results. Therefore, many organizations started to give more attention to the intangibles, such as investment in research and development (R&D),

knowledge, training & education as it could optimize their performance (Bontis, 2004). in line with the KE, the investors will attribute higher values for companies with higher amount of IC, as once they consider the IC of the firm it starts reflecting in the MV and help in furthering the goals of profit maximization with the presence of an efficient market (Gan et al., 2008; Goh, 2005; G Bharathi Kamath, 2015). However, the traditional financial reporting based on historical data it fails to adequately reflect the value of IC components causing a gap between MV and book value (BV) (Gan et al., 2008; Maditinos et al., 2011) which refers to the IC (Edvinsson et al., 1997).

That knowledge inhabits inside the employees who convert it into more or less value depending on their capabilities and skills (Pulic, 2000b) represented in the IC, so its proper identification, management, and measurement became necessary as IC is considered as a key factor for innovation and development, and to improve the usefulness of the information provided to users (Bhasin, 2012; Dumay, 2016; Pentilde et al., 2012; Sardo et al., 2018), and help in reducing the gap between MV and BV. Accordingly, IC has gained attention from both scholars and practitioners, in a KE, IC has been viewed as an intangible asset that has a significant impact on business's performance and is fundamental in the value creation process of the enterprises (Lynn, 1998; Pulic, 1998; Sveiby, 1997) .

Based on the prior studies, it has been concluded that there was a substantial positive correlation between the components of firms' IC and the financial performance (FP) for 1,000 biggest Brazilian companies for the period between 2000 and 2005 (Richieri et al., 2008). Prior studies provided

many definitions for IC, the capital that describes knowledge as a resource. Venugopal et al. (2015) figured out the IC as an intangible asset that lacks physical substance. Patric (2000) defined it as the knowledge that can be converted into profits. Current, potential investors and creditors are interested in the IC as to be the hidden value that escapes financial statements and leads the firm to obtain value (Madininos et al., 2011). IC and its components namely (human capital (HC) which is the sum of skills, competencies, capabilities, creativity, know-how and experiences developed by employees and that they take with them when they leave the firm (Forte et al., 2019). HC is “individual’s knowledge, skills or attributes which can never be separated from the employee”(Roos et al., 1997). HC theory outlines the relevance of HC as a key driver of a firm’s productivity and evaluates the employees’ possession of essential skills and knowledge to meet their positions responsibilities. Entities need employees who have creativity, problem-solving and innovational skills.

As HC concentrates on adding value to the business in terms of profitability, the entity can enhance its performance when its employees keep improving their knowledge and skills. HC contributes in organizational efficiency in many aspects such as decision-making, which improves when employees possess the required skills (Hsu et al., 2012). Structural capital (SC) which is the resource that once acquired, it later can be legally protected and maintained by the firm. Entities having proper SC will enable their employees from exploiting the knowledge and skills they possess to create competitive advantage (Florin et al., 2003). Correspondingly, a firm with

improper SC doesn't reach its performance targets (Widener, 2006). In today's KE, firms are weighed based on quality and innovation. SC further allows HC to fully utilize their skills and creativity. It also refers to "Sum of unique processes which firms acquire through R&D and then protect in the form of patents and copyrights". which is known as knowledge assets that indeed company's property and include intellectual property such as patents, copyrights, trademarks, processes, documents, and other knowledge such as (computer network and software, administrative system etc.). In brief, it is what belongs to the firm including (innovative capital, relational capital and organizational infrastructure, etc. (Roos et al., 1997).

Relational capital (RC) which is a component of IC that investing in fortifies the external relationships of the entity. Advertising, selling, and marketing investments are the main sources of forming the RC. Firms with strong RC can establish more relationships with stakeholders, which increases their coherence. Social exchanges resulting from interdependencies increase trust, which sometimes replaces explicit contracts (Dyer et al., 1998). Through these exchanges, employees learn new values and skills that will directly create value for the organization. RC is defined as "the sum of shared values, strategic coalitions and relationships with all stakeholders which results in a flow of knowledge that helps better understand the external demands". Whereby the wealth of the organization is maximized, emerged indeed in the KE. Since the fact that IC rather than physical one is the main platform of the future innovative, competitive activities and success of the company (Williams, 2001), increasing the awareness of the efficient application,

management, and development of IC can help firms to perform efficiently and to be successful and creative compared to its rivals (Goh, 2005).

IC management is made difficult by the absence of suitable tools for its proper identification and measurement. Scholars and practitioners are encouraged to develop models for measuring the IC as a response to the rise in the studies that investigate its impact on businesses performance. Thereby, it has led to the development of modern tools capable of measuring it instead of the traditional ones that weren't able to cover all IC aspects (Campisi et al., 2008; Nazari et al., 2007). Pulic (1998) developed the Value-added intellectual coefficient method (VAIC) which is a non-monetary term that determines the value of the firm's intellectual capital, yet it's an indicator of the firm's efficiency in employing its intellectual resources and creating value. To measure the efficiency of firms intellectual capital (A. Sarea et al., 2016). This approach is an indirect measurement that has broadly been accepted as the most appropriate method for measuring IC through measuring the efficiency of three components namely (HCE that is calculated as dividing the VA over the total employee costs, SCE which is in turn, will be calculated as subtracting the HC from the value-added, CEE (capital employed efficiency which gauges the efficiency of physical and financial capital in the value creation process (Firer et al., 2003; Montequín et al., 2006; Pulic, 2000a, 2000b) in the value creation process of the firm due to its reliability, comparability, simplicity, neutrality (Tarigan et al., 2019). The VAIC method have lately been extended (Nazari et al., 2007) to be the modified value-added intellectual coefficient (MVAIC), Nimtrakoon (2015) modified the original

VAIC model by introducing the marketing costs as RC to overcome the demerits of the VAIC model.

Apparently, while checking the prior studies that handled the IC and the quality of earnings, it has been revealed that measuring, and including IC in the financial reports, may timely improve the financial reporting quality (FRQ) (Darabi, Rad, & Heidaribali, 2012). The FRQ, the accuracy, and reliability of the financial reports in representing the data related to firm's activities and operations besides disclosing all the resources including the IC could enhance the FRQ indeed as it increases the usefulness of the financial reports presented to users (Ogbonnaya, 2019), as useful financial information is critical to all users' decisions and to manage businesses.

Since the financial reporting's major purpose is to direct the users with the relevant information the (FASB), in its first conceptual statement stated that financial reporting needs to provide useful data to help current and potential investors make rational decisions. once firms improve their IC it may reflect in the quality of earnings and a high quality earnings indicates a high quality financial reports. The relevance of IC can be illustrated through the framework of resource-based theory (RBV), companies that have valuable, scarce, firm-specific resources such as IC resources are more likely to possess a superior performance and sustainable competitive advantage (Barney, 1991). These resources enable companies to maintain HC which is the core of IC as it is the place where all ladders of the other IC components start, improve processes (SC), maintain contact with customers and suppliers (RC), and produce greater innovation(Xu et al., 2018) though, companies are still lacked



understanding the importance of IC in sustaining performance development of the firm (Xu et al., 2018).

## **Review of related literature& hypotheses development**

### **Empirical evidence: Intellectual capital and performance.**

Most of the studies conducted on the nexus between IC and corporate performance confirmed that IC exhibits a positive impact on corporate performance in developed countries, however recent studies are conducted targeting the IC role in developing countries, Dženopoljac et al. (2016) revealed in their study that the IC relationship with FP is insignificant. Moreover, prior studies revealed that the components of IC also may exert different influences on FP. Bassi and Buren (1999) in their study concluded a positive influence that IC has on the corporate performance using a sample of US firms, conversely, there are few studies that showed an insignificant relationship such as what found in Firer and Williams, (2003) study and some found a negative relationship such as Britto et al. (2014); Morariu (2014). The main dilemma was IC measurement. Therefore, previous literature applied different models to proxy IC, such as the model provided by Pulic which is the VAIC model that had been extensively used in Chowdhury et al. (2019); Ghosh et al. (2009); Goh (2005); Hoang et al. (2020); Joshi et al. (2010); G Barathi Kamath (2007); G Bharathi Kamath (2008); Mavridis (2004); Mohapatra et al. (2019); Nimtrakoon (2015); Sardo et al. (2018); Smriti et al. (2018); Vo (2018); Xu and Li (2020) studies and the MVAIC model used in Buallay et al. (2020); Haris et al. (2019); Sardo et al. (2017); Soetanto et al.

(2019).The following are summaries for the empirical studies made on the IC and the corporate performance.

**Tiwari (2021)**made a study to explain the linkage between IC and 84 Indian healthcare firms' profitability over 10 years (2009-2018). He employed the VAIC and MVAIC to measure the IC. He concluded that IC exhibits a positive influence on profitability. Concerning the separate impact for VAIC components, he found that CEE is the only significant influential component on profitability.

**Bhattu-Babajee et al. (2021)** in their study, they investigated the impact of IC on firms' FP using a sample of Mauritian companies using the VAIC model. The study results showed that the corporate performance had been enhanced by the VAIC while reporting a lesser impact in the short run compared to the long run.

**Xu and Liu (2020)** did a paper about the impact of IC on firm performance using an MVAIC model for measuring IC, they investigated the impact of the MVAIC on profitability, productivity, and MV of Korean companies from 2013-2018, the study revealed that the MVAIC is more accurate in measuring IC than the traditional model of VAIC, moreover, it showed that IC can provide an effective platform for the sustainable development and provides the firm with a competitive advantage, as it mainly showed that IC can act as a key driver in creating value for the firms, and as regard to each component, CEE was found to have the most significant impact on the performance, HCE positively affects the FP, RDE (R&D or innovation capital) and RCE were

observed to have a negative impact, and SCE was found not to have a significant effect on the firm performance.

**Ramírez et al. (2020)** made a paper to explore the effect of IC efficiency on performance. The study used a panel data sample comprised of 6132 observations of Spanish companies, covering the period from 2000 to 2013. They explained that ICE gives the firm a sustainable competitive advantage and better performance.

**Nguyen et al. (2020)** investigated the impact of IC on the value of Vietnam listed 61 firms over the period 2013- 2018, using the VAIC model to measure IC, and made use of Tobin's Q ratio, the study showed that VAIC positively influences profitability, and its three components exhibit a significant impact on the firm value measured by Tobin's Q.

**Chowdhury et al. (2019)** proved that the VAIC inputs (i.e., HCE, SCE, CEE) significantly influence the ROA and ATO but exhibit an insignificant influence on ROE. Moreover, HCE was found to have the most significant impact on the ROA and IC has no influence on the MtB value through their study which investigated the impact of IC efficiency on the organizational performance in Bangladesh. They used multiple regressions in their statistical analysis.

**Forte et al. (2019)** carried out an empirical study on the impact of IC on firms' FP and MV of firms in the Italian context, using VAIC to test the impact of IC on the abovementioned variables along the period 2008-2017, additionally, it has been conducted depending on OLS and regression models, the research has pointed out that leverage has a negative impact, and mainly showed that

IC has a pivotal role in enhancing companies' profitability (including growth in revenues) and stock market performance, nonetheless, one of its components (HCE) exhibit an enhancing impact on FP while SCE and CEE have a negative impact, astonishingly, each individual component affects negatively on firm's MV.

**Tarigan et al. (2019)** conducted their work on the impact of IC on the FP of all listed Indonesian manufacturing companies in the IDX stock of exchange from the period 2011-2015, using the VAIC approach to measure the IC, as well as using 10 regression models for evaluating the relationships, the findings of the study suggested that the IC exhibit a significant impact towards FP, unlike the MV. whereas concerning each component, it has been found that HCE has no relationship with FP and MV, Meanwhile, SCE has been revealed to have a strong negative correlation only with the MV, at the same time CEE was proven to have a significant impact on both FP and MV.

**Smriti et al. (2018)** investigated the influence that IC exhibits on the FP. they used a sample of Indian listed firms over the period from 2001 to 2016. They employed the VAIC model to measure the IC and its components. The study results showed the efficient usage of IC by Indian firms. Additionally, the study proved the Significant impact of HC as a major performance driver, SC and CE to have the same contribution effect on MV and growth.

**Chowdhury et al. (2018)** explained in their study the impact of VAIC on 34 textile firms' FP based in Bangladesh between 2013 and 2017. The results of their study point to the significant impact of VAIC components on productivity outcomes, CE was found to have a significant role in both

profitability and productivity. SC was revealed to have a significant impact on ATO and ROA, HC was found to have an insignificant influence on all the FP indicators.

**Tiwari et al. (2018)** studied the association between IC efficiency and performance of 39 listed public and private banks in Bombay stock of exchange between 1999 and 2015 while applying the MVAIC as a proxy for IC efficiency. Using panel fixed effects technique, the study showed that the IC is positively related to the banks' performance. Nevertheless, they found that only HC and SC exert a positive significant influence on the performance of banks. Moreover, their analysis exposed that the IC efficiency of private sector Indian banks is better than the public.

**Dženopoljac et al. (2016)** focused their study on exploring whether the IC has the capability to create value for firms and the extent of this effect. The empirical part of their based-on data of 13989 Serbian information technology firms ranged from 2009 to 2013. They used the ROA, ROE, asset turnover, profitability, return on invested capital to proxy the FP and the VAIC as a measure for IC. They concluded that only CEE significantly influences the FP.

**Nimtrakoon (2015)** investigated the relationship between IC, MV and FP and compared the level of IC, and its components among ASEAN countries. He used a sample of 2013 listed technology firms on 5 ASEAN stock exchanges. He made his study based on modifying the original VAIC by adding the RCE to its components. The study was empirically conducted using the Kruskal-Wallis one-way ANOVA and multiple regression analysis. The findings of the study ended up with a positive relationship between IC and firms' MV and FP,

especially with the ROA and margin ratio. Considering the components of IC, HC and CE were shown to be the most influential components on firms' performance rather than the RC and SC. The study also revealed an insignificant difference exists among the 5 ASEAN countries in the extent of the MVAIC while every solo country puts different amounts of interest in the MVAIC components to create value.

**Vishnu et al. (2014)** shed light on the linkage between IC and corporate performance of Indian pharmaceutical companies, in addition to testing modified models of the original VAIC. They gathered data from 22 large firms for their empirical analysis while using ROA and return on sales as performance proxies. Their study recommended three modified models of the VAIC original model. The findings of the study explained a positive linkage between IC and corporate performance; besides that, it revealed the extra component i.e., RC to have an insignificant relationship with corporate performance.

**Ghosh et al. (2009)** carried out their study seeking to study the correlation between VAIC and the traditional proxies of FP. They applied their study empirically on a sample of Indian software and pharmaceutical companies covering the period from 2002 to 2006. The study results suggested that the targeted relationships are all different in other words, IC affects profitability but not profitability likewise the MV.

**Regarding the previously discussed empirical studies**, it's obvious that most of the studies are conducted on the IC and the corporate performance in different countries, all confirmed the significant and positive

influence of IC on firm's performance. Some studies showed that IC positively affects the FP indicators and MtB as well, while some other studies revealed no association between IC and MtB. Numerous studies revealed that IC can be considered as an effective platform for sustainable development and competitive advantage and a valuable key driver for firms' value generation, since few studies were found in the Egyptian context about the impact of intellectual capital on firms' performance, thus the first section of the study will consider the impact of it on corporate performance. So, the first hypothesis could be written as follows,

**$H_0$  There is a significant and a positive relationship between the modified value-added intellectual coefficient(MVAIC), and financial performance represented by ROA.**

$H_{0.1}$ : intellectual capital efficiency exerts a significant impact on the return on assets.

$H_{0.2}$ : capital employed efficiency has a significant impact on the return on assets.

**$H_{02}$ : there is a significant and positive relationship between the modified value-added intellectual coefficient and financial performance represented by GR.**

$H_{02.1}$ : intellectual capital efficiency exerts a significant impact on growth in revenues.

$H_{02.2}$ : capital employed efficiency has a significant impact on growth in revenues.

## **Empirical evidence: Intellectual capital and financial reporting quality (FRQ).**

Since switching from the traditional industrial economy to the KE, IC importance has been increased as a dynamic effective resource to firms (Dakhely Parast et al., 2014). Due to its importance, IC became the main concern of both academics and practitioners. As revealed in the previous studies IC is a key driver for corporate competitiveness and FP thereby it is considered as a requisite to achieve firms' growth, and one of the most imperative benchmarks for firms' growth is the quality of earnings (Darabi, Rad, & Ghadiri, 2012). Hereinafter, to get to know its holistic influence on a firm's practices, the FRQ would be crucial to be investigated (Mutuc, 2021).

**Ogbonnaya (2019)** conducted a study over the period 2006-2017 on the impact of IC on FRQ of ten banks in Nigeria relying on regression analysis and value-added intellectual coefficient (VAIC) in measuring the IC and on the accruals proxy of Dechow et al. (2002) model in measuring the FRQ then the study has ended with the inference that the IC enriches FRQ.

**Nuryaman et al. (2019)** studied the nexus between IC and earnings management through real activities manipulation using a sample of 69 financial statements of the Indonesian listed firms. They employed the VAIC model as a proxy for IC and Roychowdhury (2006) model to measure earnings management. The study conjectured that the elements of the VAIC can mitigate the management behavior against earnings manipulation.

**Dakhely Parast et al. (2014)** in their paper investigated the impact of IC on EQ of 40 firms listed in Tehran stock of exchange over the period 2002-2008.



The study findings suggested that a significant linkage between IC and stability of earnings was found.

**Zanjirdar et al. (2012)** conducted a study exploring the relationship between VAIC and quality of earnings represented in earning stability and earnings predictability using as a sample of the listed firms in Tehran stock of exchange ranging between 2004 and 2009. The study results indicated that the IC has a great role in businesses success.

**(Bontis, 1998); Darabi, Rad, and Ghadiri (2012)** studied the relationship between IC and EQ of 158 firms accepted in Iran stock market using the absolute value of discretionary accruals to proxy earnings quality and the VAIC model as a proxy for IC. Their empirical study findings revealed that VAIC and the component HCE both have a significant positive influence on the absolute value of discretionary accruals, therefore, they suggested that IC exhibits an important role in financial reporting and practices.

Since few studies were found to discuss the influence of IC and its components on the quality of financial reporting as well as it hasn't been made in Egypt yet before so, the second part of the study will tackle the impact of IC on FRQ evidencing from the Egyptian listed firms as long as it may affect the FP and MV in turn, it could be considered as material information which is a main consideration for the external users.

**$H_{04}$ : the modified value-added intellectual coefficient(MVAIC) has a significant and positive impact on financial reporting quality.**

$H_{04.1}$ : intellectual capital efficiency exerts a significant impact on financial reporting quality.

$H_{04.2}$ : capital employed efficiency has a significant impact on financial reporting quality.

## **Method:**

### **Data and Sample**

The sample is selected from all the listed Egyptian firms in the Egyptian stock of exchange which is the population of the study except for the banking and financial sector due to the variance in the accounting system and statements.

I used a sample of 52 companies' financial statements and their accompanying notes covering the period from 2014 to 2019 in different sectors relying on the required data for the study, taking into consideration the availability of the required data. To get the needed data for the study I used internet websites that belong to the firms, Mubasher Egypt website and other sources.

### **Research models:**

$$ROA_{i,t} = B_0 + B_1 MVAIC_{i,t} + B_2 LEV_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t} = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + B_4 LEV_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$GR_{i,t} = B_0 + B_1 MVAIC_{i,t} + B_2 LEV_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$GR_{i,t} = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + B_4 LEV_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$MtB_{i,t} = B_0 + B_1 MVAIC_{i,t} + B_2 LEV_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$MtB_{i,t} = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + B_4 LEV_{i,t} + \varepsilon_{i,t} \quad (6)$$

$$FRQ_{i,t} = B_0 + B_1 MVAIC_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (7)$$

$$FRQ_{i,t} = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (8)$$

**Variables definitions:**

**ROA: return on assets** (Net income/total assets)

**GR:** Growth in revenues [rev at current year/rev at last year)-1].

**MTB:** market to book value.

**Lev: (leverage)**total debts/ total assets.

**Size:**the natural logarithm of assets.

**FRQ:** a dependent variable refers to the financial reporting quality proxied by the by the modified jones model.

**Value added (VA)** = Value added.

**Capital employed (CE):** physical capital.

**Human capital (HC):** Employees costs.

**Structural capital (SC)** =VA-HC

**Relational capital (RC):** Marketing costs.

**IC=HC+SC+RC** where, **ICE:** intellectual capital efficiency.

“**MVAIC=VA/(IC+CE)**”

**Results:**

**Descriptive statistics**

**Table1** shows the descriptive statistics. The mean values of ROA and GR respectively are .074, .195. The average value of the MVAIC is .232 which means that companies generate an average value of .232 for one monetary unit invested. The mean value of the ICE (.927) is much greater than the mean value of the CEE (.368) which is a sign that the companies can generate more value by using their IC rather than physical and financial

capital. Moreover, the mean values of Size, and LEV are respectively 8.89, .383.

**Table (1): Descriptive Statistics**

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>MVAIC</b>	245	.046	.511	.232	.129
<b>ICE</b>	245	.652	1.00	.927	.099
<b>CEE</b>	245	.048	1.17	.368	.291
<b>LEV</b>	245	.067	.786	.383	.205
<b>Size</b>	245	7.90	9.83	8.89	.549
<b>ROA</b>	245	.003	.220	.074	.063
<b>GR</b>	245	-.475	1.19	.195	.384
<b>MtB</b>	245	.235	6.63	1.61	1.58
<b>FRQ</b>	245	-.436	.652	.061	.254
<b>Valid N</b>	245				

### **Correlation analysis**

Inspection of the correlation matrix (**Table 2**) reveals that the MVAIC is significantly and positively related to the financial performance proxied by the ROA and insignificantly related to the financial performance proxied by the GR. Additionally, MVAIC is significantly and positively related to the MTB. The MVAIC is significantly in a positive correlation with FRQ, Moreover, CEE is positively related to the ROA but insignificantly related to the GR. CEE exhibits a significant positive correlation to MTB as well as to the FRQ. The role of physical and financial capital cannot be ruled out as a major contributor to value creation. ICE exhibits a significant and positive influence on the financial performance proxied by the ROA unlike the GR. The table shows that the ICE is negatively related to the market performance and financial reporting quality.

**Table (2): Correlations**

		MVAIC	ICE	CEE	LEV	Size	ROA	GR	MtB	FRQ
<b>MVAIC</b>	Pearson Correlation	1	-.093	.964**	.593**	.153*	.406**	.075	.416**	.329**
<b>ICE</b>	Pearson Correlation		1	-.153*	-.316**	-.076	.151*	.061	-.178**	-.057
<b>CEE</b>	Pearson Correlation			1	.619**	.158*	.295**	.067	.454**	.301**
<b>LEV</b>	Pearson Correlation				1	.070	-.088	.071	.261**	.299**
<b>Size</b>	Pearson Correlation					1	.240**	-.010	.173**	.210**

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

### Regression results

I have checked the main conditions of regression models and processed the necessary corrections for heteroscedasticity and autocorrelation problems. In general, all assumptions of OLS, including normality of residuals and multicollinearity, are satisfactorily met. A summary of regression results is presented in table (3).

**Table (3): Summary of regression results**

**Panel A: models (1) and (2):**

**Model (1):**

$$(ROA_{i,t}) = B_0 + B_1 MViAIC_{i,t} + B_2 LEV_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t}$$

Model		Coefficients <sup>a</sup>					95.0% Confidence Interval for B		Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Lower Bound	Upper Bound		
		B	Std. Error	Beta						
1	(Constant)	-.120	.053		-2.257	.025	-.225	-.015	VIF	
	MVAIC	.332	.032	.676	10.461	.000	.270	.395		1.571
	LEV	-.154	.020	-.501	-7.822	.000	-.193	-.116		1.542
	Size	.020	.006	.172	3.291	.001	.008	.032		1.025

a. Dependent Variable: ROA

**R<sup>2</sup> = .360**

**D-W = .963**

**F = 45.092 (p-value: .000)**

**Model (2):**

$$(ROA_{i,t}) = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + B_4 LEV_{i,t} + \varepsilon_{i,t}$$

Model		Coefficients <sup>a</sup>					95.0% Confidence Interval for B		Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Lower Bound	Upper Bound		
		B	Std. Error	Beta						
1	(Constant)	-.194	.071		-2.739	.007	-.333	-.054	VIF	
	ICE	.078	.037	.123	2.088	.038	.004	.152		1.120
	CEE	.114	.016	.523	7.265	.000	.083	.145		1.664
	LEV	-.119	.023	-.386	-5.207	.000	-.164	-.074		1.771
	Size	.022	.007	.194	3.427	.001	.009	.035		1.031

a. Dependent Variable: ROA

$R^2 = .254$

$D-W = .905$

$F = 20.378$  ( $p$ -value: .000)

**Panel B: Models (3) and (4):**

**Model (3):**

$$(GR_{i,t}) = B_0 + B_1 MVAIC_{i,t} + B_2 LEV_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t}$$

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.259	.402		.645	.519	-.533	1.052		
	MVAIC	.161	.240	<b>.054</b>	.671	.503	-.312	.634	.636	1.571
	LEV	.075	.149	<b>.040</b>	.505	.614	-.219	.370	.648	1.542
	Size	-.015	.045	<b>-.021</b>	-.322	.748	-.104	.075	.976	1.025

a. Dependent Variable: GR

$R^2 = .007$

$D-W = 2.203$

$F = .573$  ( $p$ -value: .633)

**Model (4)**

$$(GR_{i,t}) = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + B_4 LEV_{i,t} + \varepsilon_{i,t} \quad (4)$$

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.116	.494		-.235	.815	-1.089	.857		
	ICE	.349	.261	<b>.091</b>	1.336	.183	-.166	.864	.893	1.120
	CEE	.044	.109	<b>.033</b>	.404	.686	-.171	.260	.601	1.664
	LEV	.149	.160	<b>.080</b>	.934	.351	-.166	.464	.565	1.771
	Size	-.010	.046	<b>-.014</b>	-.212	.832	-.099	.080	.970	1.031

a. Dependent Variable: GR

$R^2 = .014$

$D-W = 2.201$

$F = .826$  ( $p$ -value: .510)

**Panel C: Model (5) and (6):**

**Model (5):**

$$(MtB_{i,t}) = B_0 + B_1MVAIC_{i,t} + B_2LEV_{i,t} + B_3Size_{i,t} + \varepsilon_{i,t}$$

		Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-2.435	1.500		-1.624	.106	-5.390	.519		
	MVAIC	4.707	.896	.383	5.252	.000	2.941	6.472	.636	1.571
	LEV	.203	.557	.026	.365	.716	-.894	1.301	.648	1.542
	Size	.324	.169	.112	1.910	.057	-.010	.658	.976	1.025

a. Dependent Variable: MtB

$R^2 = .185$

$D-W = 0.896$

$F = 18.282$  ( $p$ -value: .000)

**Model (6)**

$$(MtB_{i,t}) = B_0 + B_1ICE_{i,t} + B_2CEE_{i,t} + B_3Size_{i,t} + B_4LEV_{i,t} + \varepsilon_{i,t}$$

		Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.257	1.797		.143	.886	-3.282	3.797		
	ICE	-1.945	.951	-.123	-2.045	<b>.042</b>	-3.818	-.072	.893	1.120
	CEE	2.527	.398	.464	6.354	<b>.000</b>	1.744	3.310	.601	1.664
	LEV	-.555	.582	-.072	-.954	.341	-1.700	.591	.565	1.771
	Size	.275	.166	.095	1.658	<b>.099</b>	-.052	.601	.970	1.031

a. Dependent Variable: MtB



$R^2 = .230$

$D-W = .946$

$F = 17.935$  (p-value: .000)

**Panel D: Model (7) and (8):**

**Model (7):**

$$FRQ_{i,t} = B_0 + B_1 MVAIC_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (7)$$

		Coefficients <sup>a</sup>								
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	Constant)	-.750	.246		-3.047	.003	-1.235	-.265		
	MVAIC	.598	.119	.304	5.017	.000	.363	.833	.977	1.024
	Size	.076	.028	.164	2.708	.007	.021	.131	.977	1.024

a. Dependent Variable: FRQ

$R^2 = .134$

$D-W = 1.878$

$F = 18.775$  (p-value: .000)

**Model (8)**

$$FRQ_{i,t} = B_0 + B_1 ICE_{i,t} + B_2 CEE_{i,t} + B_3 Size_{i,t} + \varepsilon_{i,t} \quad (8)$$

		Coefficients <sup>a</sup>								
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	Constant)	-.707	.297		-2.380	.018	-1.292	-.122		
	ICE	-.006	.156	-.002	-.038	.970	-.313	.301	.974	1.027
	CEE	.239	.054	.275	4.438	.000	.133	.346	.955	1.047
	Size	.077	.028	.167	2.720	.007	.021	.133	.972	1.028

a. Dependent Variable: FRQ

$R^2 = .118$

$D-W = 1.884$

$F = 10.752$  ( $p$ -value: 0.000)

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**Testing hypotheses:**

**Testing  $H_0$ ,  $H_{0.1}$ ,  $H_{0.2}$  : the correlation between intellectual capital and financial performance represented by ROA.**

**Table (3)**, panel (A) reveals the regression results of model (1) that investigates the influence of the MVAIC on firms' financial performance proxied by the ROA. The table shows that the model is significant since the  $F = 45.92$  while the Level of significance is 5%. The adjusted  $R^2 = .352$  i.e., .352 of the variations in the ROA are explained by the MVAIC. The estimated coefficient  $\beta_1 = .332$  ( $P = 0.000 < 0.05$ ) showing that the MVAIC is significantly positively related to the ROA meaning that  $H_0$  shall be accepted.

**Table (3)**, **panel (A)** reveals the regression results of model (2) that investigates the influence of the ICE and CEE on firms' financial performance proxied by the ROA. The table shows that the model is significant since the  $F = 20.378$ , while the Level of significance is 5%. The adjusted  $R^2 = .241$  i.e., .241 of the variations in the ROA are explained by the independent variables. The estimated coefficient  $\beta_1 = .078$  ( $P = .038 < 0.05$ ) showing that the ICE is significantly positively related to the ROA meaning that  $H_{0.1}$  shall be accepted. The estimated coefficient  $\beta_2 = .114$  ( $P = .000 > 0.05$ ) showing that the CEE is insignificantly related to the ROA meaning that  $H_{0.2}$  shall be accepted.

**Testing  $H_{02}$  ,  $H_{02.1}$  ,  $H_{02.2}$  : the correlation between intellectual capital and financial performance represented by GR.**

**Table (3), panel(B)** reveals the regression results of model (3) that investigates the influence of the MVAIC on firms' financial performance proxied by the GR. The table shows that the model is insignificant since the  $F= 0.573$  while the Level of significance is 5%. The adjusted  $R^2= -.005$  which indicates the insignificance of the explanatory variables. The estimated coefficient  $\beta_1= .161$  ( $P= 0.503 > 0.05$ ) showing that the MVAIC is insignificantly related to the GR meaning that  $H_{02}$  shall be rejected.

**Table (3), Panel(B)** reveals the regression results of model (4) that investigates the influence of the CEE and ICE on firms' financial performance proxied by the GR. The table shows that the model is insignificant since the  $F= .826$  while the Level of significance is 5%. The adjusted  $R^2= -.003$  i.e.,  $-.003$  which indicates the insignificance of the explanatory. The estimated coefficient  $\beta_1= .349$  ( $P=0.183 > 0.05$ ) showing that the ICE is insignificantly related to the GR meaning that  $H_{02.1}$  shall be rejected. The estimated coefficient  $\beta_2= .044$  ( $P=0.686 > 0.05$ ) showing that the ICE is insignificantly related to the GR meaning that  $H_{02.2}$  shall be rejected.

**Testing  $H_{03}$  ,  $H_{03.1}$  ,  $H_{03.2}$  : the correlation between intellectual capital and market performance represented by MtB.**

**Table (3), panel(c)** reveals the regression results of model (5) that investigates the influence of the MVAIC on firms' market performance proxied by the MtB. The table shows that the model is significant since the  $F= 18.282$  while the Level of significance is 5%. The adjusted  $R^2= 0.175$  i.e.,

0.175 of the variations in the MtB are explained by the MVAIC. The estimated coefficient  $\beta_1 = 4.707$  ( $P=0.000 < 0.05$ ) showing that the MVAIC is significantly related to the MtB meaning that  $H_{03}$  shall be accepted.

**Table (3)**, panel(c) reveals the regression results of model (6) that investigates the influence of the CEE and ICE on firms' market performance proxied by the MtB. The model is significant since the  $F= 17.935$  while the Level of significance is 5%. The adjusted  $R^2= 0.217$  i.e., 0.217 of the variations in the MtB are explained by the independent variables. The estimated coefficient  $\beta_1 = -1.945$  ( $P=0.042 < 0.05$ ) showing that the ICE is significantly related to the MtB meaning that  $H_{03.1}$  shall be accepted. The estimated coefficient  $\beta_2 = 2.527$  ( $P=0.000 < 0.05$ ) showing that the CEE is significantly related to the MtB meaning that  $H_{03.2}$  shall be accepted.

**Testing  $H_{04}$  ,  $H_{04.1}$  ,  $H_{04.2}$  : the correlation between intellectual capital and market performance represented by FRQ.**

**Table (3)**, panel (D) reveals the regression results of model (7) that investigates the influence of the MVAIC on financial reporting quality (FRQ). The table shows that the model is significant since the  $F= 18.775$  while the Level of significance is 5%. The adjusted  $R^2= 0.127$  i.e., 0.127 of the variations in the FRQ are explained by the MVAIC. The estimated coefficient  $\beta_1 = 0.598$  ( $P=0.000 < 0.05$ ) showing that the MVAIC is significantly related to the FRQ meaning that  $H_{04}$  shall be accepted.

**Table (3)**, panel (D) reveals the regression results of model (8) that investigates the influence of the ICE and CEE on FRQ. The table shows that the model is significant since the  $F= 0.000$  while the Level of significance is

5%. The adjusted  $R^2= 0.118$  i.e., 0.118 of the variations in the FRQ are explained by the independent variables. The estimated coefficient  $\beta_1= -.006$  ( $P=0.970 > 0.05$ ) showing that the ICE is insignificantly related to the FRQ meaning that  $H_{04.1}$  shall be rejected. The estimated coefficient  $\beta_2= 0.239$  ( $P=0.000 < 0.05$ ) showing that the CEE is significantly related to the FRQ meaning that  $H_{04.2}$  shall be accepted.

## **Discussion of results**

### **The association between the intellectual capital and *performance*.**

#### ***First, intellectual capital and financial performance.***

This study revealed a positive association between the MVAIC and the financial performance measure by the ROA. This result agreed with the study of (Bhattu-Babajee et al., 2021), (Acuña-Opazo et al., 2021), (Vo et al., 2021), (Tran et al., 2020), (Xu & Li, 2020), (Kasoga, 2020), (Ramírez et al., 2020), (Chowdhury et al., 2019), (Xu et al., 2019), (Tarigan et al., 2019) that found an evidence that intellectual capital enhances the financial performance of the firm. The study tackled the separate impact of the MVAIC components and found that the CEE using the ROA proxy impacts positively on the financial performance as well as the ICE.

#### ***Second: Intellectual capital and market performance.***

The study indicated that the MVAIC is positively related to the market performance. This result is consistent with. When the study separately investigated the independent linkage between the two components of the

MVAIC, the CEE was found to have a positive relationship with the market performance unlike the ICE was found to have a negative impact.

***Third: The association between intellectual capital and financial reporting quality.***

The study showed that the MVAIC positively affects the financial reporting quality. This result comes in the same direction as (Zanjirdar et al., 2012), (Azizi et al., 2013), (Taheri et al., 2013), (A. M. Sarea et al., 2016), (Mojtahedi, 2018), (Nuryaman et al., 2019). Moreover, the study reveals that the CEE to have a positive relationship with the FRQ.

**Conclusion**

The current the study results concluded that the MVAIC exerts a significant influence on the market performance and the financial performance proxied only by ROA, and on the financial reporting quality as well. This study revealed that the ICE as a component of the MVAIC separately has a significant impact on the financial and market performance. Moreover, the CEE is shown to have a significant influence on all the dependent variables except for the financial performance proxied by the GR. The implications of the study are a little bit varied with some other previous studies in different countries. This may be due to the different application and usage of intellectual capital in the countries or the companies. So, in Egypt, firms shall give more interest to their intellectual capital. The result of the study guides more prospects for More research to be done in Egypt with different measuring approaches of the intellectual capital.

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## الملخص:

نظراً لأن المصدر الأساسي لخلق القيمة قد تحول بشكل كبير إلى الموارد غير الملموسة بدلاً من الموارد الملموسة بسبب التحول من الاقتصاد المادي إلى الاقتصاد القائم على المعرفة، فقد أصبح من الضروري للشركات أن تهتم بإنشاء وإدارة وقياس رأس المال الفكري. تهدف هذه الدراسة إلى معرفة أثر رأس المال الفكري على أداء الشركات وكذلك جودة التقارير المالية. تم اختبار عينة من 52 شركة مدرجة في البورصة المصرية على مدى 6 سنوات (2014-2019) باستخدام طريقة المربعات الصغرى. تدعم الأدلة بعض الفرضيات وترفض بعضها. أسفرت الدراسة عن نتائج تشير إلى وجود علاقة ذات دلالة إحصائية بين المعامل الفكري للقيمة المضافة المعدل والأداء وكذلك جودة التقارير المالية.

**الكلمات المفتاحية:** رأس المال الفكري، الأداء المالي، أداء السوق، جودة التقارير المالية.