Feasibility study of apartment XYZ investment by reviewing the payment alternatives and the supporting variables

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Abstract. The solution to meet the needs of residence due to the lack of space in Jakarta is to build a vertical system of residence. The most popular type of this vertical system of residence is apartment. This makes the development of apartments as an interesting investment. An investment should be assessed whether it is feasible or not due to the benefit for the developer. This research was conducted to assess the feasibility of apartment XYZ investment in West Jakarta area with several parameters. The research process begins with collecting sales data along with the payment method. Furthermore, financial analysis was conducted by comparing the initial payment methods and the combined payment method which can provide investment feasibility. Financial analysis will produce some financial parameter values, such as IRR, ROE, NPV, and payback period, which can determine the feasibility level of the investment. The results show that both of payment methods can provide a good level of feasibility. Thereafter, the sensitivity analysis is conducted on several variables, such as sales duration, capital to debt ratio, loan interest rate, construction price, and land price. The results show that this investment is most sensitive to the raise of land price, the raise of construction price, and sales duration.

1. Introduction
Along with the increasing population in Jakarta each year, the need for shelter is also increasing. According to the Badan Pusat Statistik, the population in Jakarta over the past 10 years has continued to increase to reach 10.4 million people. However, a large population increase is not matched by the availability of land for housing. One solution that can be applied to this problem is by constructing the building vertically, such as hotels, apartments and flats [1].

Lifestyle in big cities demands a practical, comfortable and affordable place to live. This makes the apartment as a preferred choice for most people. This situation provides opportunities for developers to invest in the property sector, especially in the construction of apartments [2].

Basically, investment in apartment development, besides requiring a long time in its implementation, also requires large funds [3]. Therefore, every construction project must both technically and economically feasible. So that, before the apartment development investment is carried out, it is necessary to conduct an economic study to determine the feasibility of the existing development [4].

Many apartment projects were not directly sold after they were completed. This is because previously there was no feasibility analysis on the construction of the project. So, to prevent this condition, many developers make the most efficient payment method to increase apartment sales so they don't suffer losses.

Recognizing the importance of the feasibility study of an investment apartment, so that in this study
will be carried out feasibility studies of apartment XYZ by analyzing various data related to the apartment XYZ. Investment research will be carried out by analyzing payment system that provides most advantages value for the developer to prevent losses in the construction of apartment XYZ.

2. Method and assumption

2.1 Research method

This research was conducted by assessing the investment feasibility of apartment development through the utilization of several tools, that are:

a. Net Present Value (NPV) is used to assess the feasibility of an investment by taking into account the NPV value obtained from the analysis. The feasibility criteria for this method are:
   - If the NPV value is > 0 (positive NPV), then the investment is feasible.
   - If the NPV value is < 0 (negative NPV), then the investment is not feasible.
   - If the NPV value is 0, then the value of the company remains, even though the investment is made.

b. Internal rate of return (IRR) is used to assess the feasibility of an investment by taking into account the IRR value obtained from the analysis. The IRR value is obtained through a trial and error process. The feasibility criteria for this method are:
   - If the IRR value is > MARR, then the investment is feasible.
   - If the IRR value is < MARR, then the investment is not feasible.
   - If the IRR value is same with MARR, then the company value remains.

c. Payback period (PP) used to assess the feasibility of an investment by comparing the payback period obtained with the specified maximum payback period. The feasibility criteria for this method are:
   - If the PP time is < maximum PP time, then investment is feasible.
   - If the PP time is > maximum PP time, then the investment is not feasible.
   - If the PP time is same with maximum PP time, then the value of the company remains, even though the investment is made.

2.2 Research assumption

This study was simulated using six types of payment conditions, that is:

a. Condition 1 : Sales of apartment units with hard cash payment system.

b. Condition 2 : Sales of apartment units with a 10 times flat payment system.

c. Condition 3 : Sales of apartment units with a down payment system of 20% and 80% of KPA payments (Kredit Pemilikan Apartemen).

d. Condition 4 : Sales of apartment units with a system of 50% payment of flat cash in 10 times and 50% of KPA payments.

e. Condition 5 : Sales of apartment units with a 36 times flat payment system.

f. Condition 6 : Combined system of hard cash payments, 10 times flat payment system, and KPA payment system based on sales data that has been running. The percentage of
apartment units sold using the hard cash system is 25% of the total apartment units, 45% from the 10 times flat payment system and the rest from the system of 20% down payment and 80% of KPA payment system.

The analysis was carried out based on the apartment sales data, which the sales of the apartment units has reached 70% at the beginning of 2018 and it was assumed that the apartment units will be sold out by the end of 2019. In addition, there is an increase in the sales price of apartment units by 3% in condition 2 from the hard cash payment system, an increase in the sales price of apartment units by 6% was also visible in condition 3, condition 4, and condition 5 from the hard cash payment system.

3. Results and discussion

3.1 Financial Analysis

The method of determining the investment feasibility of a major project is to do cash flow simulations. By conducting cash flow simulations, the developer can ensure whether the investment in constructing the apartment is feasible or not. The results of financial analysis can be seen in table 1.

### Table 1. Financial analysis results on all payment conditions

| Parameter Financial | IRR    | ROE    | Payback     | NPV (MARR 12.5%)   |
|---------------------|--------|--------|-------------|--------------------|
| Condition 1         | 41.26% | 196.28%| 20.20 month | Rp 301,494,076,428,- |
| Condition 2         | 27.07% | 94.48% | 47.19 month | Rp 257,164,690,222,- |
| Condition 3         | 14.21% | 55.88% | 47.09 month | Rp 54,701,489,492,- |
| Condition 4         | 18.16% | 55.76% | 46.99 month | Rp 156,718,186,363,- |
| Condition 5         | 12.81% | 39.16% | 61.85 month | Rp 11,223,850,925,- |
| Condition 6         | 24.35% | 76.42% | 46.78 month | Rp 233,122,821,394,- |

From the table above, it is found that all payment methods have an IRR value greater than the specified MARR which is equal to 12.5%, so it can be said that all payment methods are feasible. The value of the financial parameter condition 6 has better level of feasibility compared to condition 3 (20% DP and 80% KPA payment system), condition 4 (50% 10 times flat payment system and 50% KPA payment), and condition 5 (36 times flat payment system), whereas condition 1 (hard cash payment system) and condition 2 (10 times flat payment system) have a level of feasibility that is more profitable than the condition 6.

3.2 Sensitivity Analysis

In contrast to financial analysis which aims to find the feasibility of an investment, sensitivity analysis is carried out after the feasibility level of an investment is known. In this analysis, observation is made on a number of variable data that may have consequences in the future. The greater the influence of variable on the level of feasibility of an investment, the more sensitive the variable is. The level of sensitivity of the determined variables will greatly influence the decision making of a problem.

At this stage, changes are made to a number of variables that are considered capable of influencing the level of feasibility of an investment. Furthermore, an IRR, ROE, NPV, and payback period is observed on the combined condition which is the condition carried out by the developer at present, including sales time, capital to debt ratio, loan interest rates, construction prices and land prices. The illustration of sensitivity analysis on IRR values can be seen in Figure 1.
From Figure 1, it can be seen that the order of variables that give the most sensitive influence are construction prices, land prices, sales time, loan interest rates, and capital to debt ratios.

4. Conclusion
Based on the analysis that has been done, the following results are obtained:
1. From the results of the financial analysis of all payment conditions, it is concluded that all payment conditions have a good level of feasibility to run.
2. In the sensitivity analysis, it is found that the increase in construction prices, the increase in land prices, and sales time are the most sensitive variables. The increase in the three variables at a certain value will result in an investment that is not feasible. Investment is still feasible with an increase in construction prices of up to 11% and an increase in land prices to 45.89% of the initial price.

5. References
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