Investment analysis of boarding house in tanah abang district

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Abstract. Shelter is one of the basic human needs, including in Indonesia. Shelter can be a boarding house, apartment or hotel. Therefore, there are many investors competing to accommodate these needs because there is opportunities in the investment. Especially in Tanah Abang District, Central Jakarta, which is rapidly developing in boarding house construction. In investing, a feasibility study in financial side is needed that will be faced with uncertainty. This study aims to conduct an investment analysis by analyzing the configuration of boarding room units to maximize the profit using Linear Programming method then to do a risk analysis using the Monte Carlo simulation method to determine the probability of investment success rate. The result of this study shows the best configuration are 2:1:1 for type A: B: C units, with a Net Present Value > 0, Internal Rate of Return > Minimum Attractive Rate of Return, and Payback Period < 15 years. There are > 50% of investment success rate.

1.   Introduction

As time goes by, human needs for shelter keep increasing. For some investors, this is an opportunity to invest in this sector. They compete to accommodate these needs because there is opportunities in the investment. Especially in Tanah Abang district, Central Jakarta, which is rapidly developing in boarding house construction. But in investing, a feasibility study in financial side is needed that will be faced with uncertainty [1]. Therefore, this study aims to analyse the boarding house investment in Tanah Abang district.

2.   Method and materials

2.1   Linear Programming

This study conducts Linear Programming method to analyse the best unit configuration to maximize the investment value [2], which uses the Net Present Value, Internal Rate of Return, and Payback Period as the measurement tools [3]. Monte Carlo simulation also conducted in this study to find out the success rate of this investment. The investment analysis have a basic information such as; coefficient of building floor with value of 2,4; basic coefficient of building with value 60%; and the land area 657 sqm. Assumed with Minimum Attractive Rate of Return 10%, and construction cost Rp 5.000.000/sqm, with interest 5% for maintenance annually and 5% interest for rent cost annually. Model used for this linear programming was to maximize invesatation value as objective function, with decision variable used is the amount of units each type will be rent. There are 3 types for this model, those are; type A with 6 sqm/unit and rent cost Rp

3.000.000/month; type B with 9 sqm/unit and rent cost Rp 3.500.000/month; type C with 16 sqm/unit and rent cost Rp 4.000.000/month. Other constraints on this model are; coefficient of building floor with value less or equal from 2,4; basic coefficient of building with value less or equal from 60%; toilets and units' ratio for type A is 1:2; the area of each floor is typical.

2.2 Monte Carlo Simulation

Monte Carlo Simulation is defined as doing random trial and error for all statistic sampling used to estimate the solution for quantitative problems. In monte carlo simulation, a model is construct based on real system. Every variable in this model have different probability value [4].

3. Result and discussion

Evaluation of Linear Programming model shown in **Table 1**

Table 1. Linear Programming Model

Floor	2	3	4	5				
Room Type	A	A	B	C				
Room Quantity	32	32	24	14	Decision Variable			
Lease Price	IDR 3,000,000	IDR3,000,000	IDR3,500,000	IDR4,000,000				
Constraints								
Each Floor Area					379.36	m2		
Selling Area					320	m2		
Unit Area Type A 2nd Floor	6				221.6	<=	224	m2
Unit Area Type A 3rd Floor		6			221.6	<=	224	m2
Unit Area Type B 4th Floor			9		216	<=	224	m2
Unit Area Type C 5th Floor				16	224	<=	224	m2
Special Constraint								
Toilet Area 2nd Floor	0.925							
Toilet Area 3rd Floor		0.925						
KLB					2.4	<=	2.4	
KDB					57.75%	<=	0.6	
Yearly Income	IDR3,984,000,000							

Expenditure recapitulation shown in **Table 2**

Table 2. Expenditure Recapitulation

Land purchase price	IDR 18,240,291,000
Building price	IDR 9,484,000,000
Electrical billing	IDR 224,363,520
Water Billing	IDR 18,825,000
Employee salary	IDR 108,000,000

From the Linear Programming model and the expenditure recapitulation, the cashflow of this investment is produced shown in **Table 3**

Table 3. Cashflow Recapitulation

Year	Cash Out	Cash In
0	IDR (25,353,291,000)	IDR -
1	IDR (2,634,391,390)	IDR 2,988,000,000
2	IDR (368,747,946)	IDR 3,984,000,000
3	IDR (387,185,343)	IDR 4,183,200,000
4	IDR (406,544,610)	IDR 4,392,360,000
5	IDR (426,871,841)	IDR 4,611,978,000
6	IDR (448,215,433)	IDR 4,842,576,900
7	IDR (470,626,205)	IDR 5,084,705,745
8	IDR (494,157,515)	IDR 5,338,941,032
9	IDR (518,865,391)	IDR 5,605,888,084
10	IDR (544,808,660)	IDR 5,886,182,488
11	IDR (572,049,093)	IDR 6,180,491,612
12	IDR (600,651,548)	IDR 6,489,516,193
13	IDR (630,684,125)	IDR 6,813,992,003
14	IDR (662,218,332)	IDR 7,154,691,603
15	IDR (695,329,248)	IDR 7,512,426,183

With the result Net Present Value of IDR 6.428.891.974, Internal Rate of Return of 13% and Payback Period at 11.309 years.

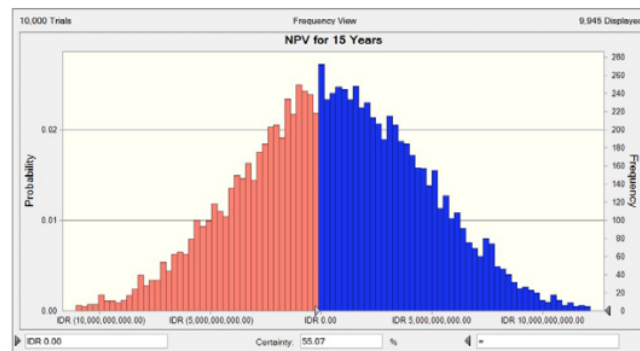Evaluation of Monte Carlo simulation shown in **Figure 1** and **Figure 2**.

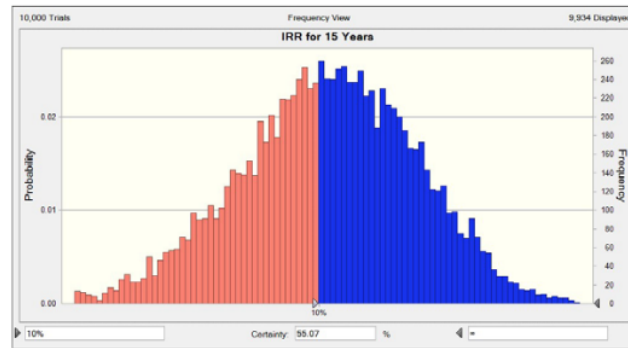**Figure 1.** show that probability value of Net Present Value more than 0 is 55,07 %

Figure 2. show that probability value of Internal Rate of Return more than Minimum Attractive Rate of Return (10%) is 55,07 %

4.   Conclusion

Based on those discussion, it can be concluded that investation at Tanah Abang classified as feasible consider the paramater such as; Net Present Value : IDR 6.428.891.974; Internal Rate of Return : 13% and Payback Period in approximately 11 years; also investment succeed chance approximately 55,07%.

5.   References

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