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Nexus between Intellectual Capital and Financial Performance Sustainability: Evidence from Listed Jordanian Firms

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Abstract: Purpose: The authors observe the effect of exploring the reality of Intellectual Capital (IC) and its impact on the financial performance of Jordanian industrial firms in Amman Stock Exchange. This empirical research explores the effect of intellectual capital on financial performance using data from 36 Jordanian industrial firms listed in Amman Stock Exchange for the period 2016-2020. The Value-Added Intellectual coefficient (VAIC) was adopted to measure the intellectual capital, while the return on assets (ROA), return on equity (ROE), and earnings per share (EPS) were adopted as measures of the company's financial performance. The effect of IC was tested by using statistical analysis, dependent on the data obtained from annual financial statements. The results showed that the IC has a significant and positive effect on profitability due to its significant effect on ROA and EPS. However, it has not been proven that IC affects the ROE. This research extends the research on IC and aims to enrich studies in this field, especially in the Jordanian market. It reflects the reality of Intellectual Capital and its impact on industrial firms' performance in Jordan as an example of developing countries.

Keywords: Intellectual Capital (IC), Value Added Intellectual coefficient (VAIC), financial performance, Return on Assets (ROA), Return on Equity (ROE), Earnings per Share (EPS), Jordanian Industrial Firms.

1 Introduction

Intellectual Capital (IC) Interest has been increased and intangible assets, such as research and development, software, computer systems, and relationships, which help in building the infrastructure and environmental suitability for continuity and economic development, in addition to the strategic success that all firms seek [1]. IC is considered a successful strategy for the future and how an organization can continue. Thus, the importance of intellectual capital has become apparent over recent developments in the current era of knowledge and information, as the focus has been more on intellectual capital, which highlights thought, creativity, and information, so, these elements are considered to be the assets of any firm, a significant source of firm value and provide a competitive advantage. According to [2], intellectual capital (IC) is considered one of the most critical assets of any firm. According to the IFAC, intellectual capital is synonymous with intellectual property and intellectual assets, which is considered capital based on knowledge owned by the firm; it is also the final Product in transforming knowledge into an asset for the firm. International Federation of Accountants (IFAC). IC is also considered one of the main pillars for evaluating the contemporary performance of a firm; if a firm fails to invest in IC, the firm will be unable to achieve its strategic goals [3].

Researchers have been looking for a definition for IC since its appearance. However, opinions showed in previous studies, and the concept of IC was unanimously agreed upon to a large extent, along with the importance of measuring it and its components, disclosing it, and its association with determining the organization's actual value.

[4] defined IC as the firm's intangible value, which comes from the competencies of its employees, the value of its relationships, and the intellectual property, such as intangible assets. [5] Also defined it as the set of intellectual assets related to a firm. They contributed significantly to improving the competitive position of that firm by adding value to stakeholders. On the other hand, [6] defined it as a capital asset that consists of knowledge that can be applied, which means that knowledge does not become capital unless it is found and applied for the benefit of a firm. Ross et al. (2005), intellectual capital is all that a firm owns and controls from non-monetary and intangible assets that create value.

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Most of the previous studies agreed that there are several components of IC, but some research varies in their number. [6, 7] They said that the IC consists of three elements: (A) human capital: any capabilities and skills of the employees in the firm in the field of providing solutions, innovation, and creativity; (B) structural (organizational) capital: which is the organizational ability to meet the market requirements and includes organizational structure, databases and the ability of the organization to use and exploit human capital; and (C) customer (social or rational) capital: this is the firm's relationship with all of the people it deals with, especially its customers. However, [8] mentions only two elements: human and structural capital.

After realizing that IC has a significant effect on creating value and increasing the financial performance of firms, many approaches have been used to measure it [7, 9, 10] As for the method of measuring IC, many methods have been developed and proposed, but the most common is value-added, which was proposed by [8, 11, 12] This is called Value Added Intellectual Coefficient (VAIC); on other hand, Modern management focused on intellectual Capital or intangible assets, in addition to physical assets. Because it realized that the institution's wealth lies in its intellectual assets, and in its intellectual or knowledge capital. This vibe appeared in the nineties of the last decade, and it became the real wealth of a competitive and successful institution Instead of physical resources [13]. However, this does not mean that the concept of intellectual capital did not exist before the nineties. But what we mean is that it was not under discussion, and it was previously known as the name of the goodwill, and it includes all the intangibles assets that appear in its balance sheet. [14, 15] here, the public developed several equations mentioned and detailed later in the study variable section – through which the firm's efficiency is measured through the efficiency of its employed capital and it's IC. All elements of IC were used in these equations, making this model one of the most comprehensive and accurate models in measuring IC.

Financial Performance of Sustainability is one of the modern concepts that receives great attention at the present time in accounting, as the administration aims to insure a balance between the rights and duties of stakeholders [16-18]. Therefore, many stakeholders focus on sustainable development and its applications that contain the environmental, social and economic aspects that are necessary and essential for the advancement of society [19]. Sustainable development has been defined by many researchers. [20, 21] defined it as the response between three axes: the economy, the society, and the environment, which includes economic well-being, social integration, and environmental growth. In addition, It was also defined as development with the aim of preserving natural resources in order to improve the standard of living for current generations, taking into account the rights of future generations, by creating a continuity between the economic, social and environmental dimensions in a symbiotic manner[21, 22]. On other hand, [23, 24] defined it as a development that focuses on meeting the necessities of immediate generations by operating the available resources at a rational pace without prejudice to the rights of subsequent generations.

This is what found by [25] that the elements of intellectual capital (IC) have an influence on Financial Performance of Sustainability, this is because well-managed IC is the main driver of increasing Financial Performance Sustainability of firms and this is also supported by superior intellectuals that will have an effect on the firm's sustainable growth. IC is also an impetus for firms to be able to grow sustainably, especially in terms of human capital owned by the firm. [26] found that IC have a markedly positive effect on the sustainable competitive performance of SMEs. On other hand, [27] found that practices dimensions of sustainability positively influence competitive advantage, and competitive advantage have positively contributes to financial performance.

Since financial performance is still one of the most important indicators for evaluating the performance of firms, according to the above facts about IC, this study came to assess the reality of IC in Jordanian industrial firms and examine its contribution to the financial performance of these firms. This research extends the research on IC, which aims to enrich studies in this field, especially in the Jordanian market, mainly dealing with Jordanian industrial firms. Also, since it is empirical research, it shows the reality of Intellectual Capital and its effect on industrial firms' performance in Jordan as an example of developing countries.

2 Literature review and research hypotheses

The study aimed to examine the impact of IC on the financial performance sustainability over its effect on ROA, ROE, and EPS in Jordanian industrial firms. For this study, three hypotheses were adopted to achieve its aim:

2.1 Return on Assets in the financial performance sustainability

A good number of previous studies aimed to examining how IC affects financial performance and sustainability. [28] point out that the IC influence and improve the financial performance (ROA) by study made to measure the IC and revealed its relationship with financial performance and. Xu and [29] investigated the relationship between IC, profitability and returns and they showed that there appositive relationship between ROA and IC. Study of [30] revealed that there a positive and significant relationship between IC and ROA as financial performance indicator. [31] focused on studying the relationship between IC and sustainability and showed a positive relationship between them. [32] find that the IC has appositive effect on financial performance of. According to [33], which was applied to a sample of companies in 14 European countries, the results

showed that there is a positive effect of IC on the ROA and also on the growth opportunities. [34], which was applied to a sample of listed Korean industrial companies, showed a positive impact of IC on financial performance indicators (ROA and ROE) as well as on sustainability. [35] which aimed to find out the impact of IC on financial sustainability, showed that there is a positive effect of IC on profitability and corporate returns measured using ROA and ROE. [36] Find out that SC had a noticeable influence on ROA with IC (human capital), indicating an insignificant influence on all financial performance sustainability indicators. [37]. The results revealed that structural capital (SC) and capital employed (CE) affect Nigerian firms' financial performance of food products. According to the resource-based theory, the results show that firms can enhance financial performance by focusing on IC, particularly in food products firms. [12] found the Intellectual Capital is influenced by human capital efficiency in the Turkish banking sector. [38] the results reveal a direct nexus between (IC-VAIC) and the performance of Egyptian insurance firms, especially with (CEE), and to a lesser extent with human capital efficiency. Additionally, a positive nexus was found between IC (capital employed and structural capital) and performance in the previous and recent years. Also, evidence suggests the possibility of a moderating nexus between IC and physical and financial capital, which also impacts corporate performance. [39] Results also show a significant positive nexus between values added efficiency of capital employed and value-added efficiency of human capital independent variable ROA. To sum up, Based on the above as a literature review most of studies found there a relationship between Return on Assets and financial performance, hence, the following hypothesis is formulated as follows:

H1: There is a statistically significant effect of IC on the ROA of Jordanian industrial firms.

2.2 Return on Equity in the financial performance sustainability

[39] Results revealed a positive relationship between IC and independent variable ROE. [40]. The results indicated that IC had a substantial effect on the performance of the firms. As well as for its components, the employed, human, and structural capital significantly affected the firms' performance. [41] The results indicated that IC had an essential effect on business performance, human and organizational capital had a positive and significant effect. Investigated the impact of IC on the profitability of Pakistani financial organizations. The results revealed a linear and non-linear effect of IC on the organization's profitability. Find out a positive mediating impact for knowledge sharing between IC and organizational performance. Also, each of the studies of [28-30, 40] and [35], which were mentioned earlier, showed o positive effect of IC on ROE. Therefore, based on the previous discussion the literature review most of studies found there a relationship between Return on Equity and the financial performance, thus, the following hypothesis is formulated as follows:

H2: There is a statistically significant effect of IC on the ROE of Jordanian industrial firms.

2.3 Earnings per Share (EPS) in the financial performance sustainability.

[42] Find a significant contribution between IC efficiency and EPS in Pakistan by using cross-sectional time-series data. [43] found that firms' intellectual capital has a significant positive relationship with their investors' shares' capital gains. [44-46] said there is an increasing gap between market value and book value. [4] also said that the difference between a firm's market value and book value is known as intellectual capital. [47] The results showed a strong relationship between IC, especially structural capital, and profitability. It was also found that IC has a crucial mediating role in the relationship between employed capital and profitability. [48] Results revealed financial and non-financial benefits for IC, but focusing on non-financial benefits was more significant and critical. [49] In Saudi banks, intellectual capital performance is considered low, an indicator associated positively with bank financial performance. [50] the relationship between the performance of banks and financial performance indicators, as the analysis indicates, are varied, like profitability and productivity. The results showed that the Value Added Intellectual Coefficient only (VAICTM) had with the Indian IT sector with a significant positive association with profitability. On the other hand, there is an insignificant relationship between productivity and market valuation. Thus, the above as a literature review most of studies found there a relationship between of IC on the EPS, hence, the following hypothesis is formulated as follows:

H3: There is a statistically significant effect of IC on the EPS of Jordanian industrial firms.

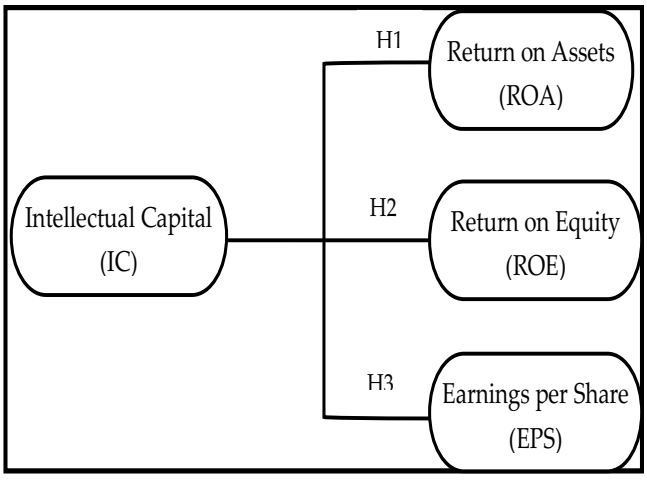

Fig. 1: Conceptual Model.

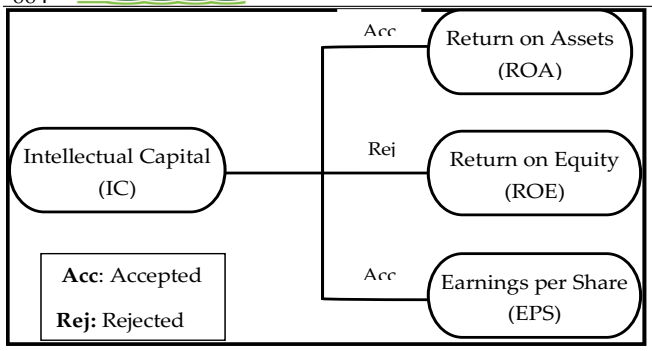

Fig. 2: Research Results

3 Methodologies

3.1 Study Sample

The study sample included 36 Jordanian industrial firms listed in Amman stock exchange, firms operating during the study period, and whose financial statements were available on Amman Stock Exchange website during 2016 and 2020.

The study dealt with industrial firms because the industrial sector is one of the largest in the Amman stock exchange, and it is also one of the largest sectors affected by knowledge and intellectual capital in its field of work; this is based on manufacturing new and advanced products with ideas that help it to achieve a competitive advantage.

3.2 Study variables

3.2.1. Dependent variable: financial performance

The financial performance of the firms was measured by using three ratios:

1- Return on Assets (ROA): this is the most well-known measure of performance and profitability and measures performance through the efficiency.

2- in managing the company's assets to achieve a profit. The following equation calculates it:

ROA = Net Profit / Total Assets

3- Return on Equity (ROE): this is measured using the following equation:

ROE = Net Profit / Total Equity

4- Earnings per Share (EPS): this is measured by the following equation:

EPS = Net profit/number of outstanding common shares

3.2.2. Independent variable: IC

IC was calculated using [8] model – Value Added Intellectual Coefficient (VAIC). This is one of the financial measures of IC that depend on the financial data obtained from the financial statements of firms. This model is considered one of the best numerical accounting methods for measuring IC in general. The VAIC uses several equations that include all of the components of IC and depends on value-added as follows:

1- VA: value added which is measured by:

VA = net operating income + salary and wages expanses (HC) + Depreciation + Amortisation.

2- HCE: Efficiency of Human Capital which is measured by:

HCE = VA / HC

Where:

HC = total salary and wages for firm.

3- SCE: Efficiency of Structural Capital which is measured by:

ESC = SC / VA

Where:

SC = VA - HC

4- IC: Intellectual capital which is measured by:

ICE = HCE + SCE

5- CEE: Efficiency of Employed Capital which is measured by:

CEE = VA / CE

Where:

CE = Total Assets - Intangible Assets

Finally:

6- VAIC = ICE + CEE or VAIC = HCE + SCE + CEE

Therefore, the higher this coefficient, the better the firm's intellectual capital, which creates value more and greater efficiency [8].

4 Results

4.1 Descriptive analysis of the study's variables

Table 1 shows the descriptive analysis of study variables. It shows the number of views is 180 for each variable, which is the number of firms in the study sample (36) and each firm has five views over a period of five years (2016 and 2020).

Table 1: Descriptive Statistics.

	N	Minimum	Maximum	Mean	Std. Deviation
HCE	180	-25.93055	7.38688	1.22	3.657
SCE	180	-0.296	0.386	0.108	0.111
EEC	180	-4.77433	10.83182	0.541	1.809
(VAIC)	180	-25.18751	10.71954	1.878	4.025
ROA	180	-0.85700	0.14100	-0.015	0.138
ROE	180	-7.37400	1.23200	-0.170	0.998
EPS	180	-2.55200	1.82100	0.021	0.464
Valid N (listwise)	180				

Table 1 shows the lowest and highest value for each variable, along with the weighted average and the standard deviation. The large discrepancy between values and the significant standard deviation is due to the extreme discrepancy between industrial firms' data. Some firms had a negative IC, meaning no IC in these firms. The mean value of IC observed from Table 1 is 1.88, indicating IC's existence in Jordanian industrial firms. Here, the most significant value of IC was 10.72, which is a large amount for the Jordanian market.

As for the efficiency of components of IC represented in human capital and rational capital and employed capital, the human capital efficiency was the largest with a mean value of 1.229, followed by rational capital efficiency with 0.542, and then in third place the employed capital efficiency with 0.108. Talking about the three financial performance indicators, we note the convergence of the numbers in ROA and EPS. Still, the ROE was slightly different because the dispersion of its value between firms was significant, as we see in its standard deviation of ROE, which is 0.998.

4.2 Normal distribution test

The Kolmogorov-Smirnov test was used to examine the normal distribution of the study variable. The results are shown in Table 2.

Table 2: Normal Distribution Test

	HCE		SCE	EEC	(VAIC)	ROA	ROE	EPS
N	180		180	180	180	180	180	180
	Mean	1.228	0.108	0.541	1.878	-0.015	-0.170	0.021
	Std. Deviation	3.657	111779	1.809	4.025	0.1385	0.998	0.464
	Absolute	0.262	0.065	0.304	0.178	0.157	0.371	0.203
	Positive	0.199	0.059	0.304	0.163	0.130	0.335	0.185
	Negative	-0.262-	-0.065-	-0.209-	-0.178-	-0.157-	-0.371-	-0.203-
Test Statistic	0.262		0.065	0.304	0.178	0.157	0.371	0.203
Asymp. Sig. (2-tailed)	0.000[c]		0.200[c,d]	0.000[c]	0.000[c]	0.000[c]	0.000[c]	0.000[c]

Based on the test used in Table 2, if the Sig. >= 0.05, then the variable follows a normal distribution and vice versa. Therefore, except for structural capital, all study variables do not follow a normal distribution as for the structural capital with Sig. = 0.200, which is greater than 0.05, is the only variable following a normal distribution. However, as there are more than 30 views of the study, one of the cases in which the normal distribution of the study variables can be overlooked; thus, the analysis will be carried out assuming the normal distribution of the variables.

4.3 Hypothesis test

To test the study hypotheses, regression analysis was used to show the impact of IC on each of the dependent variables, ROA, ROE, and EPS, as follows:

4.3.1 First hypothesis test:

Table 3: shows the effect of IC on ROA as follows:

Table 3: Model Summary (IC and ROA).						
Model	R	R Square	Adjusted R Square	Std. The error of the Estimate	F	Sig.
1	0.888[a]	0.788	0.779	0.06512	84.427	0.000

It is noticeable from the above table that the statistical model was accepted, where the value of Sig. <0.05. Also, $R^2 = 0.788$, which means that the independent variables –IC – explain approximately 79% of the changes that occurred in the dependent variables, which is ROA. Accordingly, the impact of IC on ROA is clear. The first hypothesis is accepted based on the above, so there is a statistically significant effect of IC on the ROA on Jordanian industrial firms.

4.3.2 Second hypothesis test:

Table 4: shows the effect of IC on ROE as follows:

Table (4) Model Summary (IC and ROE).						
Model	R	R Square	Adjusted R Square	Std. The error of the Estimate	F	Sig.
1	0.307[a]	0.094	0.054	0.97101	2.355	0.080

It is noticeable from Table 4 that the model is not accepted where the value of Sig. > 0.05, which means that IC does not affect ROE. Also, R2 = 0 > 0.094, which means that the IC could not explain 9% of changes that occurred in the ROE. Therefore, it can be emphasized that there is no effect of IC on ROE. Accordingly, the second hypothesis is rejected, so there is no statistically significant effect of IC on the ROE for Jordanian industrial firms.

4.3.3 Third hypothesis test:

Table 5: shows the results of testing the impact of IC on EPS:

Table (5) Model Summary (IC and EPS)						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	0.457[a]	0.209	0.174	0.4223	5.984	0.001

It is clear from the above table that the model is accepted. The value of Sig. = 0 > 0.001, which is less than 0.05, and means an impact of IC on EPS. In addition, R2 = 0.209, which means that the independent variable IC explains 21% of the changes independent variables (EPS). Accordingly, it can be emphasized that IC has an impact on EPS. Therefore, the third hypothesis is accepted, so there is a statistically significant effect of IC on the ROA in Jordanian industrial firms.

5 Theoretical and Practical implications

Theoretical implications

From theoretical perspective, this study provides evidence for the theory and literature of Intellectual capital, the traditional VAIC model and the role of IC in enhancing financial performance of companies. Because this study contributes in the literature regarding Intellectual Capital theory, so it can be used as academic teaching tool regarding the IC of organizations because of its important, effective and influential role in organizations and their performance. This study is considered an extension of previous studies on the IC and its role in companies that enrich Literature and knowledge of the subject of IC.

Practical implications

From practical perspective, this study seeks to provide evidence of the impact of Intellectual capital on financial performance of organizations, as the study links theory and practice to create a deeper understanding among managers of Jordanian industrial companies of the importance of support and develop IC in their companies. Where the study clearly showed the important role of IC in enhancing financial performance. Thus, this study indicates that companies in general and industrial companies in particular in Jordan must have awareness, care and management of each element of IC efficiently and skilfully, work on increasing investing in IC and making full use of it, educating and training employees on running out according to business needs and creating a suitable environment for this because of the essential role that IC plays in enhancing financial performance and competitive advantage.

6 Conclusions and Recommendations

Intellectual Capital is considered to significantly influence organizations and aspects of their business, as shown by many previous studies. Therefore, the main objective of this study was to find out the reality of IC in Jordan, particularly in industrial firms, to examine the effect of IC on financial performance. According to the data collected and on the results of statistical analyses, the main conclusion was that IC has an essential impact on the performance of Jordanian industrial firms. Thus, there is an essential statistical effect of IC on the ROA. This is consistent with the majority of previous studies, such as [12, 36, 37, 39]. And there is also an essential statistical effect of IC on the EPS in Jordanian industrial firms. This result agreed with [42, 43] However, it has not been proven that IC affects ROE. The IC could not explain 9% of changes in the ROE. Therefore, it can be emphasized that there is no effect of IC on ROE. Accordingly, there is no statistically significant effect of IC on the ROE for Jordanian industrial firms. So, this result doesn't agree with [39, 41].

According to the study's conclusions, the necessity to increase interest in IC in industrial firms is recommended in particular and in all sectors in general due to the critical impact of IC on financial performance, as shown in the study. Focusing the attention on measuring IC accurately and agreed manner and adopting a method for its disclosure in firms' financial statements is essential to users. To increase awareness of the importance of IC, which is more comprehensive than financial capital, additional studies must be conducted to include other sectors, other measures of IC, and other dependent variables to measure the impact of IC on various aspects of firms.

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