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Sustainable Growth and Profitability in the Pakistani Insurance Sector: An Intellectual Capital Perspective

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Abstract *In this new era of knowledge-based systems, financial institutions tend to improve as per performance standards using tangible and intangible resources. Intellectual capital (IC) gained much attention and in the recent past has encouraged the researchers to shed light on the connection of IC. The insurance companies plays a vital role in the financial system. This study investigates the impact of IC on the insurance sector's performance, i.e. sustainable growth (SGR), earnings and profitability, using value-added intellectual coefficient (VAIC) and modified value-added intellectual coefficient (MVAIC) methods. In addition, among all the IC elements, the study finds physical capital/capital employed (CE) and human capital (HC) most contributing factors in IC performance, whereas structural capital (SC) needs more focus to enhance the performance. Furthermore, the results suggest more attention towards relational capital (RC) as the study finds it's a positive impact on the performance, but it continues to remain insignificant. This study will be prospectively helpful for academics, policymakers, economists and managers. This study enlightens the IC's role in achieving sustainable growth.*

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Introduction

A knowledge-based management of intangible mostly influences sustainable performance compared to tangible resources (Reed, Lubatkin, & Srinivasan, 2006). There is a consensus among the academic community that IC is the firm's primary intangible asset and a critical source of competitive advantage (Bontis, 1998; Stewart, 2010). However, most empirical studies have focused on Anglophonic (e.g., Canada, UK) or Scandinavian (e.g., Sweden) research settings (Serenko & Bontis, 2017).

There is very little research on whether IC impacts performance in developing nations like Pakistan. However, Pakistan is a relatively large country by population (over 212 million inhabitants) but with a relatively low level of individual wealth (USD 5,872 GDP per capita). Nevertheless, it has a burgeoning financial services sector and the potential

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to become a significant economy in the long term.

This study perform within the Pakistani insurance sector using the VAIC and MVAIC. VAIC was first developed by Pulic (1998), and impact of (CEE), human capital efficiency (Makhloufi, Laghouag, Ali Sahli, & Belaid), on financial performance. There has not been any such previous study conducted related to IC that applied SGR and the other two determinants, earnings, and profitability as dependent variables over the insurance sector of Pakistan.

Literature Review

Definition and Measurement

Many previous studies have defined and provided measurement approaches for intellectual capital. (Edvinsson & Malone, 1997) proposed IC as a collection of resources that delivered a competitive advantage to an organization. Soon after, several seminal studies classified IC into physical capital, (Bontis, 1998; Stewart, 2010).

Pulic (1998) originally developed the VAIC approach an empirical method of measuring IC when most research studies examined IC from a qualitative and case study perspective. Although VAIC had some initial limitations, Pulic (2004) & Pulic (2000) continued to refine their approach and soon added a measure for relational capital efficiency to their existing model.

Several academic studies have since included relational capital in their measurement approach (i.e., by adding RCE to the previous components of CEE, HCE and SCE), which is now considered a valid modification of the original VAIC approach (MVAIC) (Chan, 2009; Vidyarthi, 2019; Xu & Wang, 2019; Yao, Haris, Tariq, Javaid, & Khan, 2019).

IC Performance

A rich literature on IC and specific financial performance in single and multiple economies is available. However, for dynamic panel data analysis, GMM has been applied in some recent studies (Adesina, 2019; Haris, Yao, Tariq, Malik, & Javaid, 2019; Yao et al., 2019). GMM estimator was first used by (Arellano & Bond, 1991) and developed lately for vibrant data sets by (Arellano and Bover, 1995). The system-GMM estimator reflects the determination of profits that affect the performance, which is difficult to measure or identify in a single equation (Yao, Haris, & Tariq, 2018). The IC performance (Ashraf, Li, & Mehmood, 2017; H. Li et al., 2021), Insurance Sector using a GMM two-step system estimator in Pakistan.

However, among existing IC studies, Ahmad and Ahmed (2016) applied linear regression over 2008–2013 on a sample of 78 Pakistan financial institutions. They found that among all the VAIC components, CEE has significant importance to raise profitability. Another study conducted by (Haris, Yao, Tariq, Javaid, and Malik (2018); Mangenda Tshiaba, Wang, Ashraf, Nazir, & Syed, 2021) and 20 banks were engaged in 2007–2016. They applied multiple regression and reported a higher contribution of HCE among all VAIC components.

Hypothesis Development

IC and Performance

Intangible resources are particularly important because they help achieve a competitive advantage and improve performance by sustaining it (Haris et al., 2019; Wernerfelt, 1984). A rich literature has supported between IC and the different financial institutions (Ahmad & Ahmed, 2016; F.-C. Chen, Liu, & Kweh, 2014; Haris et al., 2018; Mondal & Ghosh,

2012; Tasawar & Roszaini, 2017; Yalama, 2013).

Hypothesis 1(H1)

IC (VAIC and MVAIC) has a positive impact on the performance of Insurance companies in Pakistan.

CEE and Performance

VAIC, CEE is related to the measurement of the efficiency of physical capital invested in the company. In addition, however, some previous literature found and CEE performance. A few studies found no impact of CEE on performance (Firer & Williams, 2003; Joshi, Cahill, & Sidhu, 2010; Poh, Kilicman, & Ibrahim, 2018; Smriti & Das, 2018). Therefore, we propose our second hypothesis:

Hypothesis 2 (H2)

CEE has a positive relationship with the performance of Insurance companies in Pakistan.

HCE and Performance

Human capital consists of intangible resources such as knowledge, expertise, talents, ideas, experience, capabilities, and creative skills. Bontis (1998) suggested that, in a knowledge-based economy, the organization can utilize HC to achieve strategic goals and even get an innovative competitive advantage. HC is being evaluated by HCE. Many researchers studied HCE and positive and negative with performance. However, some studies (Ahmad & Ahmed, 2016; Haris et al., 2018; Yao et al., 2019), positive relationship impact of HCE on performance.

Hypothesis 3 (H3)

HCE has a positive relationship with the performance of Insurance companies in Pakistan.

SCE and Performance

SC is described as the organizational system and structure consisting of a database, corporate approaches, management processes, and organizational strategies. Moreover, some studies found positive relationship between SCE and profitability (M. A. K. Al-Musali & Ismail, 2014; F.-C. Chen et al., 2014; Y. Li & Zhao, 2018; Yao et al., 2019). Some studies found an insignificant impact on profitability (Alhassan & Asare, 2016; Kehelwalatenna & Premaratne, 2014; Smriti & Das, 2018; Tasawar & Roszaini, 2017; Tran & Vo, 2018).

Hypothesis 4 (H4)

SCE has a positive impact on the performance of Insurance companies in Pakistan

RCE and Performance

RC is related to the sustainable and long-term relationships with external factors, including vendors, customers, creditors, and even competitors. Some studies found a negative impact of RCE on performance and profitability (M. C. Chen, Cheng, & Hwang, 2005; Vidyarthi, 2019). Some studies (Ashraf, Li, Butt, Naz, & Zafar, 2019; Sardo & Serrasqueiro, 2017; Xu & Wang, 2018, 2019), reported a positive RCE and performance. Nimtrakoon (2015) and Soetanto and Liem (2019) found no interaction between performance and RCE. Yao et al. (2019) reported an insignificant intraction of RCE and performance of 111 institutions of Pakistan.

Hypothesis 5 (H5)

There is a positive relationship between RCE and the performance of Pakistani insurance companies.

Sample and Methodology

Sample and Data

In the Pakistani insurance sector, at present, 30 non-life/general insurance companies, 7 life insurance, 1 re-insurance company, and 1 Islamic Takaful company are operating in Pakistan. This study utilized a sample of 31 insurance companies from 2007–2016, in which 25 non-life insurance and 6 life insurance companies are included. 1 foreign, 4 life insurance, 1 non-life insurance, 1 re-insurance and 1 Islamic Takaful company excluded due to the unavailability of the required financial data. Sindh Insurance was established in 2014, so the study has taken the data from 2014–2016. For this study, the required financial data is acquired from both audited consolidated and unconsolidated financial statements maintained by each company and also from IAP (Insurance Association of Pakistan), which maintains the database for all the insurance companies (world bank) in the country and the data related to macro-economic variables. All the information utilized and attain the current research are relevant, authentic, and reliable to perform realistic research.

Table 1. Presents a List of Companies Analysed in this Study (C. Li et al., 2020).

S. No	Name	Abb.	Year Of Establishment	Assets (PKR'000)	Share %
1	Adamjee Insurance Company Ltd.	ADI	1960	38,579,911	3.70%
2	Alfalah Insurance Company Ltd.	ALIC	2007	2,808,426	0.27%
3	Alpha Insurance Company Ltd.	APIC	1951	1,105,534	0.11%
4	Asia Insurance Company Ltd.	ASIC	1980	1,054,652	0.10%
5	Askari General Insurance Company Ltd.	ASKC	1995	3,726,578	0.36%
6	Atlas Insurance Company Ltd.	AT:LC	1934	4,277,603	0.41%
7	Century Insurance Company Ltd.	CIC	1989	2,660,683	0.26%
8	Cooperative Insurance Company Ltd.	COIC	1949	2,222,045	0.21%
9	Crescent Star Insurance Company Ltd.	CSIC	1957	1,009,123	0.10%
10	EFU General Insurance Company Ltd.	EFUC	1932	36,204,203	3.48%
11	East West Insurance Company Ltd.	EWIC	1983	2,335,785	0.22%

S. No	Name	Abb.	Year Of Establishment	Assets (PKR'000)	Share %
12	Habib Insurance Company Ltd.	HBIC	1942	2,759,878	0.27%
13	New Jubilee Insurance Company Ltd.	NJIC	1953	17,226,095	1.65%
14	PICIC Insurance Company Ltd.	PICIC	2004	335,902	0.03%
15	Pakistan General Insurance Company Ltd.	PGIC	1947	960,234	0.09%
16	Premier Insurance Company Ltd.	PRIC	1952	3,745,154	0.36%
17	Reliance Insurance Company Ltd.	REIC	1982	1,811,478	0.17%
18	Saudi-Pak Insurance Company Ltd.	SPIC	2005	1,033,260	0.10%
19	Security General Insurance Company Ltd.	SGIC	1996	12,588,143	1.21%
20	Shaheen Insurance Company Ltd.	SHIC	1996	770,634	0.07%
21	Sindh Insurance Company Ltd.	SIC	2014	2,985,812	0.29%
22	TPL Direct Insurance Company Ltd.	TPC	2005	2,277,971	0.22%
23	UBL Insurance Company Ltd.	UBLC	2007	3,531,828	0.34%
24	United Insurance Company Ltd.	UNIC	1959	5,446,580	0.52%
25	Universal Insurance Company Ltd.	UNVC	1958	803,566	0.08%
26	East West Life Insurance Company Ltd.	EWLC	1992	476,272	0.05%
27	EFU Life Insurance Company Ltd.	EFULC	1991	106,301,531	10.21%
28	IGI Life Insurance Company Ltd.	IGILC	1994	19,232,731	1.85%
29	Jubilee Life Insurance Company Ltd.	JLIC	1994	102,796,766	9.87%
30	State Life Insurance Company Ltd.	SLFC	1972	659,811,390	63.56%
31	TPL Life Insurance Company Ltd.	TPLC	2008	433,002	0.04%
	Total Assets			1,041,312,770	

Variable Selection

Dependent Variables

This study uses three performance indicators, i.e., sustainable growth, earnings, and profitability, used in previous studies. In previous studies that applied sustainable growth (SGR) and the other two factors as dependent variables over the insurance sector of Pakistan. The profitability (ROE) is calculated by the ratio and average equity, that defines capability of shareholders to enhance profits through their investments, obtained from (Haris et al. (2019). SGR is the degree of the uses its monetary funds

to avoid external loans to achieve growth (Xu & Wang, 2018; ZHANG & YU, 2008). The calculation of SGR is given as follows in Eq. 1

$$SGR = Net\ profit\ ratio * Asset\ turnover\ ratio * Retention\ rate * Equity\ Mulitplier \quad Eq.1$$

Independent Variables

IC Determinants

This study follows the previous studies to measure the VAIC, MVAIC, and their components (Haris et al., 2018; Haris et al., 2019; Pulic, 1998, 2000; Rehman, Ilyas, & Rehman, 2011), per equation 1, mentioned below, VA is considered as the difference between output and input.

$$VAit = PRit + PCit + DPit + Ait \quad Eq.2$$

In Eq. 2, VA is the value-added, PR represents operating profits, PC represents the personal cost such as salaries and wages, DP is the depreciation. A represents amortization, followed by (Haris et al., 2019).

Further, followed by the previous literature (Haris et al., 2018; Pulic, 1998), VAIC calculation is summarized as mentioned below:

$$CEEit = VAit/CEit \quad Eq.3$$

$$HCEit = VAit\ /\ HCit \quad Eq.4$$

$$SCEit = SCit\ /\ VAit \quad Eq.5$$

$$SCit = VAit - HCit \quad Eq.6$$

$$VAICit = CEEit + HCE + SCEit \quad Eq.7$$

Followed by previous studies (Yao et al., 2019) MVAIC is formed by four components RCE, SCE, HCE, CEE.

Calculation of MVAIC is given below in Eq. 8 and Eq. 9.

$$RCit = RCit/VAit \quad Eq.8$$

$$MVAICit = CEEit + HCE + SCEit + RCEit \quad Eq.9$$

Where RC represents the relational capital, it can be measured by the sum of marketing, advertising, and selling expenses.

Other Variables

Furthermore, this study uses company-specific and macro-economic variables. Company size (SIZE), Capitalization (Casado-Belmonte et al.), and Operational Efficiency (OEF) have been used as company-specific indicators in the study, followed by (Haris et al., 2019; Tan, 2016; Xu & Wang, 2019; Yao et al., 2019)). To calculate the SIZE, the study used a proxy of company size. Capitalization CAP is measured by the ratio of shareholder's equity and total assets, the ratio among operating expenses and average assets, is used to calculate the operational efficiency (OEF). Macro-economic indicators, which have been examined in this study, are crisis (CRISIS), economic growth (EGR) and Inflation, followed by the previous literature (Haris et al., 2019; Oppong & Pattanayak, 2019; Tan & Floros, 2012; Vidyarthi, 2019; Yao et al., 2018; Yao et al., 2019). Moreover, to measure the CRISIS author allocated value 1 for the financial crisis period of 2008-2009, and value 0 is assigned.

Econometric Methodology

Following the previous studies, this study used GMM, developed by Arellano and Bond (1991). Arellano and Bover (1995) have improvised the efficiency of GMM; they introduced more instruments by designing two equation systems, level equation the first-difference equation. GMM does not use any unnecessary information or data but is confined in the moment settings, so its estimators are known to be consistent, efficient, and normal (Hansen, Heaton, & Yaron, 1996). In this study, a two-step GMM system estimator is used for efficiency.

This study employs a sample of 31 companies using 2007–2016. The study

uses unbalanced panel data to avoid errors and biased results; this study applies Windmeijer (2005) correction to get more robust and accurate results. Following are the econometric models for this study mentioned below:

$$P_{it} = \alpha_0 + \delta P_{it-1} + \beta_a VAIC_{it} + \beta_b INSSIZE_{it} + \beta_c CAP_{it} + \beta_d OEF_{it} + \beta_e CRISES_t + \beta_f EGR_t + \beta_g INF_t + \varphi_h TD_t + v_{it} + \mu_{it} \quad Eq.(a)$$

$$P_{it} = \alpha_0 + \delta P_{it-1} + \beta_a CEE_{it} + \beta_b HCE_{it} + \beta_c SCE_{it} + \beta_d INSSIZE_{it} + \beta_e CAP_{it} + \beta_f OEF_{it} + \beta_g CRISES_t + \beta_h EGR_t + \beta_i INF_t + \varphi_j TD_s + v_{it} + \mu_{it} \quad Eq.(b)$$

$$P_{it} = \alpha_0 + \delta P_{it-1} + \beta_a MVAIC_{it} + \beta_b INSSIZE_{it} + \beta_c CAP_{it} + \beta_d OEF_{it} + \beta_e CRISES_t + \beta_f EGR_t + \beta_g INF_t + \varphi_h TD_t + v_{it} + \mu_{it} \quad Eq.(c)$$

$$P_{it} = \alpha_0 + \delta P_{it-1} + \beta_a CEE_{it} + \beta_b HCE_{it} + \beta_c SCE_{it} + \beta_d RCE_{it} + \beta_e INSSIZE_{it} + \beta_f CAP_{it} + \beta_g OEF_{it} + \beta_h CRISES_t + \beta_i EGR_t + \beta_j INF_t + \varphi_k TD_s + v_{it} + \mu_{it} \quad Eq.(d)$$

In the following equations, P expresses the performance, i.e., SGR, EBITDA, and ROE. Pit–1 one-year lag of performance, α is the constant term, β is the δ is the determined profitability which ranges from 0 to 1, vit represents the unobserved company individual effect, whereas. Uit is residual, TD represents time dummies used to control the year effect. Further, for the detail of variables, see Table 1.

Findings

Descriptive Statistics

Descriptive statistics of the Insurance industry are presented in table 3. The results show that the insurance sector in Pakistan reports a 0.278 mean value of SG, 0.089 mean value of ROE, and 11.839 mean value of EBITDA, 2007-2016. The mean value of VAIC is 4.051, which is higher value of VAIC 3.015 of Pakistani Banks and lower than the mean value of VAIC 15.25 of Malaysian general insurance firms (Chen et al., 2014).

Moreover, this study reports that the HCE (2.515) is higher of CCE (0.370) and SCE (1.165). The average mean value of RCE is 0.007, which suggests the RCE has a low contribution to the IC performance of Pakistani Insurance companies. A study also reported RCE at a low level of 0.017 in IC efficiency of Indian banks (Vidyarthi, 2019).

Table 3. Summary Statistics

Variable	Obs.	Mean	Std. Dev.
SG	250	0.278	1.121
ROE	250	0.089	0.256
EBITDA	250	11.839	1.842
VAIC	250	4.051	10.265
MVAIC	250	4.057	10.027
CEE	250	0.370	0.380
HCE	250	2.515	2.530
SCE	250	1.165	10.095
RCE	250	0.007	0.271
SIZE	250	14.735	1.592
CAP	250	0.388	0.202

OEF	250	0.443	1.184
CRISIS	250	0.064	0.245
EGR	250	0.132	0.052
INF	250	120.075	26.437

Diagnostic Test

In this study, two pre-estimation tests are applied to ensure that unbalanced panel data is valid. At first, an (ADF) fisher test is applied to examine the unit root. Table 4 presents the results of the ADF test, according to which each variable with a significant p-value demonstrates a rejection of unit root in the data and provides an indication that all variables are stationary. Secondly, correlation is applied to data to examine multi-collinearity between all independent variables. Table 5 presents the correlation matrix. As per table 5, the study finds no higher collinearity among the variables, also finds that the coefficient of correlation among independent variables (Haris et al., 2019).

Furthermore, we applied a Variance Inflationary Test (VIF) to check the multi-collinearity and PV is 000**. Table 6 presents the VIF values. The VIF cut-off values at 10, indicate the absence of multi-collinearity among independent variables.

Table 4. Unit Root Test (Augmented Dickey-Fuller (ADF)

	Level	First Difference
	Coef.	Coef.
SG	271.132	468.587
ROE	453.038	655.461
EBITDA	97.346	253.579
VAIC	310.854	648.395
MVAIC	162.390	515.246
CEE	269.312	633.072
HCE	279.530	619.672
SCE	141.835	537.888
RCE	395.580	447.982
SIZE	287.858	389.019
CAP	143.032	195.496
OEF	119.735	244.779
CRISIS	93.952	829.560
EGR	125.945	968.870
INF	630.798	1178.348

Table 5. Correlation Matrix

	SG	ROE	EBITDA	VAIC	MVAIC	CEE	HCE	SCE	RCE	SIZE	CAP	OEF	CRISIS	EGR	INF
SG	1.000														
ROE	0.500***	1.000													
EBITDA	0.368***	0.618***	1.000												
VAIC	0.157***	0.093	0.139**	1.000											
MVAIC	0.121	0.126	0.099	0.022	1.000										
CEE	0.080	0.483***	0.301***	0.006	0.102	1.000									
HCE	0.515***	0.545***	0.613***	0.198**	0.083	0.172***	1.000								
SCE	0.028	-0.060	-0.024	0.767***	-0.003	-0.075	-0.056	1.000							
RCE	-0.029	0.092	0.042	-0.781***	0.017	0.109	0.082	-0.620***	1.000						
SIZE	0.288***	0.353***	0.503***	0.104	0.127*	0.500***	0.325***	0.006	0.032	1.000					
CAP	0.255***	0.061	-0.038	0.077	-0.075	-0.461***	0.280***	0.025	-0.063	-0.363***	1.000				
OEF	0.014	0.098	-0.064	0.012	-0.049	-0.105*	0.080	-0.004	-0.004	-0.097	0.115**	1.000			
CRISIS	0.000	-0.226***	-0.150**	-0.054	0.014	-0.178***	-0.194***	0.000	-0.018	-0.064	-0.014	-0.033	1.000		
EGR	-0.015	-0.068	-0.127	-0.050	-0.247	-0.100	-0.096	-0.023	0.046	-0.151	0.014	-0.024	0.093	1.000	
INF	-0.003	-0.217	-0.106	-0.052	0.010	-0.189	-0.155	-0.007	0.003	-0.035	-0.004	-0.029	0.631***	-0.044	1.000

*Notes: Level of significance at 1 %, 5 % and 10 % are represented by the *, **, and ***, respectively.*

Table 6. VIF

	Eq. (1)		Eq. (2)		Eq. (3)		Eq. (4)	
VAIC	1.03	01.03						
MVAIC					1.02	1.02		
CEE			1.59	1.66			1.59	1.66
HCE			1.48	1.52			1.50	1.53
SCE			1.01	1.02			6.60	6.64
RCE							6.67	6.73
SIZE	1.18	1.21	1.64	1.67	1.17	1.20	1.64	1.67
CAP	1.18	1.18	1.71	1.72	1.16	1.16	1.73	1.73
OEF	1.02	1.02	1.03	1.03	1.02	1.02	1.03	1.03
CRISIS		3.43		3.46		3.43		3.46
EGR		1.09		1.09		1.09		1.10
INF		3.40		3.45		3.40		3.45
Mean-VIF	1.10	1.77	1.41	1.85	1.09	1.76	2.96	2.90

Empirical Findings

IC and SGR, Earnings, and Profitability, of insurance companies. The empirical results of the study are presented in Tables 7–11. Table 7 presents the relationship between VAIC, its components, and SGR. Table 8 provides the impact of MVAIC and its components on SGR. Further, In our study, Table 10 and Table 11 are added for the additional robust checks. Table 10 provides earnings and IC, using VAIC, MVAIC, and their components. Table 11 provides the results of the relationship between profitability and IC, using VAIC, MVAIC, and their components. In the study's analysis (see Tables 7–11), F-statistics report that all regression models are jointly significant. Results report the insignificant p-values of AR(1) and AR(2), which indicate the absence of autocorrelation (Yao et al., 2018). *Impact of IC on SGR*

Table 7 presents the impact of VAIC on SGR in equations 1 and 2. In Table 7, coefficients of VAIC are positively significant in models 1 and 2 of equation 1, which indicates a positive impact of IC on SGR, consistent with (Haris et al. (2018), Haris et al. (2019) and Xu and Wang (2018). Equation 2 impact of VAIC, i.e., CEE, HCE and SCE, on SGR. Thus, this finding supports H1. Results show the positive significant coefficients of CEE in model 1 and in model 2, which is consistent with some previous studies (M. A. Al-Musali & Ismail, 2016; Haris et al., 2019). Thus, this finding supports H2. Results find that the coefficients of HCE are positively significant in Models 1 and 2 of Equation-2 (Ozkan, Cakan, & Kayacan, 2016; Ting & Lean, 2009; Xu & Wang, 2018), this supports the H3.

The results show that SCE ($\beta = 0.078$, $p > 10\%$) is positive but not significant in model 1 of Equation-2, consistent with (Tasawar & Roszaini, 2017), results also find the positive significant coefficient of SCE ($\beta = 0.145$, $p < 5\%$) in model 2 of Equation-2, this result is consistent with (Soetanto & Liem, 2019). Thus, this finding supports the H4. Moreover, results show that each component of VAIC is positively related to SGR. To offer robustness, the study also inspects the impact of company-specific and macroeconomic variables on SGR. Among company-specific variables, the results found a positive impact on company SIZE, CAP, and OEF on the SGR. However, among macro-economic variables, the

study finds that an increase in the economic growth (EGR) increases the SGR, while an increase in inflation decreases the SGR of insurance companies.

Table 7. Impact of VAIC on SGR

	Equation 1		Equation 2	
	Model (1)	Model (2)	Model (1)	Model (2)
Lag-SGR	0.118**	0.183***	0.202**	1.005***
	(0.064)	(0.089)	(0.108)	(0.412)
VAIC	0.154***	0.108***		
	(0.076)	(0.052)		
CEE			0.338***	2.596**
			(0.134)	(1.383)
HCE			0.236***	0.510**
			(0.085)	(0.340)
SCE			0.078	0.145**
			(0.085)	(0.103)
SIZE	0.167**	0.139**	0.003	-0.446
	(0.093)	(0.078)	(0.153)	(0.281)
CAP	2.160**	2.427***	0.894	2.443
	(1.087)	(1.035)	(1.351)	(1.477)
OEF	0.502*	0.977***	0.654***	-0.829
	(0.314)	(0.984)	(0.243)	(0.206)
CRISIS		-3.275***		-5.604**
		(0.984)		(3.018))
EGR		3.092***		3.454*
		(2.185)		(2.260)
INF		-2.025***		-4.054***
		(0.701)		(1.982)
Const.	-3.831***	2.905**	-1.251	6.251
	(1.838)	(1.492)	(2.571)	(4.464)
Obs.	219	219	219	219
Insurance Companies	31	31	31	31
Instrument	22	22	22	22
F-Statistics	4.00***	15.73***	4.15***	1.90**
AR-1 *(P-value)*	-0.99	-1.37	-0.75	-1.36
	(0.232)	(0.170)	(0.451)	(0.173)
AR-2*(P-value)*	0.83	0.88	0.43	1.32
	(0.409)	(0.381)	(0.667)	(0.188)
Hansen-*(P-value)*	16.10	6.84	13.18	4.46
	(0.446)	(0.910)	(0.512)	(0.954)

Additional Robust Checks

Impact of IC on Earning

Table 10 presents the impact of IC on Earnings (EBITDA). Equation 1 represents the positive coefficients of VAIC, which are significant as well in Models 1 and 2, respectively, which affirm a positive relationship of IC with EBITDA,

thus supports the acceptance of H1. This indicates that higher VAIC affects higher earnings positively. Equation 2 consists of components of VAIC, where CEE is positively significant, which support the H2. HCE is positively significant and support the H3. Moreover, SCE is also positively significant in Models 1 and 2, respectively, which supports the H4. Amongst all IC components, HCE is a higher positively significant, which means HC is a more important IC variable concerned with earnings.

Table 10. Impact of IC on Earning

	Equation 1		**Equation 2**		**Equation 3**		**Equation 4**	
	Model (1)	**Model (2)**	**Model (1)**	**Model (2)**	**Model (1)**	**Model (2)**	**Model (1)**	**Model (2)**
Lag-EBITDA	0.003 (0.001)	0.009 (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.008 (0.001)	0.009*** (0.000)	0.002** (0.000)	0.001** (0.000)
VAIC	0.548*** (0.119)	0.513*** (0.167)						
MVAIC					0.073*** (0.036)	0.162*** (0.046)		
CEE			0.632*** (0.173)	0.532*** (0.161)			0.627*** (0.191)	0.555*** (0.144)
HCE			0.335*** (0.106)	0.300*** (0.146)			0.388*** (0.117)	0.300** (0.167)
SCE			6.235*** (0.774)	5.923*** (1.221)			6.241*** (0.858)	6.075*** (1.333)
RCE							1.181 (1.846)	-0.893 (2.567)
SIZE	0.548*** (0.117)	0.475** (0.275)	0.645*** (0.914)	0.638*** (0.178)	0.955*** (0.187)	0.747*** (0.046)	0.646*** (0.084)	0.609*** (0.161)
CAP	0.218* (0.984)	0.312 (0.544)	1.611*** (0.450)	1.530*** (0.751)	3.246*** (0.827)	3.295*** (0.682)	1.615*** (0.593)	1.306 (0.872)
OFF	-0.970*** (0.413)	-1.116*** (0.423)	-0.480 (0.317)	-0.574*** (0.339)	-0.854* (0.605)	-1.949*** (0.492)	-0.527 (0.313)	-0.567** (0.368)
CRISIS		-2.955 (3.818))		-2.718 (2.363)		-0.695* (1.171)		-0.323 (0.243)
EGR		5.247 (5.013)		1.957 (8.250)		14.828*** (3.725)		0.960 (9.348)
INF		-0.013 (0.208)		-0.006 (0.208)		-0.012 (0.010)		-0.002 (0.022)
Const.	0.861 (1.820)	5.997 (6.790)	-0.869 (1.432)	0.519 (6.392)	-3.497 (2.837)	3.332 (2.488)	-0.851 (1.451)	0.013 (6.506)
Obs.	186	186	186	186	186	186	186	186
Insurance Companies	30	30	30	30	30	30	30	30
Instrument	22	22	23	23	22	22	23	23
F-Statistics	37.88***	19.47***	134.83***	69.45***	15.13***	25.75***	105.90***	75.67***

	Equation 1		Equation 2		Equation 3		Equation 4	
	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)
AR-1 *(P-value)*	-1.57 (0.116)	-1.62 (0.106)	-1.53 (-0.125)	-0.90 (-0.366)	-1.14 (0.254)	-1.14 (0.254)	-1.01 (0.313)	-0.56 (0.575)
AR-2*(P-value)*	-0.80 (0.425)	-0.86 (0.392)	0.08 (0.934)	0.02 (0.983)	-0.6 (0.949)	1.07 (0.286)	0.08 (0.934)	0.05 (0.960)
Hansen-*(P-value)*	18.19 (0.313)	17.60 (0.173)	16.85 (0.328)	15.16 (0.233)	24.48 (0.178)	12.84 (0.460)	16.16 (0.304)	13.27 (0.276)

*Notes: Level of significance at 1 %, 5 % and 10 % are represented by the *, **, *** respectively. Lag-EBITDA is the one-year lag of the dependent variable.*

IC and Profitability

Furthermore, role of IC on profitability as presented in Table 11. According to Models 1-2 in Equation 1, the coefficients of VAIC are positive with H1. Equation 2 reports the of VAIC on ROE, where coefficient value of CEE are positively significant. H2 is supported. The coefficient values of HCE are positively significant. Thus, H3, is supported (Haris et al., 2019). However, the coefficient values of SCE are negatively insignificant. Thus, this finding supports the H4, which is followed by (Xu & Wang, 2018).

Table 11. Impact of IC on Profitability

	Equation 1		Equation 2		Equation 3		Equation 4	
	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)
Lag-ROE	0.230*** (0.109)	0.373*** (0.125)	0.103* (0.068)	0.016* (0.216)	0.251*** (0.084)	0.431** (0.234)	0.129 (0.080)	0.272 (0.330)
VAIC	0.040** (0.022)	0.029*** (0.011)						
MVAIC					0.048*** (0.023)	0.007*** (0.003)		
CEE			0.303** (0.158)	0.238** (0.128)			0.304*** (0.146)	0.235* (0.157)
HCE			0.063*** (0.244)	0.055** (0.321)			0.045** (0.025)	0.058*** (0.247)
SCE			-0.041 (0.050)	-0.022 (0.044)			0.012 (0.054)	0.049 (0.047)
RCE							1.400 (1.264)	2.511 (2.414)
SIZE	0.035 (0.035)	0.022 (0.022)	-0.130 (0.014)	-0.014 (0.013)	0.055*** (0.023)	0.010 (0.10)	-0.107 (0.170)	-0.023 (0.016)
CAP	0.590*** (0.175)	-0.023 (0.221)	0.158 (0.280)	-0.069 (0.223)	0.498** (0.271)	-0.035 (0.119)	0.265 (0.254)	0.027 (0.403)
OFF	-0.402** (0.518)	0.041 (0.049)	-0.052 (0.107)	0.056 (0.075)	0.030 (0.029)	0.051 (0.096)	0.062 (0.095)	-0.062 (0.058)
CRISIS		-1.413*** (0.430)		-0.719 (0.640)		-1.007*** (0.190)		-0.275 (0.406)
EGR		1.930 (2.327)		3.211 (3.752)		1.480*** (0.470)		5.689 (6.55)
INF		-0.009 (0.005)		-0.008 (0.007)		-0.081 (0.053)		-0.011 (0.012)
Const.	-0.560 (0.540)	1.101 (0.990)	0.038 0.318)	1.670 (1.531)	-1.120 (0.405)	-0.267 (0.225)	-0.098 (0.366)	2.143 (2.330)
Obs.	219	219	219	219	219	219	219	219
Insurance Companies	31	31	31	31	31	31	31	31

	Equation 1		Equation 2		Equation 3		Equation 4	
	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)
Instrument	22	22	22	22	24	24	22	22
F-Statistics	11.97***	21.92***	12.53***	3.45***	6.47***	29.44***	12.97***	38.21***
AR-1 *(P-value)*	-1.04 (0.296)	-1.54 (0.123)	-0.77 (0.440)	-0.74 (0.461)	-0.99 (0.321)	-1.02 (0.430)	-1.02 (0.309)	-1.04 (0.300)
AR-2*(P-value)*	-0.75 (0.451)	-0.77 (0.440)	-0.41 (0.679)	0.37 (0.713)	0.41 (0.685)	0.77 (0.440)	0.40 (0.688)	0.91 (0.363)
Hansen-*(P-value)*	18.01 (0.324)	9.46 (0.737)	14.56 (0.409)	9.24 (0.600)	19.75 (0.347)	7.45 (0.944)	12.62 (0.478)	5.83 (0.830)

Conclusion and Limitations

Furthermore, results report that among components of VAIC and MVAIC, CEE and also HCE has the SCE on the performance, while finds a negative RCE and performance. In Pakistan, insurance companies are registered, regulated with (IAP) and (SECP). Overall, the growth rate of the finance and insurance sector in the year 2018-19 is 5.14%. The sectorial share of financial institutions, including insurance companies, in GDP, is 3.5% in 2018–2019 (PES, 2018-2019).

The Pakistani insurance sector has shown a significant level regarding its IC performance. The ability to perform better is highly dependent on the HC in the insurance sector. This study is conducted to IC. i.e., VAIC and MVAIC, i.e., sustainable growth, and earnings. This study used a sample of 31 insurance companies operating in Pakistan from 2007–2016. Furthermore, dependent variables, i.e., SGR (sustainable growth), EBITDA (earning indicator), and ROE (profitability indicator), are used.

On the other hand, independent variables are segregated into intellectual capital, i.e., VAIC, MVAIC, CEE, HCE, SCE, and RCE, company-specific, i.e., SIZE, CAP, and OEF, and macro-economic variables, i.e., CRISIS, EGR, and INF.

Furthermore, Results report that operational efficiency in the insurance sector positively influences performance. Financial Crisis caused a slump in the insurance sector during the study period. On the other hand, EGR is positively related to the performance of the insurance sector. Moreover, the insurance companies with better utilization of their resources can achieve a competitive advantage; thus, guaranteeing their sustainable growth in the financial system.

This research is limited to the Pakistan insurance industry that could unlock opportunities for further research as the researchers may extend to do a comparative and reasonable analysis of services and manufacturing sectors. It is suggested that researchers may add another component of social capital to examine if it may have any effect. Variables set of other emerging economies; it would be an interesting comparative analysis. The researcher can further include other financial institutions, such as development, asset management companies, currency exchanges, micro-loan organizations. The methodologies with the same dependent and independent variables that might be attention-grabbing for researchers.

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