The Impact of Intellectual Capital on Corporate Performance: Evidence from Palestine

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Abstract — The main objective of current study is to investigate the relationship between intellectual capital and corporate financial performance of 34 from 48 companies listed on Palestine Exchange (PEX) over the period of 2012-2018. Pulic's method "Value Added Intellectual Coefficient (VAIC)" is utilized to measure the Intellectual Capital (IC), and three of traditional accounting tools involving; return on equity (ROE), return on assets (ROA), and earning per share (EPS) ratios is used as a proxy of firm financial performance. The findings of Panel data model show that human capital efficiency (HCE) is consider as the most effective element of intellectual capital in the issue of value creation than structural capital and capital employed. Moreover, VAIC shows a good relationship with financial performance represented by return on assets (ROA). In conclusion, Palestinian listed companies are still weakly used its intellectual capital' potentials in create value.

Index Terms — Intellectual capital, Value added intellectual coefficient, Structural capital efficiency, Human capital efficiency, Capital employed efficiency.

I. INTRODUCTION

In the current knowledge-based economy era, Information and knowledge are considered the most essential and important building blocks of any business activity. The new era came into existence after the shift from physical labor and natural resources to knowledge and information, as the main sources of wealth generation [52]. Businesses that relied mainly on physical assets were unable to grow and compete in this shifting economy [31]. While as, businesses that were able to shift its reliance from tangible to intangible assets were able to generate for themselves a competitive advantage [17].

The shift and change to a knowledge-based economy, from a production-based one, has given the importance to Intellectual Capital as the main asset and source of competitive advantage, as well as the main driver of innovation and wealth and value creation [52], [31], [8], [16]. Intellectual Capital could be defined as the company's intellectual ability which presents the efficiency of physical capital use and the intellectual potential in value creation [46]. In other words, Intellectual capital could be considered any intangible resources, such as knowledge, information, experience, etc., that enable a company to create value and gain a competitive advantage.

According to the Value Added Intellectual Coefficient (VAIC) approach, which was generated and developed by Ante Pulic, Intellectual Capital is integrated of three

components; Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency. Human Capital is considered as the most effective and important component of Intellectual Capital as it is the main source of competitive advantage and innovation generation [9], [19], [35]. This component is comprised of the qualification of employees, experiences, skills, and knowledge, as well as the monetary investment in the company's employees, such as salaries, wages, training expenses, etc. [46]. The main characteristic of this component is that this capital is lost when the workers opt to leave the corporation [29], [51], [33].

Structural Capital is considered to be the portion of Intellectual Capital that is not related to humans or employees, such as patents, trademarks, databases, information technology, organizational structure etc., which remains in the company even if employees opt to leave [2], [40], [13], [15]. This structure helps companies in converting Human Capital into Intellectual Capital [6], [50]. The third element of Intellectual Capital is Capital Employed, which is comprised of the tangible and physical part of the capital, including the financial assets [4].

The rise of the significance of knowledge and information in the current knowledge-based economy, which replaced the traditional production-based economy, as well as the rise of the importance of creativity and innovation as the main determinants of competitiveness, has emphasized the role and importance of Intellectual Capital. Businesses and companies, in this knowledge-based economy, have to rely on their intellectual capital, comprised of intangible assets, such as knowledge, experience, talents, etc. as a driver of creativity and innovation. Otherwise, these businesses and companies will not be able to create an added value, and hence, compete in this setting [45], [47], [22], [15]. The importance of Intellectual Capital is becoming more realized around the globe. The U.S. stock inspection, as well as, the Swedish accounting board recommend that companies disclose, as a supplement to their financial statements, information about their Intellectual Capital. In addition, the Danish government proposed a law to obligate Danish companies to report their Intellectual Capital to their shareholders [44].

It is known that manufacturing companies mainly rely on physical (tangible) assets to create value. However, as mentioned earlier, in this new era of a knowledge-based economy companies started shifting their reliance from physical assets to intangible ones in order to maintain or generate a competitive advantage. The main objective of the study is to investigate whether manufacturing companies

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were able to adopt their strategies and culture to the new requirements as introduced by the new knowledge-based economy.

II. LITERATURE REVIEW

Ante Pulic was one of the first to conduct empirical research on Intellectual Capital. He created, in 1998, the VAIC method that uses accounting measurements to examine the relation between intellectual capital and financial performance. This method has paved the road for more extensive research to measure intellectual capital efficiency. Although his method was ground breaking, he was not the only one to attempt to investigate the efficiency of intellectual capital and its impact on companies' performances. [34] presented several methodologies to measure intellectual capital and its elements. Furthermore, [6] develops measurement models and finds that intellectual capital has a significant positive impact on firm performance. [49] finds a significant positive relationship between intellectual capital and financial firm performance for U.S. multinational companies. [36] also find a significant positive impact on value added performance by physical and human capital for the seventeen biggest Greek banks. They find that the magnitude of the relation between the value added performance and human capital is more significant than that with physical capital. The same results are found for the Portuguese banking sector, where both [11] and [10] find a significant positive impact of intellectual capital on performance. They also find that the more intellectual capital components interact, the more value is created. [17] also finds a positive impact from intellectual capital on U.K. banks profitability and risks. [3] find that HCE has a positive significant relation with ROA after the crisis and a positive significant relation with ROE before and after the crisis in Turkish banking sector. While [42] finds that human capital efficiency is the most effective factor in the issue of value creation than structural capital and capital employed in Turkish banking sector before and after the crisis especially with profitability measures ROA and ROE. [51] also find a positive impact by human capital on knowledge creation in Taiwan banking sector. [21] find a positive influence of human capital efficiency on technological innovations in U.S. Biotech companies and their financial performances.

Not all results find a positive relation between intellectual capital and corporate performance. [18] find that physical capital has the most effect on corporate performance for a sample of 75 listed companies in South Africa Stock Exchange. [41] and [12] both find that Malaysian banking sector depend mostly on financial and physical capital to create value.

Using Pulic's VAIC method, [32] find a positive association between Chinese public companies' performance and both structural and human capital. They find that Structural capital affects companies' performances more significantly than human capital. [13] find that intellectual capital has a significant impact on market value and financial performance for Taiwanese listed companies. The same results have been reached by [53] after examining the Taiwanese listed companies, which indicated that human capital and capital employed have a significant influence on

companies' performances. [27] and [39] find a significant positive impact on Indian banks performances by intellectual capital and its components. The same results are reached by [28] for the top 25 Indian pharmaceutical companies. [55] also find a positive relation between intellectual capital and companies' performances for 300 U.K. companies. [38] also reaches to the same results for 350 Russian industrial companies. In addition, [1] find that human capital is the main driver of Saudi bank success, although their intellectual capital efficiency is low. [48] find a significant positive relation between intellectual capital and its components and financial performance of Pakistani banks. These results are most significant for the human capital which comprise 70% to 80% of the value creation capabilities. [26] and [25] find a positive relation between intellectual capital and Australian banks financial performances. Both research results show that human capital plays a major role in Australian banks' value creation. The findings of [43] indicates that Turkish wholesale and retail trade companies are paying good attention to the use of the VAIC components especially HCE in value creation. [14] examine Australian listed companies, and they find a positive relation between human capital and companies' performances. However, they find that the relation is more significant with capital employed than human capital. On the other hand, [30] find that only human capital is significantly positively associated with Australian listed hotels' performances. [20] also find a positive relation between intellectual capital and financial performance for 64 selected European banks. [37] also find a positive relation between human capital and banks' performances. [23] find that Hang Seng Index companies listed on the Hong Kong Stock Exchange performances improve by intellectual capital. However, his findings indicate that physical capital also plays a significant role in value creation. On the other hand, [54] find opposite results for the listed companies on the Hong Kong Stock Exchange. They find a negative impact on financial performance by human capital efficiency, while as, they find a positive impact by capital employed efficiency. These results indicate that listed companies on the Hong Kong Stock Exchange create value using mainly physical and financial assets.

III. DATA AND METHODOLOGY

The main purpose of the study is to examine the effect of Intellectual Capital on Palestinian listed companies' performances. The study uses data of 34 from 48 companies listed on Palestine Exchange (PEX) for the period 2012 – 2018. The data was gathered from the companies' financial statements published on the Palestine Exchange website. Banks and companies with missing data and discontinuous listing were eliminated from the sample.

Intellectual Capital is measured utilizing Pulic's VAIC method that divides it into three different components; Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency. Furthermore, companies' financial performances are measured using the return on equity (ROE), return on assets (ROA), and earnings per share (EPS) ratios. The following control variables are used; Firm leverage (FLEV), and Firm Size (FSIZE). Table 1 presents a summary of these measures.

In order to achieve the objectives of our study, we have set the following hypothesis:

H1: There is a significant positive association between Value Added Intellectual Capital (VAIC) and its elements (HCE, SCE, and CEE) and companies' financial performance (ROA, ROE, EPS).

A Panel data regression model is implemented to examine the abovementioned hypothesis. The VAIC and its components are considered as the independent variables, while as, the performance measures and control variables are considered as the dependent variables. The following is the general model that is divided into two different models: the first measures the impact of VAIC on performance, while the second measures the impact of the components of VAIC on firm performance.

$$Y_{it} = \beta + \beta_1 X_{it} + \beta_2 C_{it} + \varepsilon \quad (1)$$

where

Y_{it} – Dependent variables (Financial Performance (ROE; ROA; EPS).

X_{it} – Independent variables (VAIC; HCE; SCE; CEE).

C_{it} – Control variables (FLEV; FSIZE).

TABLE 1: SUMMARIES OF ALL VARIABLES HAVE USED IN THE STUDY

Variables	Equation	Explanation
Independent Variables		
HCE: Human Capital Efficiency	VA / HC	VA is the value added of the firm; it can be calculated out of the difference between a firm's OUTPUT and INPUT. OUTPUT include the overall income of the firm from the products and services have sold on the market. INPUT means all expenses of resources incurred by the firm except employees' expenses. HC means human capital, HC represents all employees' expenses and compensations involving: wages and salaries, training, and development that a firm incurred on them.
		SC means Structural Capital; it can be calculated by deducting human capital (HC) from value added (VA)
		CE means Capital Employed, it refers to the physical and financial capital of the company, can be calculated by deducting intangible assets from total assets.
SCE: Structural Capital Efficiency	SC / VA	
CEE: Capital Employed Efficiency	VA / CE	
VAIC: Value Added Intellectual Coefficient	HCE + SCE + CEE	VAIC means Value Added Intellectual Coefficient, it is the aggregate of Human Capital Efficiency, Structural Capital Efficiency, and Capital Employed Efficiency
Dependent Variables		
ROE	Return on Equity	Net Income / Total Equity
ROA	Return on Assets	Net Income / Total Assets
EPS	Earnings per Share	(Net Income-Preferred Dividends)/ (Average Outstanding Shares)
Control Variables		
FLEV	Firm Leverage	Total debt / Book value of total assets
FSIZE	Firm Size	Log of firm's total assets

TABLE 2: HAUSMAN TEST

Hausman Test		ROA	ROE	EPS
	Model1 (HCE, SCE, CEE)	0.245	0.0001	0.039
	Model2 (VAIC)	0.077	0.0002	0.037

IV. RESULTS AND DISCUSSION

A. Descriptive Statistics

Table 3 present the descriptive statistics of all study variables. Human capital efficiency (HCE) indicates the highest mean value of 3.08 among the other components (SCE, and CEE) of VAIC. This means that HCE is the most important and significant factor in value creation for the study sample during the selected period of 2012-2018. The average mean value of VAIC, which includes the three components; HCE, SCE, and CEE, is 4.13.

TABLE 3: DESCRIPTIVE STATISTICS

		N	Mean	SD
Independent Variables	HCE	204	3.08	3.08
	SCE	204	0.51	1.19
	CEE	204	0.58	1.63
	VAIC	204	4.13	4.1
Dependent Variables	ROE	204	0.53	0.25
	ROA	204	0.12	0.07
	EPS	204	0.15	0.22
Control variables	FLEV	204	2.14	3.86
	FSIZE	204	7.63	0.9

HCE is human capital efficiency, SCE is structural capital efficiency, CEE is capital employed efficiency, VAIC is value added intellectual coefficient, ROE is return on equity, ROA is return on assets, EPS is earning per share, FLEV is firm leverage, FSIZE is firm size.

The results of Table 3 “descriptive tests” indicate that the components of VAIC (HCE, SCE, and CEE) have a respective mean value of (3.08, 0.51, and 0.58) for the sample companies. This means that HC is considers as the most important component in company's value creation issue than SC and CE. Regarding financial performance ratios (ROE, ROA, and EPS) only ROE ratio represents a good average fluctuating at 0.53. The standard deviation result for the independent variables show that HCE has the highest value at 3.08 and for dependent variables the highest value was a share of ROE at 0.25.

Correlation test was carried out to understand the nature of the relationships between the dependent variables (ROE, ROA, and EPS), control variables (FAGE, FSIZE, FLEV, and FCR), and independent variables (HCE, SCE, CEE, and VAIC). The results are presented in Table 4.

Table 4 indicates that human capital efficiency (HCE) is correlated with structural capital efficiency (SCE) at 13%, and correlated with capital employed efficiency (CEE) at 22.3%. The finding also shows that there is a good relationship between human capital efficiency (HCE) and value added intellectual coefficient (VAIC) with a value of

%87. As expected, Table 4 refers to a positive correlation among the three components of value added intellectual coefficient; human capital, structural capital, and capital employed efficiencies.

The results also refer that the independent variable “value added intellectual coefficient (VAIC)” has a proper level of correlation with return on assets at 21%, while it has a negative correlation with return on equity at (-0.074). This indicates that unlike the relationship with the return on assets

(ROA), intellectual capital does not have a positive influence on return on equity (ROE). Moreover, the results of the Pearson correlation coefficient show a good level of relationship between the VAIC and the leverage ratio at 27.1%. These negative and positive effects of intellectual capital should be analyzed at the same time in order to study the effect on firm performance.

TABLE 4: CORRELATION ANALYSIS

	HCE	SCE	CEE	VAIC	ROA	ROE	EPS	FSIZE	FLEV
HCE	1	0.131	0.223	0.875	0.286	0.208	0.303	0.071	-0.001
SCE		1	0.053	0.395	0.042	-0.011	0.002	0.026	-0.089
CEE			1	0.580	-0.013	-0.561	-0.496	-0.018	0.737
VAIC				1	0.210	-0.074	0.026	0.020	0.271
ROA					1	0.643	0.648	0.196	-0.142
ROE						1	0.980	0.207	-0.487
ATO							1	0.230	-0.428
FSIZE								1	0.279
FLEV									1

Correlation coefficients, using the observations 1:01 - 6:44, 5% critical value (two-tailed) = 0.1208 for n = 264.

B. Regression Analysis

Tables 5, 6, and 7 present the regression statistics among each of dependent, control, and independent variables. Model 1 shows the regression statistics between dependent variables and the components of VAIC through control variables. Model 2 depicts the regression statistics between dependent variables and VAIC through control variables.

The results of Table 5 show a significant positive impact of HCE on ROE. This mean that human capital plays a key role in companies’ value creation in Palestinian companies. Whereas, SCE, CEE and VAIC have no impact on ROE. In addition, while firm size has a significant positive effect on ROE, Firm leverage has a significant negative impact on ROE in both model 1 and model 2.

TABLE 5: REGRESSION ANALYSIS FOR ROE

Model 1				
	Coefficient	Std. Error	t-ratio	p-value
const	-0.422	0.086	-4.910	0.000***
HCE	0.021	0.007	2.921	0.003***
SCE	-0.009	0.009	-1.092	0.275
CEE	-0.063	0.033	-1.865	0.112
FSIZE	0.059	0.011	5.072	0.000***
FLEV	-0.012	0.005	-2.456	0.014**
R-squared	0.479			
Model 2				
	Coefficient	Std. Error	t-ratio	p-value
const	-0.620	0.234	-2.650	0.008***
VAIC	0.004	0.003	1.299	0.1941
FSIZE	0.093	0.034	2.728	0.006***
FLEV	-0.035	0.015	-2.314	0.020**
R-squared	0.372			

Hint: * Significant at the 0.10 level, ** Significant at the 0.05 level, and *** Significant at the 0.01 level. VIF value for all dependents, control, and independents variables are less than 3, means there is no Multicollinearity.

The results of Table 6 show a significant positive relationship between VAIC and two of its components (HCE and CEE) and ROA. This indicates that Palestinian companies depending on both human and physical capital to add value and have good performance. In addition, while firm size has a significant positive effect on ROA, Firm leverage has a significant negative impact on ROA in both model 1 and model 2.

TABLE 6: REGRESSION ANALYSIS FOR ROA

TABLE 9. REGRESSION ANALYSIS FOR ROA				
Model1				
	Coefficient	Std. Error	t-ratio	p-value
const	-0.184	0.036	-5.01	0.000***
HCE	0.005	0.003	1.754	0.079*
SCE	-0.003	0.005	-0.633	0.526
CEE	0.012	0.001	10.18	0.000***
FSIZE	0.026	0.003	7.737	0.000***
FLEV	-0.008	0	-16.04	0.000***
R-squared	0.175			
Model2				
	Coefficient	Std. Error	t-ratio	p-value
const	-0.170	0.054	-3.142	0.001***
VAIC	0.005	0.002	2.65	0.008***
FSIZE	0.024	0.006	3.879	0.000***
FLEV	-0.006	0.001	-5.928	0.000***
R-squared	0.156			

Hint: * Significant at the 0.10 level, ** Significant at the 0.05 level, and *** Significant at the 0.01 level. VIF value for all dependents, control, and independents variables are less than 3, means there is no Multicollinearity.

The results of Table 7 show a significant positive effect of HCE on EPS. This mean that human capital is positively affect earnings per share in Palestinian companies. Whereas, SCE, CEE have no impact on EPS, VAIC has a considerable mean effect on EPS. Moreover, while firm size has a significant positive impact on EPS, Firm leverage FLEV has a significant negative impact on EPS in both model 1 and model 2.

TABLE 7: REGRESSION ANALYSIS FOR EPS

TABLE 7. REGRESSION ANALYSIS FOR LHS				
Model 1				
	Coefficient	Std. Error	t-ratio	p-value
const	-0.428	0.087	-4.897	0.000***
HCE	0.028	0.007	3.916	0.000***
SCE	-0.008	0.008	-0.976	0.328
CEE	-0.063	0.032	-1.919	0.11
FSIZE	0.058	0.011	5.194	0.000***
FLEV	-0.009	0.004	-2.262	0.023**
R-squared	0.472			
Model 2				
	Coefficient	Std. Error	t-ratio	p-value
const	-0.647	0.237	-2.727	0.006***
VAIC	0.009	0.002	3.332	0.000***
FSIZE	0.096	0.034	2.774	0.005***
FLEV	-0.033	0.0158	-2.134	0.032**
R-squared	0.345			

Hint: * Significant at the 0.10 level, ** Significant at the 0.05 level, and *** Significant at the 0.01 level. VIF value for all dependents, control, and independents variables are less than 3, means there is no Multicollinearity.

V. CONCLUSION

Intellectual capital is considered as the main resource of companies' value creation. It is particularly true in the new era of knowledge-based economy, where the value added of individuals and companies has a direct relationship with their knowledge and intellectual capital [7]. The main objective of this study is to examine the relationship of intellectual capital and its three components (human capital, structural capital, and capital employed) on financial performance of the companies listed on Palestine Exchange (PEX). Our study is conducted by using the data from 34 company's annual reports published on Palestine Exchange (PEX) web site. Pulic's approach VAIC was utilized as a measure of intellectual capital. ROE, ROA, and EPS ratios used as proxies of financial performance. The results show that human capital efficiency (HCE) is the most effective component in the issue of value creation than structural capital efficiency (SCE) and capital employed efficiency (CEE) for the study period. HCE has a significant effect on financial performance indicators ROA, ROE, and EPS. This means that HCE plays a considerable role in Palestinian companies' value creation, whereas SCE and CEE do not consider as a key point to value creation. This indicates that the Palestinian companies depend on intellectual capital (intangible assets) rather than physical assets in achieving their financial performance. Although, VAIC shows a good relationship with financial performance (ROA) and (EPS), Palestinian companies are still weakly used its intellectual capital to create value. The findings of our study are mostly consistent with the earlier mentioned studies in the literature such as [5], [49], [51], [21], [24], and are not consistent with the results of the studies such as [36], [18], [1]; and [12].

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