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Intellectual Capital and Firm Performance in Jordan: A Comparative Study Before and After the Arab Spring

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Abstract

This research aimed to examine the effect of intellectual capital (IC) on firm performance before and after the Arab Spring. Quantitative data were collected for 50 Jordanian industrial companies listed on the Amman Stock Exchange (ASE) between 2008 and 2017. IC is measured using Pulic's value-added intellectual coefficient (VAIC™) and its components (human, structural, and capital employed efficiencies) (HCE, SCE, CEE). Meanwhile, Market to Book ratio (M/B) and Earnings per Share (EPS) are used to represent the firm performance. The research findings shed light on the importance of IC on firm performance during the crisis. It also provides a basis for future studies in comparing the effect of IC on firm performance before and after the COVID-19 pandemic.

Keywords

Industrial companies · Firm performance · Arab spring

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1 Introduction

Since the beginning of the twenty-first century, the global economy has been dependent on computers and digital technology, leading to the emergence of a digital economy that focuses on employees as the main drivers of wealth, as they are the actual users of technology and are responsible for achieving sustainable economic growth (Chahal & Bakshi, 2016; Momani et al., 2019; Švarc et al., 2020). Dr. Margaret Blair from the Brookings Institution studied the transformation in the companies' assets in the United States of America (USA), from 1978 to 1998, and found a significant shift in the relationship between tangible and intangible assets over time. In 1978, around 80% of the companies' value was due to tangible assets, but in 1998, the companies' value was made up of 80% intangible assets and only 20% with tangibles (Sullivan, 2000). This tremendous shift has placed a great emphasis on IC in the new "knowledge-based economy," and also in sustaining the companies' operation, given a strong competitive environment (Bontis, 2001; Petty & Guthrie, 2000; Radjenovic & Krstic, 2017). Thus, in the twenty-first century, IC is the primary element to create a new value besides increasing the company performance, which impacts the economy. According to (Tayles et al., 2007), companies should pay more attention to knowledge and IC efficiency as the main component in creating value-added for the companies. Earlier studies about IC were looking at the conceptual definition of IC, its divisions, and how it affects the company (Bradley, 1997b; Guthrie, 2001; Pulic, 2008; Spender, 1996; Yılmaz et al., 2016). The research then continued on the impact of IC on companies, mainly in developed countries. Relevantly, Edvicnsson presented Skandia's Navigator to measure IC. Skandia is a financial Swedish company and its Deputy Financial Controller found a gap between market value and the book value for the company—the gap came from intangible assets or IC. Meanwhile, (Bradley, 1997a) explicated IC and HC, wealth creation and competitive advantage. Many authors

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have tried to define IC in many different ways; (Steward, 1997) defined IC as the knowledge included in the company processes, patents, employees' experience, skills, and information about customers, suppliers, and market channels. Whereas, (Bontis, 2001) defined IC as the knowledge of company employees and their ability to convert this knowledge into new value for the company. In this study, the definition of IC will follow (Pulic, 2008) whereby it is the knowledge of company employees who are able to transfer this knowledge into new products and add new value to the company.

Meanwhile, developing countries have recently begun to pay attention to IC (Dzhioev & Gurieva, 2020). (Al-shubiri, 2011) Studied IC via VAIC™ and its relationship with financial performance, involving 14 commercial banks in Jordan, from 2002 to 2007. Using a questionnaire distributed to 116 managers, (Zeglat & Zigan, 2013) studied IC of four- and five-star Jordanian hotels. In Egypt, a study by Sherif and Elsayed (2016) showed a direct relationship between VAIC™ and firm performance among 29 Egyptian insurance companies. However, Smriti and Das (2018) found a varied relationship between VAIC™ and firm performance of 121 pharmaceutical and drug companies in India. Hamdan (2018) studied VAIC™ and firm performance of 198 companies in Saudi Arabia and Bahrain, noting a positive relationship between IC and accounting-based performance. In Jordan, (Momani et al., 2020) found a significant effect between IC measured by VAIC™ and the performance of 50 ASE-listed industrial companies. These findings show the recent awareness of these countries toward the importance of IC in developing their economy (Almarashdah et al., 2024; Alshurideh et al., 2024a, 2024b, 2024c; Alshurideh et al., 2024a, 2024b, 2024c; Alshurideh et al., 2024a, 2024b, 2024c; Samara et al., 2024; Srivastava et al., 2024).

Moreover, IC is mainly for increasing firm's performance, which finally impacts the whole economy. The present study will utilize VAIC™ to measure the companies' value creation efficiency for companies utilizing three key resources: Capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE) (Pulic, 1998). Despite the hard-economic conditions in Jordan since 2008, its industrial sector increased by 1.2% between 2016 and 2017, and this sector faced many challenges such as border closure against the neighboring countries, taxes rise, increase in the cost of production and energy, unemployment, company bankruptcies, and corruption, impeding the foreign and Jordanian investors from investing in Jordanian companies (Malik & Awadallah, 2013; Momani et al., 2020, 2021).

The Jordan industrial sector was chosen as a research object owing to data availability and ease of accessibility of the financial information on the ASE website. In addition, the distinctive geographical location of Jordan is one of the most important factors for foreign investment. Specifically, Jordan is located within the Middle East region in the continent of Asia and meets both Europe and Africa at the same time, which makes it an important point of mobility in the Middle East. Also, we selected the industrial sector in Jordan because it contributes to the exchange rate's stability by supplementing the Kingdom's official reserves with foreign currency (with more than US $ 8.0 billion a year in 2017). Furthermore, the Jordanian industrial sector is very important because it accounts for about 60% of the total investments benefiting from the Investment Law. The Jordanian economy has been facing a turbulent time since the start of the Arab Spring in 2011. For instance, the closure of borders with Iraq and Syria led to a decline in GDP from 7.23% in 2008 to 1.97% in 2017 (Benner, 2020). Additionally, Jordan suffered consistent waves of immigration from Iraq or Syria due to the Arab Spring, and the year 2012 witnessed the beginning of the repercussions of the Syrian crisis on Jordan, as 100,000 Syrians entered the Jordanian lands while the trade exchange with Syria decreased by half (and 40% of Jordanian trade at that time). This directly affected the unemployment rate in Jordan, where the unemployment rate increased from 12.7% in 2008 to 18.3% in 2018 (Benner, 2020; Ghosh, 2016).

2 Related Study

2.1 Intellectual Capital and Its Components

The term IC was first used in 1969 by Galbraith (Pouraghajan et al., 2013). Generally, an accepted definition of IC is still lacking, but several efforts have been made for the purpose. For instance, Bradley (1997a, 1997b) defined IC as a company's capacity to convert knowledge and intangible assets into wealth-creating resources. Marr et al. (2004) defined IC as a group of knowledge assets that improve an organization's competitive position by adding value to it. Stewart and Ruckdeschel (1998) argued that IC that is not actively used in the firm is capital is buried and wasted. Ozkan et al. (2017) mentioned that IC represents intangible assets not listed explicitly on a firm's balance sheets but positively impact a firm's performance. Pulic (2004a, 2004b, 2008) stated that IC is the main resource for creating a competitive advantage and that the traditional measurement methods of company performance are unsuitable for measuring knowledge performance as they do not explain the value created from knowledge assets (Iazzolino & Laise, 2013). Some researchers did not agree with the definition of IC and its components, but most studies divided it into three main components. According to Petrash (1996), the components of IC comprise human

capital (HC), structural capital (SC), and relational capital (RC), also known as customer capital (CC). According to (Ramanauskaitė & Rudžionienė, 2013), the percentages of IC components are made of 36% HC, 29% SC, and 35% RC. Martí (2003) mentioned that RC is the relationship between the company and its customers, suppliers, shareholders, and banks including all the marketing strategies of the company and its related trademarks and others.

2.2 Definition of Value-Added Intellectual Coefficient

The present study will employ a VAIC™ model proposed by Pulic (1998) to measure the company's power in creating value. This method measures the value creation efficiency by using the accounting numbers from annual reports (Pulic, 2000). This method combines financial and physical capital efficiency and Intellectual Capital efficiency (ICE) to measure the performance of the company (Pulic, 2000, 2004b, 2008; Ståhle et al., 2011). The concept of this method depends partially on Skandia Navigator (Nazari & Herremans, 2007). However, Pulic explained the concept of IC as knowledgeable employees with the ability to convert his knowledge into a product that creates value for the company. Such employees are the real investment and they are the key source of IC (Butt, 2022; Pulic, 2000). The companies in the knowledge economy integrate two resources to create value, namely the physical and financial capital, and IC (Iazzolino & Laise, 2013; Pulic, 2008). The main difference between IC with the Skandia Navigator and Pulic concept is that Skandia Navigator defined IC as a set of characteristics for HC, SC, and CC (Iazzolino & Laise, 2013).

2.3 Intellectual Capital and Firm Performance

The effect of VAIC™ on firm performance whether for companies or banks or any organization in the economy is a simple phenomenon (Buallay et al., 2019). Many researchers studied IC using this method. Relevantly, Hamdan et al. (2017) found a significant relationship between IC based on accounting and return on assets (ROA) and Tobin's Q. Suhendra (2016) indicated that IC has a significant effect on profitability, market valuation, and growth but an insignificant effect on productivity and firm value (Aziz, 2021). Nadeem et al. (2018) reported a positive and significant link between IC efficiency and ROA and return on equity ROE. Also, there is a positive significance between HCE, SCE, and CEE with firm performance. Bayraktaroglu et al. (2019) concluded a significant relationship between VAIC™ and ROA, ROE, and market to book ratio (M/B) (Al-Gasaymeh et al., 2023). Meanwhile, CEE plays a moderating role in the relationship between SCE and profitability for the Turkish manufacturing sector. Momani and Nour (2019) found a negative relationship between VAIC™ and ROE among commercial banks in Jordan, and a positive relationship between HCE, SCE, and CEE and ROE among Jordanian banks (Chang et al., 2024). Rangkuti et al., (2020) found a significant relationship between VAIC™ and profitability, leverage, firm size, and firm growth on firm value. Dzhioev and Gurieva (2020) applied VAIC™ and confirmed the importance of IC for the company, in specific, the process of creating value within it, especially the relationship in high-tech companies (pharmaceutical, information technology, high-tech manufacturing, telecommunications, etc.).

2.4 Research Framework

Theory focuses on the link between IC and resources, capabilities, companies' profitability, and competitive advantage, aside from examining the impact of these connections on the creation of sustainable competitive advantage and improving firm's performances (Buallay et al., 2019; Radjenovic & Krstic, 2017). Thus, the following hypotheses have been developed to examine if there is a relationship between VAIC™ in general and by components among industrial companies in Jordan before and after the Arab Spring.

H1. There is a significant relationship between VAIC™ and M/B ratio before and after the Arab Spring among industrial companies in Jordan.

H1a. There is a significant relationship between HCE and M/B ratio before and after the Arab Spring among industrial companies in Jordan.

H1b. There is a significant relationship between SCE and M/B ratio before and after the Arab Spring among industrial companies in Jordan.

H1c. There is a significant relationship between CEE and M/B ratio before and after the Arab Spring among industrial companies in Jordan.

3 Research Design and Methodology

3.1 The Study Sample

The study used a sample of 464 observations derived from 50 industrial companies listed on the ASE for ten years from 2008 to 2017. Since the purpose of this study was to measure the effect of VAIC™ on firm performance before and after the Arab Spring, the study period was divided into two parts; the first period of 2008–2011 refers to the period before the Arab Spring, and the second period of 2012-2017refers to the period after the Arab Spring.

3.2 Study Variables

Value-added intellectual coefficient "VAIC™" model was used to measure the effect of IC and its components (HCE, SCE, and CEE) on firm performance denoted by MB and EPS measurement for Jordanian industrial companies.

3.3 Study Framework

The present study used multiple regression analysis for testing the hypotheses, so, we have four main models as follows:

Model 1: M/B it = α0 + β1 VAIC™ it + β2 Ln Size it + β3 Ln Age it + εit.

Model 2: M/B it = α0 + α0 + β1 CEE it + β2 HCE it + β3 SCE it + β4 Ln Size it + β5Ln Age it + εit.

4 Results

4.1 Descriptive Statistics

Table 2 displays the descriptive statistics for all study variables. As observed, the descriptive results of the VAIC™ components (HCE, SCE, and CEE) show that HCE has the most influential component in creating value before and after the Arab Spring with the mean value of 1.1699 and 0.9273, respectively, compared to SCE and CEE. Moreover, the value of VAIC™ and its components before the Arab Spring is higher than after, denoting the negative impact of the Arab Spring on the effectiveness of IC of industrial companies in Jordan, which may be attributed to the loss of many regional markets with neighboring countries, in addition to the closure of borders with Iraq and Syria.

Table 1 Summary of all variables

Variables	Equations
VA	$VA_{it} = OP_{it} + EC_{it} + D_{it} + I_{it} + Div_{it} + T_{it}$
HC	HC it is employee expenses of company *I* in year *t*. (wages and salaries)
HCE	$HCE_{it} = VA_{it}/HC_{it}$
SC	$SC_{it} = VA_{it} - HC_{it}$
SCE	$SCE_{it} = SC_{it}/VA_{it}$
CE	Is the book value of the company's net assets
CEE	$CEE_{it} = VA_{it}/CE_{it}$
VAIC™	$VAIC^{TM}{}_{it} = HCE_{it} + SCE_{it} + CEE_{it}$
M/B	M/B = the market value divided by the book value of common stock
EPS	EPS = (Net Income-Preferred Dividends)/(Weighted Average Number of Shares)
SIZE	SIZE = Natural log total assets
AGE	Age = Natural log (current year—formation year of the company)

Table 2 Descriptive statistics

	Statistics	Independent variables				Dependent variables		Control variables	
		HCE	SCE	CEE	VAIC™	M/B	EPS	LNSize	LNAge
Before Arab Spring	N	189	189	189	189	189	189	189	189
	Mean	1.1699	0.0146	0.3027	1.1761	0.0597	0.0420	16.5469	2.8445
	St. D	0.6887	0.0871	0.2035	0.4582	0.5973	0.1511	1.4244	0.8701
After Arab Spring	N	275	275	275	275	275	275	275	275
	Mean	0.9273	−0.0101	0.3088	1.0323	−0.0588	0.0343	16.4731	3.1202
	St. D	0.5737	0.0984	0.2394	0.4305	0.7220	0.1458	1.3132	0.6091

HCE is human capital efficiency, SCE is structural capital efficiency, CEE is capital employed efficiency, VAIC™ value-added intellectual coefficient, MB is market to book ratio, EPS is earnings per share, lnAge is Natural log for company age, lnSize is Natural log for company size

4.2 Regression Analysis

Table 3 presents the regression statistics for the main hypotheses to examine the effect of VAIC™ on M/B ratio and EPS before and after the Arab Spring. Model 1 presents the regression statistics between VAIC™ and M/B ratio, while Model 3 displays the regression statistics between VAIC™ and EPS.

Table 4 presents the regression statistics for the sub-hypotheses to examine the effect of VAIC™ components (HCE, SCE, and CEE) on M/B ratio and EPS before and after the Arab Spring. In Model (2), all components of VAIC™ before the Arab Spring were found to be insignificant, therefore, H1a, H1b, and H1c were rejected before the Arab Spring. By contrast, after the Arab Spring, the results show that SCE and CEE had a significant positive relationship with M/B ratio (coefficient = 0.5211674 and 0.8319172, respectively) at 1% and 5% level, respectively. Therefore, this result supported H1b and H1c but not H1a after the Arab Spring.

Table 3 Regression analysis for main hypotheses

Variables	M/B before Model 1		M/B after Model 1		EPS before Model 3		EPS after Model 3	
	Coef	T-test	Coef	T-test	Coef	Z-test	Coef	Z-test
Constant	− 0.6796564	− 0.55	− 2.36764	− 1.35	− 0.220696	− 1.28	− 0.2151716	− 1.17
Control effect								
Size	0.136967	1.67	0.1432687	1.90	− 0.000731	− 0.07	− 0.0065943	− 0.61
Age	− 0.54116	− 13.16***	− 0.0546283	− 0.22	0.002468	0.16	0.0501712	2.23**
Main Hypoth								
VAIC™	0.0160255	0.82	0.1145983	0.92	0.2266041	10.83***	0.1907884	9.84***
R^2	0.1243		0.0166		0.4414		0.3107	
Num of groups	49		48		49		48	
F (Chi^2)	8316.33		3.24		128.19		100.76	
Prob F (Chi^2)	0.0000		0.1194		0.0000		0.0000	

Notes ***, **, and * significant at the levels 1%, 5%, and 10%
VAIC™: Value added intellectual coefficient. Size: Company size. Age: Company age. M/B: Market to Book Ratio. EPS: Earnings per Share

Table 4 Regression analysis for sub-hypotheses

Variables	M/B before Model 2		M/B after Model 2		EPS before Model 4		EPS after Model 4	
	Coef	T-test	Coef	T-test	Coef	Z-test	Coef	Z-test
Constant	−0.3119879	−0.20	−1.032911	−0.59	−0.080392	−0.68	−0.0146578	−0.07
Control effect								
Size	0.1189527	1.18	0.0749864	1.07	−0.002954	−0.39	−0.0109381	−0.96
Age	−0.560873	−15.09***	−0.1227674	−0.56	−0.010631	-0.66	0.0459108	1.94
Sub-Hypoth								
HCE	−0.067137	−1.85	−0.1420845	−1.84	0.1223256	4.31***	0.0774772	2.27**
SCE	0.3435695	1.16	0.5211674	4.52***	0.0744166	0.48	0.4315257	2.81***
CEE	0.2608935	1.25	0.8319172	3.56**	0.1865375	1.70*	0.0445377	0.59
R^2	0.1325		0.0801		0.4830		0.3244	
Num of groups	49		48		49		48	
F (Chi^2)	6.96		772.54		101.09		66.83	
Prob F (Chi^2)	0.0706		0.0000		0.0000		0.0000	

Notes ***, **, and * significant at the levels 1%, 5%, and 10%
HCE: Human capital efficiency. SCE: Structural capital efficiency. CEE: Capital employed efficiency. M/B: Market to Book Ratio. EPS: Earnings per Share

5 Conclusions

The results show a decrease in all study indicators, whether it is VAIC™ and its components, or firm performance (M/B ratio and EPS) after the Arab Spring. Moreover, the Arab Spring imparts a negative impact on the Jordanian economy, while reducing HCE. Still, HCE remains the main component of creating value in the companies, compared to SCE and CEE. VAIC™ before and after Arab Spring is insignificant in relation to M/B ratio, denoting the investors' lack of confidence in the Jordanian economy, and thus their unwillingness to bear the risks of investing in the Jordanian economy despite the safe economic environment in Jordan. In contrast, there is a significant relationship between VAIC™ and EPS before and after the Arab Spring, showing that despite the bad conditions that the Jordanian economy is experiencing, Jordanian industrial companies still tried to maintain their profitability per share, preventing collapse to this sector. The relationship between VAIC™ components and M/B ratio shows insignificance of all components of VAIC™ before the Arab Spring. This was attributed to Jordanian economy being affected by the Subprime mortgage crisis. However, HCE was not significant after the Arab Spring, and this was linked to the indifference of investors toward the employees as they were more concerned about the profits. Hence, SCE and CEE are significant with M/B ratio. As for the relationship of the components of VAIC™ and EPS, HCE is significant both before and after the Arab Spring, denoting the importance of this element (employees) for industrial companies despite the decrease in the significance level after the Arab Spring. This is expected owing to the increase in the employee turnover rate in addition to the increase in unemployment. Notably, SCE became important after the Arab Spring, unlike CEE.

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