THE EFFECT OF INVESTMENT AND PRODUCT DEVELOPMENT ON COMPANY SOLVENCY (CASE STUDY IN INDONESIAN PHARMACEUTICAL COMPANY PT X IN BANDUNG PERIODE 2016-2017)

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Abstract
Pharmaceutical businesses that do research must be aware of the essential aspects that influence innovation rates, R&D expenses, and the likelihood of success. The goal of the research was to look into the impact of product development elements, investment value, and alternative funding sources for research and product development activities on solvency. Simple linear regression and the Hypothesis Test (t-test) were used to assess the data. The results revealed that the optimal product selection strategy, investment obligations, and investment value will have a beneficial and substantial influence on the company's financial stability. The results presented have consequences for providing an analysis of the impact of investment in product research and development activities based on specific data on product development activities and company financial performance; and providing an overview of the impact of funding for research and product development activities in order to choose the best funding strategy.

Keywords: Pharmaceutical Company, Investment, Solvency

Introduction
Indonesia has experienced improvements in various health indicators, including life expectancy, reduction in infant mortality, and delivery assisted by health workers. This achievement was successfully realized through various efforts to improve equitable access to health services. However, the Covid 19 Pandemic teaches that resilience in the health sector is crucial for all countries, including Indonesia. In Indonesia, pharmaceuticals are an attractive industry. Because of rising consumer interest, the authorities have designated the healthcare and pharmaceutical industries as key industries for implementing the Making Indonesia 4.0 program.

In accordance with the Centers for Disease Control and Prevention (CDC), 16.8 million persons in the United States entered health facilities in 2015 because of infectious and parasitic disorders. Chronic viral hepatitis infects around 70 million Africans (60 million with Hepatitis B and 10 million with Hepatitis C). As a result, the rising number of global infectious illnesses is projected to motivate major market companies to create innovative and effective medications and vaccines. Based on advances in technology, the vaccines market is divided into recombinant vaccines, conjugate vaccines, live attenuated vaccines, inactivated vaccines, and toxoid vaccines. In 2018, the conjugate immunizations sector retained the biggest percentage of the market, accounting for 65.1% of the vaccine industry.

The worldwide vaccine industry is divided into two categories: pediatric and adult patients. In 2018, the pediatric category accounted for 70.0% of the vaccination industry by patient category. Because newborns require external vaccinations, this particular category is projected to take over the industry by 2027. Conventional ideas for innovation begin with scientific investigation, which is funded by government and charitable funding, and are followed by product commercialization, which is funded by pharmaceutical company earnings and capital investment. Based on a single estimate, state and philanthropy contributions provide for roughly one-third of total life sciences investment (projected at $194.2 billion in 2018), with industry funding the remainder. The research and development process of medicinal products, especially biological products, requires a long time, has an enormous investment value, and has a high risk of failure, encouraging researchers to analyze the impact of some circumstances on the company's financial performance.

Pharmaceutical businesses that conduct research must be aware of the crucial aspects that influence development rates, research and development costs, and the probability of success (Schuhmacher et al., 2016). Several studies have been conducted to determine the suitable decision-making method for product development investment. Efficient implementation of strategic decisions, such as decisions on the uncertainty of process design and the pharmaceutical sector requires production capacity invested during the product development process. (Marques et al., 2018). Decision-making on the product portfolio to be developed by pharmaceutical companies is very important because products must be innovative amid stringent regulatory rules (Jekunen, 2014). In general, the purpose of this study was to investigate the impact of product development aspects, the amount of investment value and alternative funding sources for research and product development activities on the solvency.

Literature Review

Financial performance

Various experts have widely defined financial performance. The ability of a corporation to manage and control its resources is defined as *financial performance (*Indonesian Institute of Accountants, 2007). Furthermore, a different interpretation of *financial performance* is an overview of the company's financial condition during a specific period in terms of raising and channeling funds, which is normally assessed by indicators of capital adequacy, liquidity, and profitability (Jumingan, 2006). Financial performance is a term that describes the company's achievement that can be viewed as the outcomes achieved for numerous actions that have been

done. According to (Fahmi, 2012), financial performance is an examination undertaken to determine how well a company has followed the standards of financial implementation.

Benefits of Financial Performance Report

The evaluation of the financial health of a business for internal and external purposes. Financial performance reports are beneficial for a company. Information that can be utilized in several ways, including a) Used to determine future company strategy; b) Assessing the company's achievements in a specific period, which illustrates the effectiveness of the execution of its actions; c) Assessing the role of an aspect in accomplishing the company's general targets; d) The foundation for establishing capital investment regulations to improve the company's performance and profitability; e) Observing the general performance of the company; f) Direct decision-making and company activities in general, as well as specific company divisions.

Objective of Financial Performance Evaluation

Munawir specifies the following goals for monitoring the company's economic growth: a) Understanding the level of liquidity, Liquidity shows a company's ability to carry out financial commitments that must be dealt with straight away; b) Understanding the level of solvency, Solvency shows the company's capacity to fulfill its financial responsibilities if the company fails to fulfill in terms of both short- and long-term financial situation; c) Understanding the level of revenue, Rentability, also known as profitability, demonstrates the company's capacity to earn revenue throughout a particular period of time; d) Understanding the level of stability, Stability demonstrates the company's capacity to operate its activities consistently as assessed by its capability to pay its debts as well as interest charges on its debts on schedule.

Analysis of Financial Performance Evaluation

According to Jumingan (2006), financial analysis can be divided into:

a. A comparison of financial statements. An analysis method that compares financial statements from multiple time periods to reveal changes in both sums of money (absolute) and percentages (relative).
b. Analysis of trends (position tendency). Analysis approach is used to evaluate whether the financial condition is likely to increase or decline.
c. Component percentage analysis (standard size). The percentage of investment in each asset to total assets and debt is calculated using an analysis technique.
d. Analysis of the source & usage of working capital. Technique for determining the number of sources and uses of working capital over two contrasting periods.
e. Cash sources and uses are examined. Analysis method for determining the state of cash as well as the reasons for changes in cash over a specific time period.
f. Financial ratio evaluation. Techniques for determining the link between specific items in the form of balance sheets and profit and loss financial statements, both individually and concurrently.
g. Analysis of changes in gross profit. Analysis technique to determine the profit position

and the causes of changes in profit.

h. Breakeven analysis. Analysis technique to determine the level of sales that must be achieved so that the company does not experience losses

Financial Performance Measurement

The following are examples of important financial ratios that are extensively used in the business world to aid and assess firm performance:

a. The margin of Gross Profit
   The gross profit margin is a proportion that determines how much income remains after reducing the cost of products sold. This ratio depicts the portion of each dollar earned that can be used to cover the company's operating expenses.
b. Working Capital Ratio
   The measurement of working capital reveals the organization's liquid net assets accessible to fund operations on a daily basis. Liquidity determination is crucial since it indicates whether the company has resources that can be rapidly transformed into cash.
c. The Current Ratio
   The current ratio is a measurement of liquidity that determines if a company's assets are sufficient to satisfy or fulfill its present obligations.
d. Stock Turnover Ratio
   The turnover of stock is a ratio of efficiency that measures how many times a company's average inventory is sold in a fiscal year. It enables businesses to swiftly identify whether their stock is in demand, outmoded, or holding excessive quantities.
e. Leverage
   A business assesses leverage as an equity multiplier to represent how much debt is utilized to purchase properties. If all assets are financed by equity, the leverage multiplier remains one, but it begins to increase as additional debt is utilized to purchase assets.
f. Return on Assets
   Return on assets assists a company in determining how successfully its resources have been utilized to increase profitability. The business's return on resources will be minimal if its assets are not used properly.
g. Return on Equity
   Return on equity is a revenue proportion used to assess the efficiency with which equity generates returns for investors. A greater profit margin on equity suggests that shareholders receive earnings far more proficiently, making the business more profitable overall.

Medicine Products

Product Development Process

The development of drugs is a time-consuming and costly procedure. Companies rushing to market after discovering an innovative chemical substance must complete preclinical, Phase 1, Phase 2, and Phase 3 studies before launching their new invention. Achieving the final

commercialization stage is a close to zero-probability occurrence; out of the 250 drugs that undergo preclinical evaluation, only one gets approved by the FDA (Food and Drug Administration) (Anita Rao, 2019).

Drug molecules are tested on animals in preclinical studies. Based on the findings, the corporation can decide to submit an experimental new medication filing to each country's drug regulatory agency, which can either accept or reject the request for approval. If accepted, the drug must pass all the following three stages of clinical tests: Phase 1 includes experiments on a restricted number of normally fit people; Phase 2 includes evaluation on a minor category of people diagnosed with the illness in order to demonstrate that the drug has the intended impact on individuals; and Phase 3 includes extensive research to validate the drug's safety and efficacy.
Once a drug has been established, the firm responsible for its development must apply to the national drug regulatory body for registration, marketing authorization, and exportation permission in the nation where the medicine will be produced, distributed, and sold.
In order to secure rights that might, among other things, prevent others producing the drug for 20 years following the submission date, the corporation may also submit a patent application in order to get patent protection for the new drug or pharmaceutical product.

Types of Medicinal Products

Some types of drugs include:

a. Drugs that are derived from either plants or non-plants, synthetic or semi-synthetic, and can lead to a change or reduction in consciousness, loss of taste, pain relief, and addiction are called narcotics. These drugs are classified in accordance with the provisions of the Narcotics Law.
b. Psychotropic medications, both natural or synthetic, are not categorized as narcotics but contain psychoactive qualities that selectively disrupt the central nervous system, resulting in regular behavioral and mental activity changes.
c. Vaccines, hormones, antigens, immunosera, enzymes, blood products, and fermentation products, including monoclonal antibodies and those created from recombinant DNA technologies, are examples of biological products. These items are used to examine or impact physiological systems or pathological disorders, as well as to aid in the prevention, cure, and restoration of these conditions.
d. Contraceptives are drugs or devices whose intended use is to prevent conception.

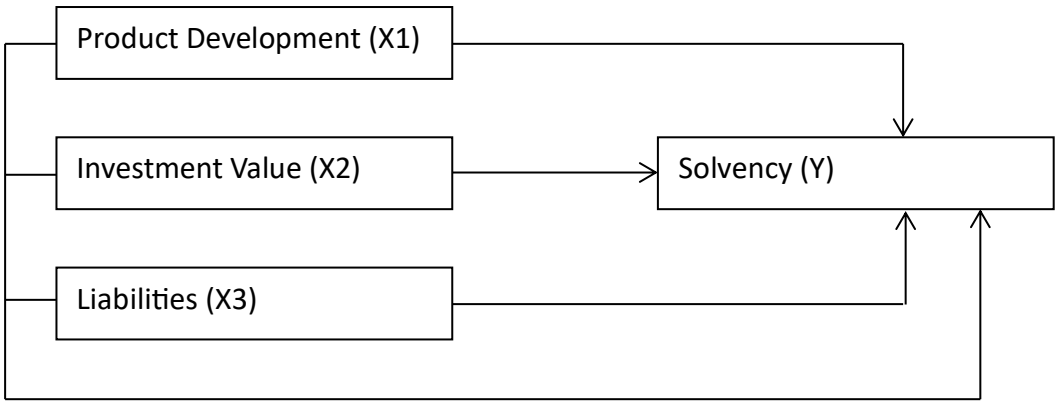
Research Methodology

The subject of this research is PT X in Bandung, one of Indonesia's pharmaceutical companies. This research consists of two-time spans. The time for collecting product development data is from 2012-2021, while for financial reports from 2016-2021.

Conceptual Framework

To determine a relationship between the company's financial performance and the characteristics of the product selection strategy, investment value, and financing sources for product research and development activities, some further research needs to be conducted.

Figure 1. *Conceptual Framework*



Research Question, Objective, and Hypothesis

This study presents the question of whether there is a relationship between the research issues and the literature review and whether: (i) How does product development partially affect the company's solvency?; (ii) How does the company's liability for product development partially affect the company's solvency?; (iii) How does the value of product development investment partially affect the company's solvency?; (iv) How do product development, corporate liabilities for product development, and investment value simultaneously affect the Company's solvency?. Furthermore, the following are the study's goals: (i) To Analyze the effect of product development on the solvency of PT X in Bandung; (ii) To examine the impact of the investment value in product development research on the financial stability of PT X in Bandung, (iii) To analyze the effect of funding sources for research activities on PT X in Bandung solvency; (iv) To analyze the effect of product development aspects, the amount of investment value and alternative sources of funding for research and product development activities on the solvency of PT X in Bandung. Based on the research framework, several hypotheses are compiled, are:

Hypothesis 1: New product development will positively and significantly affect company solvency

Hypothesis 2: The investment value will positively and significantly affect the company's solvency

Hypothesis 3: That liabilities directly positively and significantly affect corporate solvency

Hypothesis 4: That new product development, investment value, and liabilities will have a considerable positive impact on business solvency.

Data and Variables

Both primary and secondary data will be used in this research's analysis of the data. Primary data is gathered via surveys given to parties involved in PT X in Bandung product development and research. Primary data is mostly related to the approach for choosing products. Detailed knowledge on internal and external company aspects is required for product selection. Secondary data for research is gathered from the company's financial filings for the years 2016 through 2021. The data comprise the quantitative value for each dependent variable, solvency, and include (i) Debt to Asset Ratio (DAR); (ii) Debt to Equity Ratio (DER); (iii) ROA (Return on Asset)., respectively. For independent variables including product development, investment value, and liabilities. Table 1 below explores the variables' characteristics and formulas.

Table 1. *The formula of quantitative value for each dependent variable and independent variable*

Variable	Description	Formula
Product development	A company's organized process for conceiving, designing, and commercializing an item.	-
Investment Value: 1. Payback Period (PP) 2. Net Present Value (NPV) 3. Internal Rate of Return (IRR)	1. Measures the period required to recoup investment expenditures using cash flow. 2. The process of evaluating the amount by which the investment's current worth differs from the anticipated net returns in the future 3. Determining the rate of profit that balances the current value and projected future income streams	1. PP = $\frac{investment\ value}{net\ cash\ inflow}$ x 12 months 2. $NPV = \sum_{t=1}^{n} \frac{CFt}{1+K^t} - I_0$ 3. $I_0 = \sum_{t=1}^{n} \frac{CFt}{(1+IRR)^t}$
*Debt to Asset Ratio (*DAR)	A proportion that gauges the extent to which the assets of the organization can satisfy the debts owed by the company.	DAR = $\frac{Total\ Debt}{Total\ Assets}$ x 100%
Deb to Equity Ratio (DER)	Measurement of debt to equity ratio	DER = $\frac{Total\ Debt}{Equity}$ x 100%

Source: Processed Data

Method of Data Analysis

Data analysis lasted through simple linear regression analysis and Hypothesis Test (t-test). The Significance level of 0.05 is used as the test criterion, and the significance value obtained is

compared with the predetermined significance level. As long as the statistical significance value is smaller than 0,05, the autonomous factor has the potential to significantly impact the reliant variable, thereby validating the hypothesis. Furthermore, by evaluating the t-value against the t-distribution table according to the prescribed criteria, it is feasible to:

1. If the calculated t-value is greater than the critical t-value from the table, then the null hypothesis (Ho) is rejected.
2. If the calculated value is less than the critical value from the table, then the null hypothesis is remains valid.

Results And Discussion

Data Description

Product Development

Product development at pharmaceutical company PT X in Bandung is carried out to broaden the range of products available on the marketplace. From the business aspect, product development is also based on the gross profit margin value of the product to be developed. The purpose of product development is to get an assessment in the form of weighting to determine the profit and net sales of new products. The following is the gross profit margin of the new product.

Table 2. *Gross Profit Margin* New Product

Product Title	*Gross Profit Margin*
A	79 %
B	41 %
C	29 %
D	28 %
E	50 %
F	36 %

Source: Processed data

Product development is also indicated by revenue growth. Table 3 showed the revenue growth from 2016 to 2021.

Tabel 3. *Sales Data from 2016-2021*

Years	Revenue (Million Rupiah)
2016	2.315.759
2017	3.011.571
2018	3.235.225
2019	2.542.592
2020	2.790.043
2021	30.320.454

Souce: Processed data

Analysis of Investment Feasibility

The investment feasibility study is a process that thoroughly examines an activity, business, and business is carried out, as shown by Kasmir and Jakfar (2012). Investment feasibility analysis, on the other hand, is the study of whether or not an investment project can be implemented successfully, according to Husnan and Suwarsono (2008). The payback period technique has the benefit of being precise enough to assess the worth of investments that are contrasted for various instances and decision-makers. Its flaw is that it doesn't take into account investment earnings or proceeds after the payback period has passed. The payback period of this study showed in Table 4.

Table 4. Payback P*eriod*

Period (years)	Net Profit	Cash Balance
2016	501.041	492.728
2017	525.356	498.117
2018	543.226	549.293
2019	355.940	348.371
2020	355.166	317.819
2021	1.916.575	1.888.361
Payback Period		1,27

Source : Processed data

The Net Present Value value was described in Table 5. Using an interest rate of 5% per period, the projected NPV for the sixth period (2021) is IDR 3,100,160. The cash inflow value was obtained assuming that the sales target is 100 units per month from the first to the sixth period. That way, it can be declared feasible in month two because the NPV exceeds 0.

Table 5. *Net Present Value and IRR*

Period (years)	Cash Inflow	NPV
1	-Rp 447.950,00	-426.619
2	Rp 369.546,00	335.189
3	Rp 535.910,00	462.939
4	Rp 533.761,00	439.126
5	Rp 3.193.763,00	2.502.397
6	Rp 6.430.503,00	4.798.540
NPV		6.200.335
IRR		143%

Source: Processed data

The Internal Rate of Return value was outlined in Table 5. By using an interest rate of 5% per period, an IRR projection of 143% was obtained. That way, an investment can be deemed viable if the internal rate of return (IRR) exceeds the relevant interest rate.

Financial Performance Analysis
Solvability

Table 6. *The outcomes of computing the pharmaceutical firms' solvency proportion for the period 2016-2021*

Years	Debt	Assets	Capital	DAR	DER	Description
2016	620302	6449449	5302152	9,617907	12	12% Equity / Capital owned by the company obtained from debt
2017	799493	7401159	5649956	10,80227	14	14% Equity / Capital owned by the company obtained from debt
2018	1438320	7940399	5962839	18,11395	24	24% Equity / Capital owned by the company obtained from debt
2019	1792157	5922454	6148252	30,26038	29	29% Equity / Capital owned by the company obtained from debt
2020	5175048	26046653	20871605	19,86838	25	25% Equity / Capital owned by the company obtained from debt
2021	11802190	34485436	22683246	34,22369	52	52% Equity / Capital owned by the company obtained from debt

Source: Processed data

According to Table 6, the company can be deemed solvable because the total debt-to-asset ratio calculation results were less than 100%. The ratio result for 2016 was the smallest compared to past years, making it the best. The DAR ratio's findings fluctuate every year as a result of changes in total assets and total debt. Current assets, whose inventory or accounts receivable increase, are often what create an increase or reduction in total assets. Additionally, current debt that rises owing to rising accounts payable or non-current debt that rises due to rising bank debt typically have an impact on overall debt. Due to the low DER value, it was regarded as the position that was easiest to solve in 2016. The fluctuations in the company's total equity and total debt typically have an impact on the DER ratio. Current or non-current debt can result in an increase or decrease in total debt, whereas retained earnings or loans to shareholders that are later converted to equity might result in changes in total equity each year. Due to the low DER value, it was regarded as the position that was easiest to solve in 2016.

Profitability

Table 7 showed the Profitability Ratio values for firms from 2016 to 2021. The greatest average value was 15.37%, while the lowest average value was 1.36%.

Table 7. *The outcome of computing the profitability ratio. for the 2016-2021*

Ratio	2016	2017	2018	2019	2020	2021
Return on Asset (ROA)	15,37%	8,62%	8,24%	5,78%	1,36%	6,33%

Hypothesis Test and Discussion

T-test

Table 8. *T-test result*

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	12,980	,190		1,360	,000
Liability	1,869	,000	8,106	1,804	,000
Product Development	4,605	,000	5,176	1,127	,001
Investment value	1,928	,000	3,315	1,517	,000

The t-test was employed to establish whether the dependent variable, Solvability, is substantially impacted by the independent factors, which are financial sources, product development, and liabilities. Table 8 showed the results of the t-test analysis. Table 8 shows that the independent variable has a significant value less than 0.05 and a (t) count less than (t) table. As a result, it is possible to conclude that the source of finance, product development, and liabilities all have a substantial beneficial influence on the company's solvency.

Multiple Linear Regression Analysis

Table 9. *Multiple linear regression analysis result*

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	12,980	,190		68,360	,000
Product Development	4,605	,000	5,176	44,127	,001
Investment value	1,928	,000	3,315	46,517	,000
Liability	1,869	,000	8,106	49,804	,000

The multiple linear regression equation obtained is as follows:

$$Y = (12,980) + 4,605X1 + 1,928X2 + 1,869X3$$

Information:

Y = Solvency
X1 = Product development
X2 = Investment value
X3 = Liability

Interpretation:

- The constant (β) is 12.980 which indicates that the influence of the independent variable on the dependent variable is 0, so the solvency value is 12.98%.
- The value of the regression coefficient of the product development variable (β1) is 4.605 with a positive direction indicating that the value of product development increases by one unit, it will increase solvency by 46.05%
- The value of the regression coefficient of the investment value variable (β2) is 1.928 with a positive direction indicating that the value of the investment value increases by one unit, it will increase solvency by 19.28%
- The regression coefficient value of the Liability variable (β3) is 1.869 in a positive direction indicating that the value of the Liability increases by one unit, it will increase the solvency by 18.69%.

According to Table 9, the first hypothesis test reveals that the coefficient value of the product development variable is 4,605 with the significance value obtained was 0.001<0.05, which signifies that the outcome is noteworthy. Therefore, it can be inferred that choosing the appropriate product will have a favorable and noteworthy impact on the financial stability of the company.
The findings of the second hypothesis test similarly demonstrate that the investment variable holds a coefficient value of 1,928, which is accompanied by a significance value of 0.000<0.05, suggesting that the solvency of the company is positively affected by the investment value in a significant manner. Additionally, the tests conducted in Table 9 show that the liability variable

carries a coefficient value of 1,869, with a resulting significance value of 0.000<0.05, which implies that liability has a favorable and noteworthy impact on the company's solvency. The results of the fourth hypothesis test reinforce the outcomes of the prior test, indicating that the appropriate selection of products, investment responsibilities, and investment value can contribute positively and substantially to the company's solvency.

Discussion

Solvency is significantly benefited by product development. Analyzing product expenses and investments is also crucial when creating a product development strategy. In the planning and execution phases of company start-up and business development, investment is a crucial component. Investment analysis is used for forecasting the potential for failure or loss as a result of the implementation of an investment (Umar, 2007).

The company's solvency is directly and significantly impacted by investment value. In addition to investment decisions, there are other factors that investors need to consider, such as the company's solvency. The higher the solvency owned by the company, the smaller the dividends that will be distributed to shareholders because the profit achieved by the company is used more to finance debt than to be dispersed among stockholders as dividends, this is due to the fact that the company's profit is utilized to finance debt rather than being paid to shareholders in the form of dividends. This implies that the company's investment operations have produced maximum returns, and even while the value tends to rise, this situation can be attributed to a variety of internal and external causes, including economic conditions.

The company's solvency will be impacted positively and significantly by investment obligations from R&D operations. The business has the ability to settle all commitments and debts. The measure of solvency evaluates the amount of a company's capital that comes from financing sources based on debt. As the company's debt burden increases, its stability also increases. So that the company's risk ownership also rises. resulting in a rise in profitability. On the other hand, if the company's debt is reduced, it shows the company's solvency is deteriorating.

The value of future investments is ascertained through the application of business investment analysis. The evaluation in issue is intended to determine if the operation of the business is possible, particularly in terms of the technical and economic components of production (Tandelilin, 2010). The Debt to Asset Ratio (DAR), is one of the various measurement tools that can be used to determine the solvency ratio in this study. Riyanto (Yunita and Wulandari: 2016: 3) believes that this refers to the business's capacity to pay all of its debts, including both short- and long-term debt. The level of solvency will drop if the company uses more debt than its own capital because the amount of interest that must be paid will also rise. This will lead to a decline in profitability.

Conclusion And Recommendation

Conclusion

According to the findings of this study, choosing the proper products will significantly and favorably impact a company's ability to remain solvent. Additionally, investment liabilities from

R&D operations will have a favorable and significant impact on the solvency of the corporation. The value of investments has a direct, positive, and considerable impact on the solvency of corporations. The appropriate approach to product selection, investment liabilities, and investment value taken combined will have a beneficial and significant effect on a company's ability to remain solvent.

Recommendation

The research's practical implications include the ability to a. provide an analysis of the impact of investment in product research and development activities based on specific data on product development activities and company financial performance; and b. give a summary of the influence of financing on research and development endeavors in order to determine the most effective funding approach. Additionally, theoretical research advantages include: the findings of the study are anticipated to advance strategic management science, particularly in terms of decision-making approaches for product development activities. Other upcoming researchers should be able to get an overview of the study's findings.

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