Utilizing Discriminant Analysis to Evaluate Performance of Indonesia's Joint Venture Life Insurance Companies

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ABSTRACT : *This study evaluates the performance of joint venture life insurance companies in Indonesia through discriminant analysis. Joint venture life insurance companies are collaborations between local and foreign insurance companies, dominating the Indonesian life insurance market with a 69.1% market share. A significant business issue is the case of PT Asuransi Jiwa Bakrie Life, which faced a crisis in 2008 due to aggressive stock market investments, resulting in substantial losses for policyholders and a loss of consumer confidence and a decline in company performance. The method used in this study is discriminant analysis, aimed at distinguishing between well-performing and poorly-performing joint venture life insurance companies. This analysis employs four key financial variables: Net Profit Margin (NPM), Leverage Ratio, Liquidity Ratio, and Risk Based Capital (RBC). The results indicate that discriminant analysis can effectively differentiate between high-performing and low-performing companies with an accuracy rate of 81.7%. These variables have proven to be significant in predicting company performance. This study provides valuable insights for investors to make better investment decisions and for management to enhance company performance by better managing these key financial variables.*

KEYWORDS – *Life Insurance Company, Joint Venture Life Insurance Company, Company Performance, Risk Based Capital, Discriminant Analysis*

I. INTRODUCTION

The Indonesian insurance industry continues to see growth in premiums and assets, which have steadily increased year after year. However, its role in the national economy tends to be stagnant. Despite increases in premiums and assets, the insurance industry's contribution to national economic growth has yet to reach its full potential. Insurance companies are institutions that are authorized to provide protection against potential future risks, including financial losses caused by unforeseen events [1]. Various insurance companies are currently competing to offer insurance programs for both individuals and businesses. Insurance companies must be able to compete with other companies in order to achieve profits that will subsequently impact the company's value and ensure its sustainability [2].

As a part of the economic machinery, the insurance industry plays a vital role. Its function is to restore financial positions to their pre-risk state. Insurance is important in this context because it protects against unforeseen events that affect both businesses and individuals. Given the role of insurance in risk mitigation, both in business activities and in individual protection needs, it is critical to understand that the Indonesian insurance industry is structured based on the types of risks covered.

Currently, insurance penetration in Indonesia is only 2.75%, significantly lower than in other ASEAN countries in the region [3]. According to the ASEAN Insurance Surveillance Report 2022, Singapore has an insurance penetration rate of 12.5%, Malaysia 3.8%, and Thailand 4.6%. At the end of 2022, Indonesia's insurance density rate was Rp 1,882,640, which was lower than the regional average. The Financial Services Authority has set an ambitious target of Rp 2,400,000 in insurance density by 2027, indicating the need for significant efforts to increase the penetration and quality of insurance services in Indonesia. And also, literacy in the insurance sector remains low, at 31.7%, and inclusion is only 16.6%. These figures are significantly lower than those for the banking sector, indicating serious challenges in the development of Indonesia's insurance industry. This disparity highlights the need for increased public awareness of the value of insurance, as well as additional efforts to improve education and accessibility to insurance products.

In Indonesia, insurance companies are classified as life insurance companies, general insurance companies, reinsurance companies, compulsory insurance companies, and social insurance companies. Business competition in Indonesia's insurance industry, particularly in the life insurance industry, is split into two major players: local life insurance companies and joint venture life insurance companies. Joint venture companies dominate the Indonesian life insurance sector, accounting for 69.1% of the total market. The relatively small market conditions for local life insurance companies lead to fierce competition among industry players [4].

Despite joint venture life insurance companies dominating the market, joint venture life insurance companies still face stiff competition, both from fellow joint venture life insurance companies and local life insurance companies which continue to strive to improve their performance. This competition forces joint venture life insurance companies to continue to innovate and improve operational efficiency.

This motivates them to consistently deliver the best performance in order to maintain market share and profitability. Thus, life insurance companies must strike a balance between increasing productivity and profitability and remaining a dependable source of risk protection for the public. Faced with these dynamics, comprehensive and adaptive management strategies become critical in managing the complexities of the insurance industry in order to contribute to inclusive and sustainable economic growth.

Joint venture life insurance companies in Indonesia are formed through the collaboration of foreign and local insurance companies. They have a significant presence in Indonesia, even dominating the top five life insurance companies with the most assets [5]. Joint venture companies still have a strong presence in the domestic life insurance market. This is not without reason. Vice Chairman of the Insurance and Pension Funds Permanent Committee of Kadin, Herris Simandjuntak, believes that there are several factors that make joint venture companies have a large market share. One of them is the global network owned by the business group [6]. From the name alone, global brands brought by joint venture players already have high selling value. In addition, with the networks they possess, customers naturally expect satisfactory services. Furthermore, the groups behind joint venture players are typically experienced players who have been active in the international life insurance business. Experience and financial strength are certainly added values sought by customers.

Despite the advantages that joint venture life insurance companies have over conventional ones, some have encountered significant problems that have harmed their policyholders. A notable example is the Bakrie Life case, which made policyholders wary of life insurance. PT. Asuransi Jiwa Bakrie Life faced a crisis in 2008, causing its stock prices to plummet and resulting in the loss of policyholders' premiums and an inability to fulfill payment obligations. In 2005, Bakrie Life introduced Diamond Vista, an insurance product combining investment and life insurance with a focus on providing a maximum and guaranteed fixed-rate return. This product differed from unit-linked insurance or mutual funds, offering a high investment return of approximately 13 percent per year [7].

The default incident involving the Bakrie Group's insurance company pertained to the Diamond Investa product, a unit-linked offering that combines insurance and investment. This product defaulted in 2008 due to the company's overly aggressive stock market investments. During this period, stock prices fell sharply as a result of the global crisis sparked by the subprime mortgage collapse in the United States (US). The Capital Market Supervisory Agency and Financial Institution (Bapepam-LK), now known as the Financial Services Authority (OJK), reported that the default amount for Diamond Investa reached IDR 500 billion. To address this issue, a settlement was arranged for Bakrie Life to repay its obligations in installments. However, these repayments faced difficulties, and not all policyholders recovered their funds. As a result, in 2016, the OJK revoked Bakrie Life's operational license [8].

In 2019, Jimmy Theja, S.H, MBA, the attorney representing Bakrie Life's victims, directly appealed to the Chief of Police and the Head of Criminal Investigation to address the situation of Bakrie Life policyholders who had been neglected for 11 years. The victims, located throughout much of Indonesia, suffered severe consequences including depression, stroke, death, disrupted education, and divorce [9].

Based on a case that occurred with one of the joint venture life insurance companies, customers were hesitant about choosing a joint venture life insurance company. Therefore, research using the discriminant analysis method is expected to provide knowledge to stakeholders to differentiate joint venture life insurance companies with good and bad company performance, as well as fill gaps in the academic literature.

II.   LITERATURE REVIEW

2.1 Theoretical Foundation

2.1.1 Insurance Company

Insurance companies play a critical role in the stability of the financial system. The insurance industry represents the largest investor in the financial markets, maintains close relationships with banks and other financial institutions, and confrontations with issues in insurance companies can spread to the banking sector. Additionally, insurance companies contribute to the stability of household and corporate balance sheets by insuring their risks [10]. Insurance companies are non-bank financial institutions that have a role that is not much different from banks, which are engaged in services provided to the public in overcoming risks that will occur in the future [11]. Meanwhile, according to [4], Insurance is a type of business that allows individuals or businesses to transfer the risk of uncertainty to third parties in exchange for a premium that is significantly less than the potential loss. In this case, the insurance party inherits uncertainty.

According to the Indonesian Trade Administration and the law, insurance or coverage is an agreement by which an insurance company binds itself to the insured, by accepting a premium, to provide financial compensation to the insured for any damage, loss of expected profits, which may be suffered due to an undue

event [12]. In Indonesia, insurance companies are classified into life insurance companies, general insurance companies, reinsurance companies, compulsory insurance companies, and social insurance companies.

2.1.2 Life Insurance Company

The life insurance industry is a contract between an insurance company and a policyholder in which the insurance company guarantees to pay a sum of money to one or more beneficiaries when the insured dies in exchange for premiums paid by the policyholder during his or her lifetime. The best life insurance companies have good financial strength, low number of customer complaints, high customer satisfaction, diverse policy types, available and included riders, and easy application [13]. Business competition in the insurance industry in Indonesia, especially the life insurance industry, is divided into two major players, namely local life insurance companies and joint venture life insurance companies.

Local life insurance companies are companies established and operating in Indonesia, with the main focus on providing life insurance products to the Indonesian people. Meanwhile, a joint venture life insurance company is a life insurance company established through cooperation between two or more parties, where one party is a local insurance company and the other party is a foreign insurance company [14]. In Indonesia, the market share of life insurance companies is dominated by joint venture life insurance companies at 69,10%, while the market share of local life insurance companies only reaches 30,90% [15].

Figure 1 Market Share of the Insurance Industry in Indonesia

2.1.3 Joint Venture (JV) Life Insurance Company

According to [14] joint venture life insurance companies are life insurance companies established through cooperation between two or more parties, where one party is a local insurance company and the other party is a foreign insurance company. Joint venture life insurance has a higher market share than local life insurance. According to [6] there are several factors that influence joint venture life insurance companies to dominate market share:

1. Cooperation with foreign insurance companies
   Conglomerate foreign insurance companies can provide greater technology, proficiency, and resources to build and install business strategies.
2. Broader market
   Joint venture life insurance companies can access a wider market and serve more customers by cooperating with local insurance companies.
3. Expansion to international markets
   Joint venture life insurance companies can serve overseas customers through foreign insurance companies that have networks and experience in international markets.
4. Resources and capacity
   Joint venture life insurance companies can have greater resources and capacity due to cooperation with local and foreign insurance companies.
5. Experience and expertise
   Joint venture life insurance companies can have more experience and expertise by cooperating with local and foreign insurance companies.

2.1.4 Risk Based Capital (RBC)

In this research, the classification of joint venture life insurance companies that have good and bad company performance can be seen based on Risk Based Capital (RBC). RBC is a ratio that indicates the level of financial health of an insurance company [16]. According to Indonesian Government Regulation (PP) Number 63 of 2004, RBC is a measure that informs the level of financial security or health of an insurance company. RBC that is far below the minimum limit will signal that the company will experience a lack of capital that can result in limitations in paying claims, so that it can show the financial performance of the insurance company.

RBC has been required by law to regulate the level of financial health of insurance companies in Indonesia [17]. The purpose of calculating RBC is to signal that the company is guaranteed and healthy or vice versa. Thus, the performance of insurance companies can be seen from Risk Based Capital (RBC). Thus, the Indonesian government through the Minister of Finance Decree No. 424/KMK.06/2003 has established the obligation of insurance companies in Indonesia, especially life insurance companies to maintain a minimum Risk Based Capital (RBC) level of 120%. RBC can be calculated by looking at the gap between the confirmed asset level and the required paid-in capital amount.

RBC is the difference between the solvency level and the minimum solvency limit (BTSM). The lower the RBC ratio, the higher the probability of a company experiencing financial difficulties. This may be because companies with high solvency are better able to pay their obligations and this is a good indication of the company's performance [1] and [18].

2.1.5 Financial Ratio Analysis

Financial ratio analysis is an index that relates two accounting numbers and is obtained by dividing one number by another. By calculating ratios, more useful and informative comparison results will be obtained when compared to the original numbers. Financial ratios are the activity of comparing numbers in financial statements by dividing one number by another [19]. Comparisons can be made between one component and components in one financial report or between components in the financial statements, then the comparative figures can be figures in one period or several periods [20].

Based on this explanation, financial ratios are a comparison of the number of components contained in the financial statements, both in one period and several periods and then used as material for analysis. Financial ratios can be further divided into five basic categories: liquidity, activity, debt, profitability, and market ratios. Liquidity, activity, and debt ratios primarily measure risk. Profitability ratios measure profit while market ratios measure risk and return [4]. The financial ratios used in this study are profitability ratio and solvency ratio.

2.1.5.1 Profitability Ratio

In the business world, the main objective of establishing a company is mostly oriented towards profit maximization. The same applies to the insurance industry, including life insurance. The acquisition of profits in accordance with the target is an indicator that business continuity becomes more real and can guarantee the process of business development. therefore, profitability is a must for the business continuity of insurance companies [21].

Results of the research conducted by [4] shows that the profitability ratio calculated using Return on Equity (ROE) does show a significant difference in comparing company performance. While the research conducted by [21] and [22] shows that profitability ratio does not show a significant difference in comparing company performance.

2.1.5.1.1 Return on Asset (ROA)

Return on Assets (ROA) is a profitability ratio that measures the company's ability to generate profits with all funds invested in assets used for company operations. ROA can be seen as the value of profit together divided by the value of the company's total assets [23].

2.1.5.1.2 Return on Equity (ROE)

Return on Equity (ROE) is a profitability ratio that is useful for assessing a company's ability to generate profits from the company's shareholder investment. ROE can be seen as the value of profit together divided by the value of the company's average share ownership [24].

2.1.5.1.3 Net Profit Margin (NPM)

Net Profit Margin (NPM) is a profitability ratio to assess the percentage of net profit earned after deducting taxes against revenue earned from sales [24].

2.1.5.1.4 Investment Yield Ratio

Investment Yield Ratio reflects how much the company's ability to generate profit or profit from each investment it makes [21].

2.1.5.2 Solvency Ratio

Solvency ratio is part of the debt ratio, so this ratio is related to the company's financial stability in the long term and its health in facing its obligations. According to [20] another important factor is the company's ability to fulfill its obligations, especially long-term obligations or solvency. The inability to fulfill long-term obligations can be a big problem for insurance companies, considering that insurance companies are a long-term industry.

Results of the research conducted by [4] shows that the solvency ratio calculated using Technical Reserve to Investment and Debt Ratio does show a significant difference in comparing company performance. While the research conducted by [21] and [22] shows that solvency ratio does not show a significant difference in comparing company performance.

2.1.5.2.1 Capital Ratio
The capital ratio is a financial ratio that reflects the proportion of a company's capital compared to its total liabilities [21]. This ratio indicates how much capital the company has to cover all its liabilities.

2.1.5.2.2 Leverage Ratio
The leverage ratio is a measure that compares a company's total liabilities to its total equity [21]. This ratio assesses the extent to which the company funds its operations through debt compared to its own capital.

2.1.5.2.3 Liquidity Ratio
The liquidity ratio is a financial ratio that measures a company's capacity to meet its short-term obligations [21]. It assesses the availability of liquid assets that the company can employ to pay down its liabilities efficiently.

2.1.5.2.4 Risk Based Capital (RBC)
Risk Based Capital analysis measures the level of risk-based capital with a normal limit of at least 120% [10]. The prescribed level of internal solvency in Indonesia as per OJK Regulation number 71/POJK.05/2016 regarding the financial viability of insurance and reinsurance firms is established at 120% of the Risk-Based Minimum Capital requirement [25].

Table 1 Variable Operationalization

Variable		Indicator
Group of Indonesian joint venture (JV) life insurance companies	Rating based on Risk Based Capital (RBC) value	Joint venture life insurance companies that have good company performance are assessed with a score of 1 and joint venture life insurance companies that have poor company performance are assessed with a score of 0.
Profitability Ratio	Return on Asset (ROA)	$ROA = \dfrac{Net\ Income}{Total\ Asset}$
	Return on Equity (ROE)	$ROE = \dfrac{Net\ Profit\ After\ Tax}{Total\ Equity}$
	Net Profit Margin (NPM)	$NPM = \dfrac{Net\ Profit\ After\ Tax}{Net\ Sales}$
	Investment Yield Ratio	$Investment\ Yield\ Ratio = \dfrac{Investment\ Portfolio\ Income}{Average\ Invested\ Assets}$
Solvency Ratio	Capital Ratio	$Capital\ Ratio = \dfrac{Capital}{Liability}$
	Leverage Ratio	$Leverage\ Ratio = \dfrac{Liability}{Capital}$
	Liquidity Ratio	$Liquidity\ Ratio = \dfrac{Liquid\ Assets}{Liability}$
	Risk Based Capital (RBC)	$RBC = \dfrac{Solvency\ Level}{Minimum\ Solvency\ Limit}$

2.1.6 Discriminant Analysis
Not only can the company's financial ratios be analyzed and tested by conventional analysis per ratio, they can also be analyzed by discriminant analysis. Discriminant analysis refers to a statistical technique that can determine group membership based on a set of metric predictors that are independent variables. The main function of this technique is to assign each observation into a particular group or category according to the independent characteristics of the data [26]. This analysis can determine the most important ratio in the Early Warning System (EWS) effort as an early warning about the health of the company, which is the most effective and consistent ratio in assessing the company's financial health, as an early detection system for company bankruptcy [27]. According to [28] and [29], the discriminant function is as follows:

$$Z_{jk} = \alpha + W_q X_{1k} + W_2 X_{2k} + \ldots + W_n X_{nk}$$

Where,
Z_{jk} = Discriminant Z score of discriminant function j for object k
α = Intercept
W_i = Discriminant weight for independent variable i
X_{ik} = Independent variable i for object k

2.2 Conceptual Framework
In the rapid growth of joint venture life insurance companies, financial analysis is important to assess the financial performance of joint venture life insurance companies in Indonesia. By conducting financial analysis on joint venture life insurance companies, it will be known which joint venture life insurance companies have good performance and joint venture life insurance companies that do not perform well. This study will try to

reveal how the performance differences between joint venture life insurance companies that have good performance and joint venture life insurance companies that do not perform well. In this study, the framework will be described as follows:
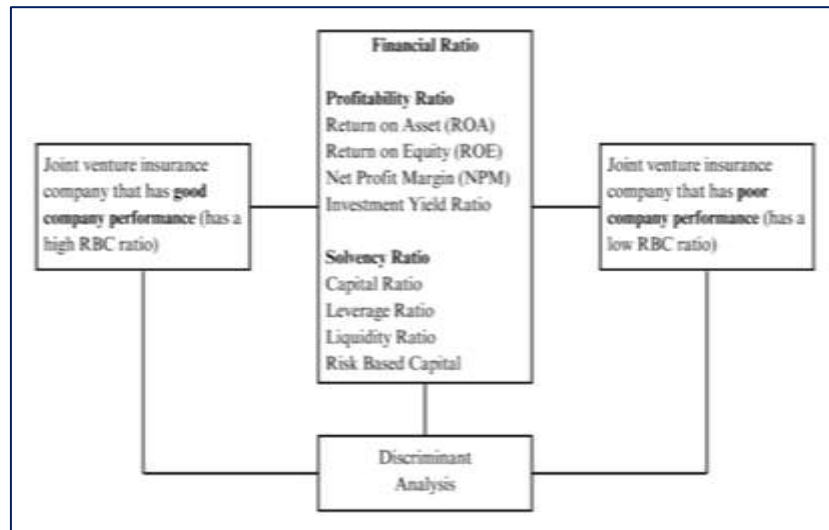

Figure 2 Conceptual Framework

This research is motivated by several problems faced by several joint venture life insurance companies. This situation makes it possible for customers to feel doubtful when choosing a life insurance company, so this situation requires discriminant analysis to be able to identify and classify companies that have good performance and poor performance.

Based on analysis of business problem and theoretical gaps, researchers will develop research question. The researcher will then construct a model and test the hypothesis generated by the literature review and consideration of existing business problems. The hypotheses found in this research are:

H_1 : There is a significant difference between joint venture life insurance companies with good (high) performance and those with poor (low) performance.

H_2 : Discriminant analysis techniques can be used to differentiate the performance of joint venture life insurance companies.

H_3 : There are factors that differentiate joint venture life insurance companies with good (high) performance from those with poor (low) performance.

III. RESEARCH METHODS

3.1 Research Design

According to [30] research is a systematic scientific activity that progresses through several stages. Initially, researchers observe environmental changes, identifying phenomena where expectations diverge from reality, particularly within Indonesia's joint venture life insurance companies. This is followed by gathering preliminary information through literature research, which includes journals, articles, books, and prior studies, to deepen understanding of the observed issues. The next step is defining the problem, where a clear problem statement is formulated. This leads to the formulation of a theoretical framework, integrating all gathered information to conceptualize the factors distinguishing high-performing companies from low-performing ones. Based on this theoretical framework, hypotheses are developed as temporary assumptions that can be tested. Subsequent stages involve collecting further scientific data to test these hypotheses and conducting data analysis to determine their validity. The final step is deduction, where researchers interpret the data analysis results to draw conclusions and propose recommendations for problem-solving based on their findings.
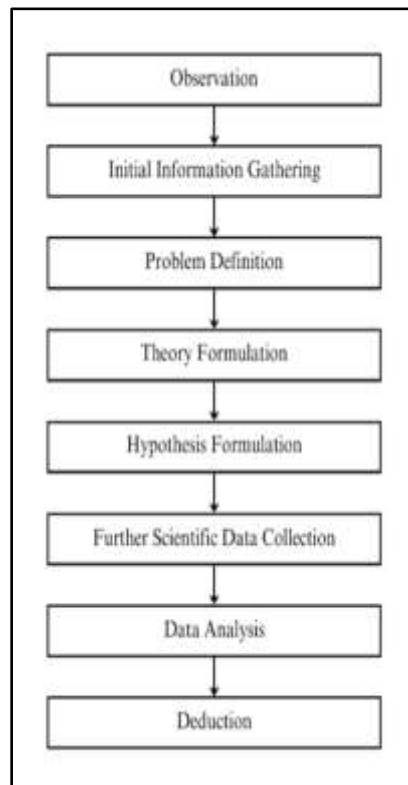
Figure 3 Research Flow Design

3.2 Research and Population Sample

Population is a generalization area of objects or subjects that have the quantity and characteristics that have been determined by researchers to draw conclusions from the research conducted [31]. The population in this study are Indonesian joint venture (JV) life insurance companies for 2020-2022. The sample is part of the number and characteristics contained in the population [31].

The sampling technique in this study used purposive sampling technique. The purposive sampling technique is a sampling technique with a consideration [31]. The sample selection criteria in this study are as follows:

1. Indonesian joint venture (JV) life insurance companies for the 2020-2022 period.
2. Indonesian joint venture (JV) life insurance companies that does not consistently present financial report for the 2020-2022 period.
3. Indonesian joint venture (JV) life insurance companies which are ranked in the top 10 and least 10 based on the Risk Based Capital (RBC) ratio.

Based on the explanation of the sampling criteria above, the sample used was top 10 joint venture life insurance companies and least 10 joint venture life insurance companies based on Risk Based Capital (RBC) ratio.

IV. RESULTS AND DISCUSSIONS

4.1 Classical Assumption Test
4.1.1 Multicollinearity Test

In discriminant analysis, it is essential to perform an assumption test for multicollinearity. The multicollinearity test is conducted to examine the correlations among the independent variables being analyzed. Independent variables that exhibit high correlations with one another will be excluded from the model to avoid bias in the research. Table 2 presents the results of the correlation among the independent variables using Pearson product-moment correlation.

Table 2 Multicollinearity Test Result

Correlations

	ROA	ROE	NPM	IYR	CR	LvR	LqR	RBC
ROA	1	.817	.485	.008	-.389	.088	.076	.172
ROE	.817	1	.270	.138	-.190	.206	.028	.093
NPM	.485	.270	1	-.200	-.172	.069	.083	.036
IYR	.008	.138	-.200	1	.177	.094	-.261	-.042
CR	-.389	-.190	-.172	.177	1	-.136	.397	.603
LvR	.088	.206	.069	.094	-.136	1	-.146	-.068
LqR	.076	.028	.083	-.261	.397	-.146	1	.494
RBC	.172	.093	.036	-.042	.603	-.068	.494	1

Two variables are considered to have a very high correlation if their correlation coefficient exceeds 0.8. Based on the results of the correlation test among these variables, it can be observed that there are two variables with a correlation greater than 0.8: ROA (Return on Assets) and ROE (Return on Equity). The other variables do not exhibit multicollinearity issues within the research data and can therefore proceed to the next stage of analysis. Initially, there were 8 variables in the study; however, after addressing multicollinearity, this number was reduced to 6. Consequently, Table 3 shows changes in initial and final variables.

Table 3 Final Variables

No		Original Variables		Final Selected Variables
1	X1	Return on Assets	X3	Net Profit Margin
2	X2	Return on Equity	X4	Investment Yield Ratio
3	X3	Net Profit Margin	X5	Capital Ratio
4	X4	Investment Yield Ratio	X6	Leverage Ratio
5	X5	Capital Ratio	X7	Liquidity Ratio
6	X6	Leverage Ratio	X8	Risk Based Capital
7	X7	Liquidity Ratio		
8	X8	Risk Based Capital		

4.1.2 Box's M Test

The Box's M test is used to ensure that the covariance matrices among groups of variables do not differ multivariately. The test results show an F value of 38.540 with a significance level of 0.000, and since this probability value is less than 0.05, it can be concluded that the covariance matrices among the groups are different, thus violating the assumptions of discriminant analysis, as shown in Table 4.

Table 4 Box's M Test Result

Box's M		416.538
F	Approx.	38.540
	df1	10
	df2	16082.869
	Sig.	.000

Tests null hypothesis of equal population covariance matrices.

Box's M tests the variance of each variable. Table 4 shows that the significance value is less than 0.05, indicating that the group covariance matrices are different. However, discriminant function analysis remains robust even if the assumption of homogeneity of variances is not met, provided there are no outliers in the data [32].

4.2 Interpretation of Model Accuracy and Significance Difference Test
4.2.1 The Most Influential Ratios Prediction Analysis and Result
    The final variables tested in the discriminant analysis, after undergoing the multicollinearity test, consist of 6 (six) variables. To determine whether these 6 variables are significant in differentiating company performance, the results can be seen in Table 5 as follows.

Table 5 Stepwise Test Result

Variables Entered/Removed

Step	Entered	Statistic	Between Groups	Min. D Squared Statistic	Exact F df1	df2	Sig.
1	RBC	1.511	Highest and Lowest	22.663	1	58.000	0.000
2	NPM	2.149	Highest and Lowest	15.838	2	57.000	0.000
3	LqR	2.886	Highest and Lowest	13.930	3	56.000	0.000
4	LvR	3.934	Highest and Lowest	13.991	4	55.000	0.000

At each step, the variable that maximizes the Mahalanobis distance between the two closest groups is entered.

a. Maximum number of steps is 12.

b. Maximum significance of F to enter is .05.

c. Minimum significance of F to remove is .10.

d. F level, tolerance, or VIN insufficient for further computation.

    The results indicate that only four variables significantly distinguish the top ten joint venture life insurance companies from the least ten joint venture life insurance companies. The variables Risk Based Capital (RBC), Net Profit Margin (NPM), Liquidity Ratio, and Leverage Ratio are identified as the most influential ratios distinguishing between high-performing and low-performing joint venture life insurance companies. Additionally, other variables such as Capital Ratio and Investment Yield Ratio were excluded due to their insufficient significance in differentiating between high-performing and low-performing joint venture life insurance companies.

    The significance of the four selected variables is demonstrated by their individual significance levels, each being below 5%, indicating a high level of significance for each variable. Based on the four variables selected to significantly differentiate between high-performing and low-performing joint venture life insurance companies, the analysis can be further refined to identify which ratio provides the highest level of significance in distinguishing between the two groups. This can be determined through the stepwise test, where the ratio with the highest statistical value will be identified as the strongest differentiator between high-performing and low-performing joint venture life insurance companies.

    The research results indicate that the Leverage Ratio is the most significant variable distinguishing between high-performing and low-performing joint venture life insurance companies, as evidenced by a stepwise test statistic of 3.934. This is followed by the Liquidity Ratio with a value of 2.886. The Net Profit Margin (NPM) ranks third with a value of 2.149, and the RBC is the least significant ratio in differentiating between high and low-performing joint venture life insurance companies, with a value of 1.511.

    However, it should be noted that the above ratios were pre-selected as the most influential in distinguishing the performance of high and low-performing joint venture life insurance companies. To determine the contribution of these four variables to the dependent variable, or in other words, to measure their relevance to the population, we can refer to the Summary of Canonical Discriminant Function. This summary also serves to reinforce the results of the stepwise test, with the findings presented in Table 6.

Table 6 Summary of Canonical Discriminant Function

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.018[a]	100.0	100.0	.710

a. First 1 canonical discriminant functions were used in the analysis.

Table 6 shows a canonical correlation value of 0.710 or 71.0%, indicating that these four variables contribute 71.0% to the dependent variable Y. This result reinforces the earlier statement from the stepwise test that these four variables significantly impact the performance of joint venture life insurance companies and are considered the most influential financial ratios distinguishing between high-performing and low-performing joint venture life insurance companies.

4.2.2 Wilk's Lambda Test

To test the significance of the discriminant function, a multivariate test of significance is used. Since this case involves more than one independent variable, a multivariate test using Wilk's Lambda, approximated by the chi-square statistic, is employed to examine the differences between the two groups of companies (high-performing and low-performing) across all variables collectively. The results are presented in Table 7.

Table 7 Wilk's Lambda Test Result

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.496	39.305	4	.000

A good discriminant function model is indicated by a significance value of less than 0.05. Based on the calculation results, the significance value is 0.000. Since the significance value is less than 0.05, the discriminant scores for the two groups of companies differ significantly. This level of significance with a value of zero also supports the hypothesis formulated earlier. According to the Wilk's Lambda model above, H0 is rejected, and H1 is accepted, demonstrating a significant difference between the performance of the top ten joint venture life insurance companies and the performance of the least ten joint venture life insurance companies.

4.3 Canonical Discriminant Function Coefficient Result

Table 8 presents the Discriminant Function compiled from all stages of the Discriminant Analysis used in this research. From Table 8, it can be analyzed that variables with higher coefficient values show a positive relationship with the performance of joint venture life insurance companies, while variables with lower or negative coefficient values indicate a negative relationship. The financial ratio with the highest positive value related to the performance of joint venture life insurance companies is the Liquidity Ratio, with a value of 0.292. In contrast, the financial ratio with the highest negative value is the Net Profit Margin (NPM), with a value of -0.597.

Table 8 Canonical Discriminant Function Coefficients

	Function 1
NPM	-.597
LvR	.002
LqR	.292
RBC	.061
(Constant)	-1.334

Unstandardized coefficients

Based on the results in Table 8, the following equation can be derived:

$$Z\ Scores = -1.334 - 0.597NPM + 0.002LvR + 0.292LqR + 0.061RBC$$

To determine whether the performance of a joint venture life insurance company falls into the category of high-performing or not using the Z Score, the Group Centroid Function will be used to establish a cutoff value, as shown in Table 9.

Table 9 Functions at Group Centroid

RBC Value	Function 1
Highest	0.992
Lowest	-0.992

Unstandardized canonical discriminant functions evaluated at group means

The Functions at Group Centroid are used to establish the cutoff for classifying joint venture life insurance companies as high-performing or low-performing. The analysis results show a cutoff value of 0.992. This means that companies with a score greater than 0.992 are classified as high-performing, while those with a score less than 0.992 are classified as low-performing.

The accuracy of the Z Score in classifying the performance of a joint venture life insurance company must be tested using the Predicted Group Membership Test. This test is used to assess the reliability of the identified Discriminant Function, with the results shown in Table 10.

Table 10 Predicted Group Membership Test Result

Classification Results

Original		Kinerja	Predicted Group Membership		Total
			Highest	Lowest	
	Count	Highest	20	10	30
		Lowest	1	29	30
	%	Highest	66.7	33.3	100.0
		Lowest	3.3	96.7	100.0

a. 81.7% of original grouped cases correctly classified.

Table 10 displays the predictive accuracy of the discriminant function. The accuracy values range from 0 to 100%, with values closer to 100% indicating better accuracy. From the classification results, it can be seen that the predictive accuracy for high-performing companies is 66.7%, meaning there is a 33.3% error rate in predicting high performance.

V. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Based on the data calculations and analysis, the results indicate that Discriminant Analysis is effective in significantly distinguishing between well-performing joint venture life insurance companies and poorly-performing ones. This finding supports the hypothesis previously formulated, whereby H0 is rejected and H1 is accepted, indicating a significant difference between joint venture life insurance companies with good (high) performance and those with poor (low) performance.

Furthermore, discriminant analysis can be used to differentiate the performance of joint venture life insurance companies with good (high) performance and those with poor (low) performance. This is demonstrated by the classification results in Table 10, which indicate that discriminant analysis can predict the performance of well-performing and poorly-performing life insurance companies with an accuracy of 81.7%. Thus, this supports the rejection of H0 and acceptance of H2, indicating that discriminant analysis can be effectively used to differentiate the performance of joint venture life insurance companies.

Based on the data analysis using discriminant analysis, four variables were found to be the most significant in predicting the performance of joint venture life insurance companies. These four variables are Net Profit Margin (NPM), Leverage Ratio, Liquidity Ratio, and Risk Based Capital (RBC). This finding supports the rejection of H0 and the acceptance of H3, indicating that there are factors distinguishing joint venture life insurance companies with good performance from those with poor performance.

One of the objectives of this study is to establish a discriminant function that can be used to predict the performance of joint venture life insurance companies. The discriminant function derived from this study has an accuracy of 81.7%. The discriminant function identified in this research is:

$$Z\ Scores = -1.334 – 0.597NPM + 0.002LvR + 0.292LqR + 0.061RBC$$

This study recognizes several limitations that should be taken into account when interpreting the results. Firstly, the temporal scope of this research is confined to the period from 2020 to 2022, likely missing long-term trends and structural changes in Indonesia's joint venture life insurance industry. Thirdly, the study focuses solely on financial variables, overlooking non-financial factors such as customer satisfaction, service quality, and product innovation, which may also significantly influence company performance. Furthermore, the sample size is restricted to the top ten and bottom ten joint venture life insurance companies based on their Risk Based Capital (RBC) ratios, indicating that a larger and more varied sample might provide more comprehensive insights.

For future research, several directions are recommended. Conducting longitudinal studies over an extended period can yield a better understanding of industry trends and changes. Including non-financial variables such as service quality and customer satisfaction will provide a more comprehensive view of the factors affecting company performance. Comparative analysis between joint venture life insurance companies in Indonesia and those in other ASEAN countries can highlight best practices and areas for improvement. Examining the impact of regulatory changes and government policies on company performance can also be valuable. Additionally, broadening the sample to include various types of companies, including local and other joint venture firms, will improve the representativeness and generalizability of the findings. By addressing these limitations and exploring these research directions, more in-depth and comprehensive insights into the factors influencing the performance of joint venture life insurance companies in Indonesia can be achieved.

5.2 Recommendation
For Investor

Investors can utilize the discriminant function developed in this study to make well-informed investment decisions regarding joint venture life insurance companies. With an accuracy rate of 81.7%, this discriminant function effectively differentiates between high-performing and low-performing firms. By employing this function, investors can pinpoint companies with superior financial health and performance potential, thereby reducing investment risks. The function incorporates key financial ratios such as Net Profit Margin (NPM), Leverage Ratio, Liquidity Ratio, and Risk Based Capital (RBC), which are crucial indicators of company performance. Applying these insights can improve investment strategies and portfolio management by focusing on companies with strong financial foundations.

For Management

Management of joint venture life insurance companies can use the insights from this study to enhance their company's performance. The key variables identified—Net Profit Margin (NPM), Leverage Ratio, Liquidity Ratio, and Risk Based Capital (RBC)—should be carefully monitored and managed. Improving these critical financial metrics can boost overall performance and market competitiveness. Management should concentrate on:

1. Enhancing Profit Margins: Develop strategies to increase profitability by optimizing operational efficiency and reducing costs.
2. Managing Leverage: Adopt a balanced approach to leverage to ensure long-term financial stability and avoid excessive debt.
3. Improving Liquidity: Ensure sufficient liquid assets are available to meet short-term obligations, enhancing financial flexibility.
4. Strengthening Capital Adequacy: Maintain adequate capital levels to support business operations and absorb potential losses, in line with regulatory requirements.

By focusing on these areas, management can strengthen their company's financial health, making it more attractive to investors and securing a stronger position in the market.

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