Intellectual Capital Effects on Firm's Profitability with Industry Types as Moderating Variable

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ABSTRACT

Intellectual Capital has become one of the essential components for companies to be able to generate value in this era of knowledge. With the different activities, markets, needs and goals in each industry, companies have difficulties in generating value using its Intellectual Capital they have. The ability of companies to utilize their Intellectual Capital, may increase investor's confidence in the perceived value of the company. Although many studies have been done but empirical research still shows some inconsistencies. The purpose of this research is to examine whether intellectual capital affects a company's predicted profitability based on its return on assets (ROA), with the type of industry as moderating variable. This quantitative research was designed using total of 645 samples consisting of 129 companies divided into 10 types of industries over a five-year period (2018-2022) in Indonesia. According to the research, Intellectual Capital and its two components (Human Capital and Structural Capital), have a positive and significant influence on ROA, but Capital Employed does not have a significant impact on ROA. While the Industry Types moderates the relationship of ROA to Intellectual Capital and Human Capital. The limitation in this study is that it does not cover 5 industries out of a total of 15 types of Capital Intellectual High industries due to the lack or absence of companies in such industries on the Indonesian Stock Exchange. Despite these constraints, industry practitioners included in the sample need to pay attention to Intellectual Capital and its components as it is beneficial in order to generate a return for the company. This research also contributed to the literature of Intellectual Capital by introducing a moderation variable of the type of industry that can add new insights related to the role of Intelligent Capital in the respective types of industry.

Keywords: Intellectual Capital, Human Capital, Structural Capital, Industry Type, Financial Performance

INTRODUCTION

Globally, companies are increasing their investment in intellectual capital such as intellectual property, research and development, human capital, technology, and software (McKinsey, 2022). In the same survey, McKinsey revealed differences in investment levels and results among companies, where High-growth Companies invested 2.6 times more and grew 6.7 times faster. The same was also found in the US and EU, where company investments in knowledge capital increased productivity levels by 20-34% (OECD, 2013).

The fact that Intellectual Capital, in which classified as an intangible asset of knowledge and information, can be utilized by firms to gain profits (Khalique et al., 2015), will increase the market value of a firm in value creation process (OECD, 2013), improve organizational performances (Pedro, Leitao, & Alves, 2018), and also to increase investor's confidence in the perceived value of the company (Nuryaman, 2015). Therefore, the development and success of a company will be based on the company's capability to maximize knowledge and Intellectual Capital in this era of global competition (Nuryaman, 2015).

Measuring Intellectual Capital becomes challenging, because it requires several components, including structural capital, human capital, dan capital employed components (Soewarno & Tjahjadi, 2020). According to

(Nuryaman, 2015), the definition of Human Capital includes intellectual abilities, creativity, and innovation of employees, and Structural Capital acts as a bridge that structures the relationship between Human Capital and Intellectual Capital. Furthermore, Structural Capital takes the form of a company's ability to navigate the market, hardware and software infrastructure, and other supporting infrastructure and therefore, Structural Capital is a foundation that plays a role in the utilization of Human Capital. Then, the Capital Employed component is the capability of a company to use their capital assets (Soewarno & Tjahjadi, 2020)

Although surveys from various sources indicates that Intellectual Capital plays an important role in a company's overall performance, empirical research still shows some inconsistencies. Various Authors states that Company's financial performance is significantly affects IC in positive way (Ousama, Hammami, & Abdulkarim, 2020; Ozkan, Chakan, & Kayacan, 2017; Soewarno & Tjahjadi, 2020), yet other authors show the adverse (Ciptaningsih, 2013; Pramelasari, 2010; Rahajeng & Hasibuan, 2020). Furthermore, to the Author's knowledge, the existing research still appears to be homogeneous. Based on the data collected by the author as shown in Table 1, the majority of samples come from the banking and technology sectors.

Table 1Samples in various empirical studies

No.	Author (Year)	Samples	Countries
1.	Vishnu & Gupta (2014)	Pharmaceuticals	India
2.	Nimtrakoon (2015)	Technology	ASEAN
3.	Ousama & Fatima (2015)	Banking	Malaysia
4.	Dzenopoljac, Janovic, & Bontis (2017)	ICT	Serbia
5.	Sidharta & Affandi (2016)	Banking	Indonesia
6.	Nawwaz & Haniffa (2017)	Banking	Various Countries
7.	H. S. Mohamed, Bujang, & Hakim (2018)	Construction	Malaysia
8.	Ozkan et al. (2017)	Banking	Turkey
9.	Bayraktaroglu, Calisir, & Baskak (2019)	Manufacturing	Turkey
10.	Tandon & Purohit (2015)	IT and Pharmaceutical	India
11.	Ousama et al. (2020)	Banking	GCC Countries
12.	Soewarno & Tjahjadi, (2020)	Banking	Indonesia
13.	Weqar (2020)	Banking	India

Source : Prepared by the Author

However, Intellectual Capital is important for all sectors and needs to be studied across sectors (Kolachi & Shah, 2013), (Zeghal & Maaloul, 2010). Furthermore, there are many other industry sectors that are considered knowledge intensive and require the utilization of Intellectual Capital, as identified by Morgan Stanley and Standard and Poor's (S&P) in General Industry Classification Standard (GISC) (Dewi, Young, & Sundari, 2014). High Intellectual Capital industries are those that utilized and relies on their intellectual assets to gain competitive advantage, which in turn can enhance the performance of the company (Dewi et al., 2014).

Different behavior of firms across industries can also be seen from differences of intensity of Research and Development (R&D) investment. Table 2 shows the data from the NCSES & U.S. Census Bureau, about various level of R&D Investment across industries.

Table 2 R&D Intensity Across Industries

Industry	R&D Intensity (%)
Computer and electronic products	12.8
Professional, scientific, and technical services	10.9
Chemicals	8.4
Information	7.7
Machinery	4.2
Transportation equipment	3.9
Electrical equipment, appliances, and components	3.7
Nonmanufacturing (other)	1.7
Manufacturing (other)	1.7
Finance and insurance	0.6

Source : (NCSES, 2019)

Another difference is the focus on intellectual capital components, such as the technology industry sector, which requires more investment in human capital (HC) because it is part of the company's core competencies, while the automotive industry sector requires more investment in structural capital (SC) (OECD, 2013). Not to mention, Research related to intellectual capital in Southeast Asian countries is still lacking (Khalique et al., 2015). Therefore, due to the difference level of activity, investment, and focused components of Intellectual Capital in each industry sectors, researcher merely divide the impact of intellectual capital on value creation in two categories, as simply being influential or not without considering the factors and characteristics of the industry itself would be superficial.

The paper is aimed to answer the possibility of industry types moderating effect that might answer research gap and problems above, and also to add heterogeneity of samples to the existing Intellectual Capital literature, as well as to answer questions such as, does intellectual capital important? Which components are the most important? And which industry needs it the most?

LITERATURE REVIEW

Intellectual Capital (IC)

Intellectual Capital can be interpreted as the total sum of intangible resources, such as knowledge, social value, honesty, the “know-how”, innovation, skills and expertise, database and organizational structure, trust and relationship with external parties (Khalique et al., 2015). It is a form of intangible assets, that shows overall capacity of a firm as a result of human capital, competencies, processes, expertise and innovativeness (Soewarno & Tjahjadi, 2020), and is beneficial in value creation process (Jardon & Martines-Cobas, 2021). Several authors have supported this statement, as demonstrated in empirical research (Ousama et al., 2020; Ozkan et al., 2017) Firm’s financial performance is positively affected by IC. Apart from competitive advantage and financials’ performance, in addition, intellectual capital also helps firms to attain sustainable competitive advantage by enabling lower costs, fostering innovation and creativity, improving efficiencies, and enhancing customer benefits. (Asiaei & Juzoh, 2015). To continue. Intellectual Capital Consists of 3 elements, namely Capital Employed, Human and Structural Capital (Astray & Darsono, 2020; Soewarno & Tjahjadi, 2020).

Human Capital (HC)

Human Capital refers to individual abilities, knowledge (tacit and explicit), work capabilities, experience, commitment and motivation, health, personal network, and individual attitudes (Galabova & McKie, 2013). While according to (Boujelbene & Affes, 2013), Human Capital contains the expertise, experience, cognitive

and the ability to innovate from the employees. In Essence, Human Capital is human resources attributes that is obtained from the knowledge and skills of employees (Baikuni et al., 2022) and can be divided into three components; competence; attitude; and intellectual agility (Soewarno & Tjahjadi, 2020), Human Capital also has direct influence to the profitability within a firm (Dzenopoljac et al., 2017; Sidharta & Affandi, 2016), but still inconsistencies appears (Razafindrambinina & Anggreni, 2017; Vishnu & Gupta, 2014)

Structured Capital (SC)

For companies to be able to utilize their Human Capital, they need a structure that connect company elements, this is called as the structural capital (Vaz, Selig, & Vegas, 2018). Structural Capital is the structure or mechanism in an organization that supports their employee to perform (Khanhossini, Nikoosnebati, Kheire, & Moazez, 2013), including information system, processes, and data (Asiaei & Juzoh, 2015), or laboratories and distribution channels (Vaz et al., 2018). Independently, Structural Capital has been shown to influence company's performance of ROA (Maji & Goswami, 2017; Nadeem, Gan, & Nguyen, 2018) but not according to other authors (Nimtrakoon, 2015; Ousama & Fatima, 2015)

Capital Employed (CE)

The last components, Capital employed, is a capital investment needed by a company to operate and consists of all physical and financial assets of a firm (Astari & Darsono, 2020). It represents the capability of a company to use their capital assets (Soewarno & Tjahjadi, 2020) and it represents the usage of financial physical assets in creating value for a firm, and also covers the element in which could not be measured by Human Capital and Structural Capital (Astari & Darsono, 2020). Empirical research shows that Capital employed doesn't have any significant influence in firm's performance (Bayraktar et al., 2019) and (Chowdhury, Rana, & Azim, 2019). Yet according to (Nadeem et al., 2018; Sidharta & Affandi, 2016) capital employed has significant influence to firm's financial performance.

Intellectual Capital and Firm's Profitability

Company performance is determined by evaluating performance indicators which are derived from the activities performed, and this assessment results in an overall measure of the company's success over a specific time period (Soetrisno & Lina, 2014). One of performance indicator is profitability. Profitability is one of many dimension that often utilized to evaluate a company's financial performance, as it offers a summary of the firm's operating outcomes by measuring the profits generated through its business activities. (Soewarno & Tjahjadi, 2020). The metric utilized in this study to gauge profitability is the Return on Assets.

Intellectual Capital is an intangible resource that does not directly generate a return, from which ROA is chosen as a measure of corporate performance. Besides, ROA can also capture the return generated by the company holistically, because the assets used in ROA are a combination of assets acquired through Liability and Equity. The return on assets metric quantifies a company's capability to render profits from its assets during a specific timeframe (Soewarno & Tjahjadi, 2020).

Many studies and empirical literature support the arguments that IC affects profitability which proxied by ROA positively (Ousama et al., 2020; Ozkan et al., 2017; Soetrisno & Lina, 2014). Therefore, the hypothesis 1 for this paper is,

H1: IC has significant and positive influence to ROA

Each component of IC also has significant influence independently to ROA (Nadeem et al., 2018), (Maji & Goswami, 2017), (Ozkan et al., 2017) Therefore, the other hypothesis for this paper is:

H2: HC has significant and positive influence to ROA

H3: SC has significant and positive influence to ROA

H4: CE has significant and positive influence to ROA

Industry Types

The study will employ Industry Types based on the "Global Industrial Classification Standard" (GICS), which was created by Morgan Stanley Capital International (MSCI) in 1999 altogether with Standard & Poor's, and is globally recognized as a standard to interpret the complexity of industry classification (MSCI, 2023). According to (Woodcock & Whiting, 2009) in (Yovita & Amrania, 2018), in the Global Industry Classification Standard (GICS), there is an industry classification into high-IC (Intellectual Capital is a primary for its business) and low-IC industry (where Intellectual Capital is not essential). The classification of the industry is as follows:

Table 3 classification Of Industries Based on Gics

Industry with High IC Intensity	Industry with Low IC Intensity
Automobile and components	Energy
Banks	Consumer Durables and Apparels
Capital Goods	Food, Beverage and Tobacco
Consumer Services**	Consumer Services**
Commercial Services and Supplies**	Commercial Services and Supplies**
Diversified Financials	Retail
Health Care Equipment and Services	Materials
Insurance	Tronsportation
Media	Utilities
Pharmaceutical, Biotechnology, and Life Science	
Real Estate	
Semi Conductors and Semi Conductor Equipment	
Software and Services	
Technology, Hardware and Equipment	

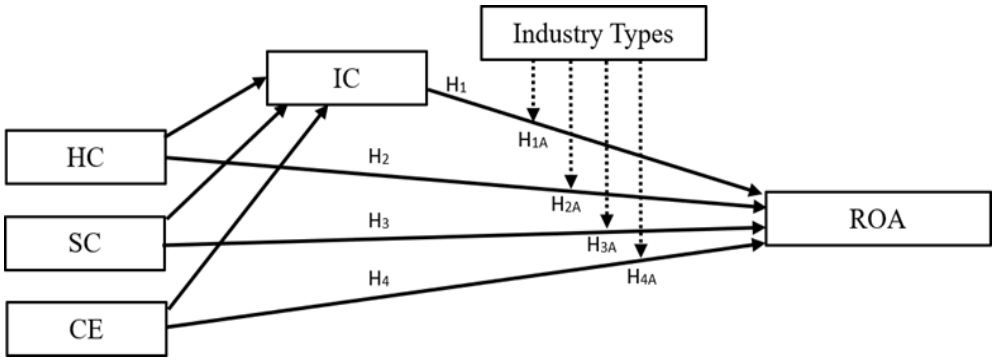
***According to* (Woodcock & Whiting, 2009), *the Consumer Services industry that belongs to High-IC Group is Educational, Medical, and legal services while Commercial Service industry that belongs to High-IC are services that includes recruitment, Engineering and scientific, Development of educational software*
Source : (Woodcock & Whiting, 2009) *via* (Yovita & Amrania, 2018)

Referring to Resource Based-View theory, whereas IC is a distinct resource that can be maximized to improve performance of a firm, and considering that the firm's behavior, and strategy are determined and influenced by the market, it is plausible that the type of industry or industry concentration could have moderating effects on the correlation between IC and profitability, as the logic behind that the IC needs and usage will depend on the market and structure. The hypotheses constructed for the variables are as follows:

H1A: IC effects on ROA is moderated by Industry Types H2A: HC effects on ROA is moderated by Industry Types H3A: SC effects on ROA is moderated by Industry Types H4A: CE effects on ROA is moderated by Industry Types

The research design for this study can be described as figure 1 below:

Figure 1 Research Design



RESEARCH METHODOLOGY

Sample in this paper was taken from companies listed in the Indonesian Stock Exchange (IDX) that fit the Global Industry Classification Standard (GICS) category in the period 2018-2022. The sampling method is stratified (by industry types), and purposive (based on availability of financial statement and the size of company's capitalization), resulted 129 companies as total population for this study.

Table 4 List of Samples

No	Industry	Samples	No of Observations	Total Samples
1	Automotives and Components	8	5	40
2	Banks	35	5	175
3	Capital Goods	6	5	30
4	Diversified Financials	16	5	80
5	Healthcare Equipment & Services	6	5	30
6	Insurance	6	5	30
7	Media	6	5	30
8	Pharmaceuticals, Biotech and Life Science	7	5	35
9	Real Estate	29	5	145
10	Telecommunication Services	10	5	50
11	Semi-Conductors and semi conductors equipment	2	N/A.	N/A.
12	Software and Services	2	N/A.	N/A.
13	Technology, Hardware, and Equipment	3	N/A.	N/A.
14	Commercial Services and Supplies	0	N/A.	N/A.
15	Consumer Services	1	N/A.	N/A.
				645

Source : Prepared by Author

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The operational definition of variables can be summarized into the following table.

TABLE 5
OPERATIONAL DEFINITION OF VARIABLES

Variable Type	Name (Abbreviation)	Definition	Scale
Dependent	Return on Assets (ROA)	Company's ability to render profits from its assets during a particular period (Soewarno & Tjahjadi, 2020)	Ratio
Independent	Intellectual Capital(IC)	IC is the aggregate total of knowledge within a firm (Bindu, Singh & Rao, 2016) that is a form of unique resource (Baikuni et al., 2022) that enhances firm's performance (Soewarno & Tjahjadi,2020)	Ratio
	Human Capital(HC)	First component of IC, in form of human resources that is obtained from the knowledge and skills of employees (Baikuni et al., 2022)	Ratio
	Structural Capital(SC)	Second component of IC, in form of structure nor mechanism wihin an organization that supports their employee to perform (Khanhossini et al., 2013)	Ratio
	Capital Employed(CE)	Last component of IC, in form of capital investment needed by a company to operate and consists of all material and financial assets of a firm (Astari & Darsono, 2020)	Ratio
Moderating	Industry Types (IT)	A group of industries with similar characteristics and structures (Raguseo et al., 2020) shaped by the market (Lelissa & Kuhil, 2018)	Nominal

Source : Prepared by Author

The measurement for each variable is described as follows:

Dependent Variables

ROA Indicators is going to be taken to measure the dependent variable. ROA, is a conventional accounting metric utilized to evaluate a firm's performance. It is extensively employed to ascertain a company's profitability (Soetanto & Liem, 2019) and is widely used by various author (Majumder & Ruma, 2023), (Sumedrea, 2013), (Zeitun & Gang Tian, 2007), Based on those papers, the ROA formula is as follows:

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

Independent Variables

The independent variables used in this paper is Intellectual Capital and its component (Human Capital, SC,

and Capital Employed). The model to measure Intellectual Capital and the components in this paper is based on Ante Pulic's Measurement of VAICTM. VAICTM method is practical, transparent and is widely accepted (Khanhossini et al., 2013), and is appropriate for cross-sectional data (Nimtrakoon, 2015). The measurement is used in various papers (Bayraktaroglu et al., 2019; Ousama et al., 2020; Soetanto & Liem, 2019; Soewarno & Tjahjadi, 2020). For the paper, the calculation is based on (Pulic, 2000, 2004).

Value Added (VA) of a company which shows the capabilities of a company creates value is the first element that is going to be calculated (Pulic, 2000), the formula is:

$$VA = OUT - IN$$

Where, OUT represents revenue or overall income of a firm, and IN represents all expenses except labor costs as it represents investment rather than costs (Pulic, 2000, 2004).

The Human Capital Efficiency (HCE) can be determine using the following formula:

HCE = VA / HC where HC represent Total salary and Wages

The Structural Capital Efficiency (SCE) determine using the following formula:

SCE = SC / VA where SC = (VA – HC)

The Capital Employed Efficiency also determined to measure intellectual capital efficiency. The formula to measure CEE is as follow:

CEE = VA / CE where CE represents Book Value of the nest assets

Last step is to sum all of the components, the ending formula is:

$$VAIC = HCE + SCE + CEE$$

Moderating Variables

According to (Soetanto & Liem, 2019), there are varying levels of influence on firm performance across different industries related to intellectual capital. In this paper, dummy variables will be assigned to each category that represents the effects of ten types of industries as defined by the Global Industry Classification Standard, which is utilized in this study.

Statistic Analytical Tools

The model will be tested using Panel Data Regression. However, given the large number of samples, and since the extreme and any negative values aren't eliminated as (Zeghal & Maaloul, 2010) did, this condition raise consideration of the presence of heteroscedasticity and autocorrelation in the dataset. This leads to the need for other statistical analysis tools that can provide estimates that accommodate the state of the data, which is Generalized Least Square regression model. Furthermore, since this study will test the moderation effect of Industry Types on the relationship between independent and dependent variables, then Moderated Regression Analysis will be performed.

RESULT AND DISCUSSION

Descriptive Statistic

This study employs 645 total data from 129 Companies across 10 Industries for the period of 2018-2022. The grouped population, the mean, standard deviation, total observation, minimum and maximum value is provided in table 6.

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TABLE 6

DATA TABULATION

Industry	Freq	Percent	Cum.
Insurance	30	4.65	4.65
Diversified Financials	80	12.4	17.05
Automotives	40	6.2	23.26
Media	30	4.65	27.91
Capital Goods	30	4.65	32.56
Pharmaceuticals	35	5.43	37.98
Real Estate	145	22.48	60.47
Telecommunication	50	7.75	68.22
Banks	175	27.13	95.35
Healthcare	30	4.65	100
Total	**645**	**100**	

Source : Data Processed

The banking and real estate industry holds the largest number of samples (175 and 145 respectively) and holds a share of 27.13% of the total population to the Bank, and 22.48% of total population for Real Estate. While Insurance, Media and Capital Goods industry had the smallest number of samples, 30 or 4.65% of the total.

TABLE 7

DESCRIPTIVE STATISTICS

Stats	ROA	VAIC	HCE	SCE	CEE
Mean	0.036822	3.037237	2.297864	0.568584	0.170789
SD	0.071645	3.330501	3.058644	1.221075	0.308287
Range	1.075143	33.92736	33.65071	23.78509	8.72341
Median	0.019994	2.446659	1.731217	0.495079	0.140281
Max	0.795816	20.30323	19.00882	17.81965	6.396157
Min	-0.27933	-13.6241	-14.6419	-5.96545	-2.32725
Obs	645	645	645	645	645

Source: Data Processed

Hypothesis Testing

Relationship Between VAIC to ROA

The relationship between VAIC to ROA can be seen in Figure 2 below.

FIGURE 2
REGRESSION OUTPUT OF VAIC TO ROA

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
VAIC	.0032003	.0003342	9.58	0.000	.0025453	.0038554
Industry_Code						
Diversified Financials	-.0451574	.0060098	-7.51	0.000	-.0569364	-.0333784
Automotives	-.0476879	.0097086	-4.91	0.000	-.0667165	-.0286594
Media	-.0645682	.0112962	-5.72	0.000	-.0867083	-.0424281
Capital Goods	.0177705	.0295385	0.60	0.547	-.040124	.0756649
Pharmaceuticals	-.1268424	.0131364	-9.66	0.000	-.1525893	-.1010954
Real Estate	-.0233953	.0047185	-4.96	0.000	-.0326435	-.0141472
Telecommunication	-.0199328	.0061854	-3.22	0.001	-.0320559	-.0078098
Banks	-.0203188	.0045762	-4.44	0.000	-.029288	-.0113497
Healthcare	-.0668115	.0172433	-3.87	0.000	-.1006077	-.0330153
Industry_Code#c.VAIC						
Diversified Financials	.0234783	.0015347	15.30	0.000	.0204703	.0264862
Automotives	.0332159	.0033432	9.94	0.000	.0266633	.0397684
Media	.0302174	.0028681	10.54	0.000	.0245961	.0358387
Capital Goods	.0124607	.0061191	2.04	0.042	.0004675	.0244539
Pharmaceuticals	.0769453	.0044934	17.12	0.000	.0681384	.0857522
Real Estate	.006885	.0005149	13.37	0.000	.0058758	.0078942
Telecommunication	.0048452	.000915	5.30	0.000	.0030519	.0066385
Banks	.003652	.0004574	7.98	0.000	.0027555	.0045484
Healthcare	.0460393	.0063461	7.25	0.000	.0336011	.0584774
_cons	.0136929	.0045238	3.03	0.002	.0048263	.0225594

Source: Data Processed

From the regression test between VAIC and ROA, individually, VAIC affects ROA significantly which been shown by p-value <0.05. The constant value is 0.0136, which means that if the other variable has a value of 0, then the ROA value is 0.0136, while the coefficient of the VAIC variable is 0.0032 which indicates each increase of 1 VAIC value, then ROA will also increase by 0.0032. It shows that VAIC affects ROA positively and significantly. This finding is in line with the results of research by (Ousama & Fatima, 2015) and (Ozkan et al., 2017) It also shows that intellectual capital holds a significant role in corporate performance.

The moderating effect of industry type, can be seen based on the p-value of the interaction term on the model, it is apparent that the entire p- value of each industry shows a value <0.05, which means that Industry Types moderates the relationship between VAIC and ROA significantly.

TABLE 7
HYPOTHESES 1 TESTING RESULT

Hypotheses	Statement	Decision
H_1	IC has significant and positive influence to ROA	Supported
H_{1A}	IC effects on ROA is moderated by Industry Type	Supported

Source: Prepared by Author

Moreover, for all type of industry, the direction of the relationship also shows positive figures, which means the VAIC and ROA relationship is reinforced by the type of industries. In this study, pharmaceutical industry has the highest coefficient value, 0.076, which means that for every 1 increase in the VAIC value, the pharmaceutical industry will get an additional ROA of 0.076 higher than the Insurance industry, followed by the Healthcare industry (Coeff=0.046) and the Automotive industry (Coeff=0.033). Whereas the lowest coefficient is held by

the Banking industry, of 0.003, which means every 1 VAIC increase, then the Banking industry only gets an increase in ROA by 0.003 compared to the Insurances Industry, followed by Telecommunication (Coeff=0.004) and Real Estate (0.006).

Based on the statistical result, it can be concluded that Intellectual Capital plays an important role in generating Return for companies in which categorized as High Intellectual Capital. This amplifies the theory of Resource Based View which says that intellectual capital is one of the unique resources that each company owns, and can be maximized to create Value as well as improving the performance of the firm. Along with these, Industrial Organization Theory with its Structure-Conduct-Performance paradigm, also dictates the role and usage of Intellectual Varies across Industry and moderates the Intellectual Capital to ROA relationship. In addition to the above, this study also shows that Intellectual Capital has a significant influence, mainly for the Pharmaceuticals, Healthcare, and Automotive industries.

Relationship between HCE to ROA

FIGURE 3
REGRESSION OUTPUT OF HCE TO ROA

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
HCE	.0034083	.0003739	9.12	0.000	.0026754	.0041412
Industry_Code						
Diversified Financials	-.0410327	.0059677	-6.88	0.000	-.0527292	-.0293362
Automotives	-.0747185	.010483	-7.13	0.000	-.0952648	-.0541722
Media	-.058832	.0099488	-5.91	0.000	-.0783314	-.0393326
Capital Goods	.0014608	.0303493	0.05	0.962	-.0580227	.0609444
Pharmaceuticals	-.1313078	.0109143	-12.03	0.000	-.1526994	-.1099161
Real Estate	-.0208311	.0050492	-4.13	0.000	-.0307274	-.0109349
Telecommunication	-.0219317	.0060407	-3.63	0.000	-.0337713	-.0100922
Banks	-.0247028	.0047405	-5.21	0.000	-.0339939	-.0154117
Healthcare	-.1268637	.0113333	-11.19	0.000	-.1490765	-.1046509
Industry_Code#c.HCE						
Diversified Financials	.0293304	.0016514	17.76	0.000	.0260937	.0325672
Automotives	.0623344	.0053066	11.75	0.000	.0519337	.0727351
Media	.0371357	.0028859	12.87	0.000	.0314795	.0427918
Capital Goods	.0222481	.0085074	2.62	0.009	.0055738	.0389223
Pharmaceuticals	.1114105	.0056946	19.56	0.000	.1002492	.1225718
Real Estate	.0073262	.0005357	13.67	0.000	.0062761	.0083762
Telecommunication	.0076152	.0010385	7.33	0.000	.0055797	.0096506
Banks	.0076986	.0005126	15.02	0.000	.006694	.0087032
Healthcare	.1071943	.005778	18.55	0.000	.0958696	.1185191
_cons	.0153165	.004693	3.26	0.001	.0061184	.0245145

Source: Data Processed

On Figure 3, we can see that individually, HCE has a significant influence on ROA, indicated by p-value <0.05. For the coefficient of the independent variable HCE is 0.003, which indicates the positive influence of HCE on the ROA. Whereas for the constant value is 0.0153, which shows that when the other variable is 0 then the value of ROA is 0.0153. Whereas in every 1 increase in the HCE value, ROA increases by 0.003. The findings show a positive and significant influence on ROA and agrees with the findings of (Dzenopoljac et al., 2017) and (Sidharta & Affandi, 2016)

In testing the moderation variable, the p-value of all industry shown a value of <0.05 this indicates a significant moderating effect from Industry Types. The coefficient value of each industry also shows positive values for all industry, the highest coefficient value is from the pharmaceuticals industry of 0.111, that is, for each HCE increment of 1, the pharmaceutical industry has an increment in ROA by 0.111 compared to the Insurance industry. Besides the pharmaceutical industry, the other highest Coefficients are held by the Healthcare industry (0.107) and Automotive (0.062). Industry with the lowest coefficient is Real Estate (0.0073) followed By Banks

(0.00769) and Telecommunication. (0.00761). This discovery is consistent with the relationship between VAIC and ROA.

Based on the statistical result, it indicates that Human Capital roles on ROA is moderated by industry types, where Pharmaceuticals, Healthcare and Automotive benefit most from utilizing Human Capital. On the other hand, the industries like Real Estate, Banks, and Telecommunication have less benefits. This condition suggested that Pharmaceuticals, Healthcare and Automotive relies heavily on their Human Capital rather than Real Estate, Banks and Telecommunication.

TABLE 8
HYPOTHESIS 2 TESTING RESULT

Hypotheses	Statement	Decision
H_2	HC has significant and positive influence to ROA	Supported
H_{2A}	HC effects on ROA is moderated by Industry Type	Supported

Source: Prepared by Author

Relationship Between CEE to ROA

FIGURE 4
REGRESSION OUTPUT OF CEE TO ROA

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
CEE	.0005596	.0016993	0.33	0.742	-.002771	.0038901
Industry_Code						
Diversified Financials	-.0461563	.007005	-6.59	0.000	-.0598859	-.0324267
Automotives	-.0823582	.0136442	-6.04	0.000	-.1091003	-.0556162
Media	-.046334	.0120145	-3.86	0.000	-.0698819	-.0227861
Capital Goods	.0073691	.0442534	0.17	0.868	-.0793659	.0941041
Pharmaceuticals	.0206261	.0124809	1.65	0.098	-.003836	.0450881
Real Estate	-.0503248	.0061211	-8.22	0.000	-.062322	-.0383276
Telecommunication	-.0345932	.0066629	-5.19	0.000	-.0476523	-.021534
Banks	-.0465778	.0060401	-7.71	0.000	-.0584161	-.0347395
Healthcare	-.0481232	.0269651	-1.78	0.074	-.1009737	.0047274
Industry_Code#c.CEE						
Diversified Financials	.2254601	.022103	10.20	0.000	.182139	.2687813
Automotives	.4439345	.0361823	12.27	0.000	.3730185	.5148506
Media	.3975338	.0432306	9.20	0.000	.3128033	.4822642
Capital Goods	.2067384	.1429054	1.45	0.148	-.073351	.4868278
Pharmaceuticals	.1158049	.0187941	6.16	0.000	.0789691	.1526407
Real Estate	.611431	.0127167	48.08	0.000	.5865068	.6363552
Telecommunication	.2421587	.0215789	11.22	0.000	.1998649	.2844526
Banks	.1434516	.0061951	23.16	0.000	.1313095	.1555938
Healthcare	.2639319	.0872841	3.02	0.002	.0928582	.4350056
_cons	.0352521	.0059415	5.93	0.000	.0236069	.0468973

Source: Data Processed

From figure 4 above, CEE does not appear to have a significant influence on ROA (p-value = 0.742), whereas for the constant value is 0.035. It means when the other variable is 0, then ROA is 0.0035. These findings are in line with research by (Bayraktaroglu et al., 2019) and (Chowdhury et al., 2019).

As for the moderation of the Industrial Type to the relationship between CEE and ROA, the p-value seems varies across Industry. Capital Goods shows a p-value of 0.148, which means insignificant influence by Industry Types as moderating variable. Therefore, industry types do not moderate the relationship of CEE to ROA significantly. Whereas coefficient of the interaction term between the industrial type and CEE has a positive value which means it strengthens the relation between the CEE to ROA. The highest coefficient value is owned by the Real Estate (0.611) which shows in every CEE increase, Real Estate's ROA has a higher ROA of 0.611 compared to Insurance. Followed by Automotive (0.443) and Media (0.397), while Pharmaceuticals (0.115), Banks (0.143) and Diversified Financials had the lowest coefficients (0.225).

The statistical results show that in order to create value for the firm, Employed Capital has to be collaborated with Human Capital and Structural Capital. Additionally, this also reinforce many research in regards to Knowledge-Capital Era, where it is being stated that Company needs to shifts their focus from physical capital to intellectual capital, because as the results suggests, compared to HC and SC, CE doesn't appear to significantly impact ROA. Moreover, industry types do not moderate the relationship between CE and ROA. It means that Capital Employed, which are the material and financial investment of a firm, is certainly vital for any firms to be able to operate and grow.

TABLE 8
HYPOTHESIS 4 CONCLUSION

Hypotheses	Statement	Decision
H4	CE has significant and positive influence to ROA	Not Supported
H4A	CE effects on ROA is moderated by Industry Type	Not Supported

Source: Prepared by Author

CONCLUSION

The findings in this study indicates that overall, Intellectual Capital plays a significant role in increasing Return on Assets, and are moderated by Industry Types. This implies the needs for Firms to utilize their knowledge capital more in order to create value for the firms.

For each component, Human Capital and Structural Capital appears to significant and positively affects ROA, in contrast with Capital Employed which does not have a significant impact on ROA. This finding, reinforce the needs to shift more focus on Knowledge Capital rather than Physical Capital as the research by (OECD, 2013) suggests.

Industry Types also appears to moderates the relationship between Intellectual Capital and Human Capital to ROA, but does not moderate the relationship between Structural Capital and Capital Employed to ROA. This condition implies that the needs, usage, and efficiency of Human Capital varies according to industries, while the role of Structural Capital and Capital Employed are vital regardless of the industry.

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Since this study doesn't consider the different industrial character on macro level and focusing only on the industries belonging to the High Intellectual Capital, this study fails to capture the single coefficient determination of the model. Meanwhile, this study gives an insight about the different needs of Intellectual Capital component among industries and how each component of Intellectual Capital affect differently according to the industry types. The different roles of each component of Intellectual Capital implies the need for further research. Furthermore, a comprehensive examination of how each of the components can create value for the company, as well as the role of intellectual capital in Perceived Value of Stakeholder may also be an interesting topic for future research.

REFERENCES

1. Adnan, M., Abdulhamid, T., & Sohail, B. (2018). Predicting Firm Performance through Resource

Based Framework. European Journal of Business and Management, 10(1).
2. Asiaei, K., & Juzoh, J. (2015). A multidimensional view of intellectual capital: The impact on organizational performance. Management Decision, 53(3).
3. Astari, R. K., & Darsono. (2020). Pengaruh Intellectual Capital Terhadap Kinerja Perusahaan. Diponegoro Journal of Accounting, 9(2).
4. Baikuni, A., Dafik, Poernomo, J., & Sisbintari, I. (2022). Framework of Intellectual Capital-Based View in Improving Firm Agility. Journal of Business and Management Studies, 4(3).
5. Bayraktaroglu, A. E., Calisir, F., & Baskak, M. (2019). Intellectual capital and firm performance: An extended VAIC model. Journal of Intellectual Capital, 20(3).
6. Bindu, Singh, B., & Rao, R. (2016). Effect of intellectual capital on dynamic capabilities. Journal of Organizational Change Management, 29(2).
7. Blazkova, I., & Dvoulety, O. (2018). The causes of firm performance variation in the Czech food processing industry in the context of the outlier effect. Management Research Review.
8. Boujelbene, M. A., & Affes, H. (2013). The Impact of Intellectual Capital Disclosure on Cost of Equity Capital: A Case of French Firms. Journal of Economics, Finance and Administrative Science.
9. Burgman, R., & Roos, G. (2007). The importance of intellectual capital reporting: Evidence and implications. The importance of intellectual capital reporting: Evidence and implications.
10. Castro, J. P. G., Ramirez, D. F., & Escobar, J. (2020). The relationship between intellectual capital and financial performance in Colombian listed banking entities. Asia Pacific Management Review.
11. Chowdhury, L. A. M., Rana, T., & Azim, M. I. (2019). Intellectual Capital Efficiency and Organizational Performance. Journal of Intellectual Capital, 20(6), 784–806.
12. Ciptaningsih, T. (2013). Uji Pengaruh Modal Intelektual Terhadap Kinerja Keuangan BUMN yang Go Public di Indonesia. Jurnal Manajemen Teknologi.
13. Dewi, K., Young, M., & Sundari, R. (2014). Firm characteristics and intellectual capital disclosure on service companies listed in Indonesia stock exchange period 2008- 2012. Merit Research Journal of Accounting, Auditing, Economics and Finance, 2(2).
14. Dranove, D. (2011). Health Care Markets, Regulators, and Certifiers. Handbook of Health Economics, 2.
15. Dzenopoljac, V., Janovic, S., & Bontis, N. (2017). Intellectual capital and financial performance in the Serbian ICT industry. Journal of Intellectual Capital.
16. Fahling, E. J., Ghiani, M., & Simmert, D. (2020). Small versus Large Caps—Empirical Performance Analyses of Stock Market Indices in Germany, EU & US since Global Financial Crisis. Journal of Financial Risk Management.
17. Galabova, L., & McKie, L. (2013). "The five fingers of my hand": Human capital and well-being in SMEs. Personnel Review, 42(6).
18. Jardon, C., & Martines-Cobas, X. (2021). Measuring intellectual capital with financial data. Plos One, 16(5).
19. Khalique, M., Bontis, N., Abdul Nasir bin Shaari, J., & Md. Isa, A. H. (2015). Intellectual capital in small and medium enterprises in Pakistan. Journal of Intellectual Capital, 16(1).
20. Khanhossini, D., Nikoosnebati, M., Kheire, H., & Moazez, E. (2013). Investigating of relationship between intellectual capital and financial performance in MAPNA group companies.
21. Kolachi, N. A., & Shah, H. A. (2013). BRICS Countries and their Strategic HRD Agenda in 2020. International Journal of Management & Information Systems.
22. Lelissa, T. B., & Kuhil, A. M. (2018). The Structure Conduct Performance Model and Competing Hypothesis- A Review of Literature. Research Journal of Finance and Accounting, 9(1).
23. Maji, S. G., & Goswami, M. (2017). Intellectual capital and firm performance in India: A comparative study between original and modified value-added intellectual coefficient model. International Journal of Learning and Intellectual Capital, 14(1).
24. Majumder, M. T., & Ruma, I. J. (2023). Does intellectual capital affect bank performance? Evidence from Bangladesh. LBS Journal of Management & Research, 21(2).
25. McKinsey. (2022). Why intangibles are the key to faster growth in Europe.
26. Memon, M. A., Cheah, J.-H., Ramayah, T., Ting, H., Chuah, F., & Cham, T. H. (2019). Moderation Analysis: Issues and Guidelines. Journal of Applied Structural Equation Modeling, 3(1).
27. Mirae Assets. (2019). Large Cap Fund: Aims Growth with Stability. Retrieved from

https://www.miraeassetmf.co.in/docs/default-source/educational-article/largecapfund-aims_growth_with_stability.pdf
28. Mohamed, H. S., Bujang, I., & Hakim, T. A. (2018). The Impact of Intellectual Capital on Financial Performance of Malaysian Construction Firms. The International Journal of Academic Research in Business and Social Sciences.
29. Mohamed, Z. S., Shamsudin, M., & Mu'azu, A. (2013). Measuring competition along the supply chain of the Malaysian poultry industry. International Conference on Social Science Research.
30. MSCI, R. (2023). GICS is a widely recognized global classification standard that is utilized by numerous market participants from various major groups involved in the industry. MISC. Retrieved from https://www.msci.com/our- solutions/indexes/gics
31. Mujiani, S., Wilestari, M., & Putri, E. M. (2020). Does Corporate Governance Structure and Leverage Affect Intellectual Capital Disclosure? Equity, 23(20).
32. Nadeem, M., Gan, C., & Nguyen, C. (2018). The importance of intellectual Capital for firm performance: Evidence from Australia. Australian Accounting Review, 28(3).
33. Nawwaz, T., & Haniffa, R. (2017). Determinants of financial performance of Islamic banks: An intellectual capital perspective. Journal of Islamic Accounting and Business Research.
34. NCSES. (2019). Business Enterprise Research and Development Survey, 2019.
35. Nimtrakoon, S. (2015). The relationship between intellectual capital, firms' market value and financial performance: Empirical evidence from the ASEAN. Journal of Intellectual Capital, 16(3).
36. Nurwulandari, A. (2020). Intellectual Capital, the Capital Market, and Their Effect on the Value of Indonesian Manufacturing Firms Listed on the Indonesian Stock Exchange (IDX) from 2017 to 2020. Advances in Social Science, Education and Humanities Research, 560.
37. Nuryaman. (2015). The Influence of Intellectual Capital on The Firm's Value with The Financial Performance as Intervening Variable. Procedia Social and Behavioral Science, 211.
38. OECD. (2013). Supporting Investment in Knowledge Capital, Growth and Innovation.
39. Onumah, J. M., & Duho, K. C. T. (2019). Intellectual Capital: Its Impact on Financial Performance and Financial Stability of Ghanaian Banks. Athens Journal of Business & Economics, 5(3), 243–268.
40. Ousama, A. A., & Fatima, A. H. (2015). Intellectual capital and financial performance of Islamic banks. International Journal of Learning and Intellectual Capital.
41. Ousama, A. A., Hammami, H., & Abdulkarim, M. (2020). The association between intellectual capital and financial performance in the Islamic banking industry. International Journal of Islamic and Middle Eastern Finance and Management, 13(1).
42. Ozkan, N., Chakan, S., & Kayacan, M. (2017). Intellectual capital and financial performance: A studyof the Turkish Banking Sector. Borsa Istanbul Review, 17(3).
43. Pedro, E., Leitao, J., & Alves, H. (2018). Intellectual capital and performance: Taxonomy of components and multidimensional analysis axes. Journal of Intellectual Capital, 19(2), 407–452.
44. Pramelasari, Y. M. (2010). Pengaruh Intellectual Capital Terhadap Nilai Pasar Dan Kinerja Keuangan Perusahaan.
45. Pulic, A. (2000). VAICTM – an accounting tool for IC management. International Journal Technology Management, 20.
46. Pulic, A. (2004). Intellectual Capital—Does it Create or Destroy Value?
47. Radjenovic, T., & Krstic, B. (2017). Intellectual Capital in The Theory of Firm. Ekonomika, 63(4), 13–27.
48. Raguseo, E., Vitari, C., & Pigni, F. (2020). Profiting from big data analytics: The moderating roles of industry concentration and firm size. International Journal of Production Economics, 229.
49. Rahajeng, D. K., & Hasibuan, N. Z. (2020). Does Intellectual Capital Matter? A Case Study of Indonesia Sharia Banks. The Indonesian Journal Of Accounting Research, 23(2).
50. Razafindrambinina, D., & Anggreni, T. (2017). Intellectual capital and corporate financial performance of selected listed companies in Indonesia. Malaysian Journal of Economic Studie, 48(1).
51. Setyawan, A., Mustika, H., & Swityani, N. W. (2019). Analisis Masalah Heteroskedasticities Menggunakan Generalized Least Square dalam Analisis Regresi. Eigen Mathematics Journal, 2(2).
52. Sidharta, I., & Affandi, A. (2016). The empirical study on intellectual capital approach toward financial performance on rural banking sectors in Indonesia. International Journal of Economics and Financial Issues, 6(3).

53. Soetanto, T., & Liem, P. F. (2019). Intellectual capital in Indonesia: Dynamic panel approach. Journal of Asia Business Studies.
54. Soetrisno, A., & Lina. (2014). The Influence of Intellectual Capital Components Towards the Company Performance. Jurnal Manajemen, 14(1).
55. Soewarno, N., & Tjahjadi, B. (2020). Measures that matter: An empirical investigation of intellectual capital and financial performance of banking firms in Indonesia. Journal of Intellectual Capital, 21(6).
56. Sumedrea, S. (2013). Intellectual Capital and Firm Performance: A Dynamic Relationship in Crisis Tim. Procedia Economics and Finance, 6.
57. Tan, Y. (2016). Theory of Bank Efficiency and Bank Competition. Efficiency and Competition in Chinese Banking.
58. Tandon, K., & Purohit, H. (2015). Intellectual Capital, Financial Performance and Market Valuation: A Study on IT and Pharmaceutical Companies in India. The IUP Journal of Knowledge Management, 13(2).
59. Uddin, M., Chowdhury, A., Anderson, K., & Chaudhury, K. (2021). The effect of COVID – 19 pandemics on global stock market volatility: Can economic strength help to manage the uncertainty? Journal of Business Research.
60. Vaz, C. R., Selig, P. M., & Vegas, C. V. (2018). The five fingers of my hand: Human capital and well-being in SMEs', Personnel Review, Vol. 4. Journal of Intellectual Capital.
61. Vishnu, S., & Gupta, V. K. (2014). Intellectual capital and performance of pharmaceutical firms in India. Journal of Intellectual Capital,
62. Wahyuni, K. T. (2019). Studi Perbandingan Kinerja Portfolio Saham Berdasarkan Kapitalisasi Pasar di Bursa Efek Indonesia Dengan Risk Adjusted Return. Jurnal Ilmu Manajemen, 9(1).
63. Weqar, F. (2020). Measuring the Impact of Intellectual Capital on the Financial Performance of the Finance Sector of India. Journal of Knowledge Economy.
64. Woodcock, J., & Whiting, R. H. (2009). Intellectual Capital Disclosures by Australian Companies. AFAANZ Conference.
65. Xu, X., & Liu, C. K. (2020). How to keep renewable energy enterprises to reach economic sustainable performance: From the views of intellectual capital and life cycle. Energy, Sustainability and Society, 9(7).
66. Yovita, M., & Amrania, G. K. P. (2018). The Influence of Intellectual Capital to Market Value with Return on Assets as Intervening Variable. Journal of Accounting Auditing and Business, 1(2).
67. Zeghal, D., & Maaloul, A. (2010). Analyzing Value Added as an Indicator of Intellectual Capital and its Consequences on Company's Performance. Journal of Intellectual Capital, 11.
68. Zeitun, R., & Gang Tian, G. (2007). Does ownership affect a firm's performance and default risk in Jordan? Corporate Governance: The International Journal of Business in Society, 7(1).