Real Estate Development: Select a New Project

Jiaxing Lin

Individual Assignment 2

AD 715 Professor Lindley

Boston University

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Executive Summary

Preamble:

A real estate company is considering building apartments, offices, or warehouses, with the potential profit dependent on market conditions. To get a more precise idea of the probabilities of each market condition, the company is considering hiring a business analyst but with a fee and the results could be positive or negative. Therefore, the employment of a business analyst should be decided by the evaluation of profit against the costs, and analyzing at what point the probability of survey results would impact their decision.

Analysis and Recommendation:

If the benefit of hiring the analyst is less than not hiring, then the company should rely on their own market condition estimations. By analyzing and comparing the payoff between hire and not hiring a business analyst, the company should build apartments with a $316,000 expected monetary value (EMV). However, if the market analyst provides a probability higher than 0.956 and lower than 1 for a positive outcome which indicates a greater likelihood of an optimistic market condition, then it would be beneficial for the company to hire the analyst to achieve a higher potential payoff.

Decision Tree Establishment

A real estate firm is contemplating the construction of one of three potential projects including an apartment, office, and warehouse, and the potential profit from selling the property varies based on optimistic, realistic, or pessimistic market conditions. The company is considering the hiring of a business analyst to survey with an upfront fee of $8,000 and may potentially provide a more precise evaluation of market conditions, but the results could be positive or negative.

To decide whether to hiring a business analyst and which type of building should be construct, the company should opt for the alternative with the highest expected monetary value to maximize returns. Based on the existing facts, the decision tree has been created to visualize the decision-making process with paths:
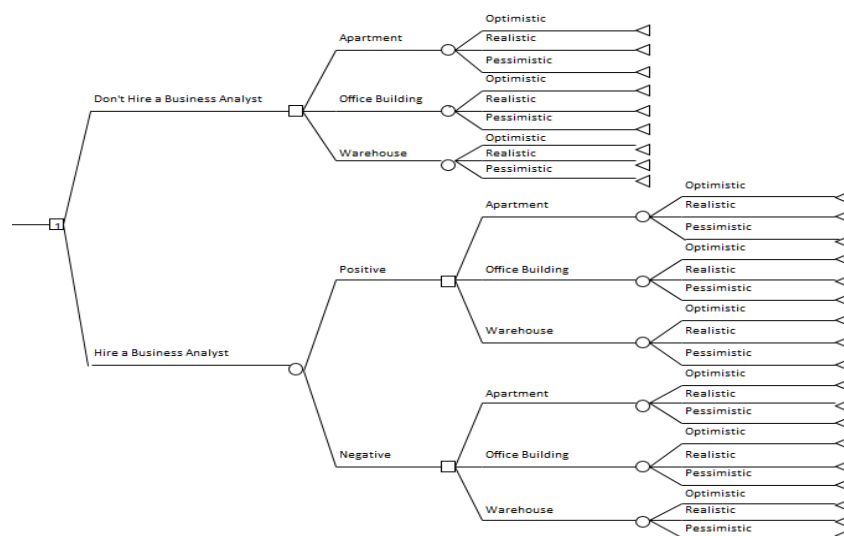

Figure 1: Decision Tree Strategy with decisions and events

Payoff and EMV Analysis

With the directions sorted out by the Decision Tree above, the analysis can be continued by implementing payoff data. The business analyst may adopt a more

conservative approach by stating that if the survey results are negative, it is more likely that the market will experience a pessimistic condition rather than optimistic. If hiring a business analyst, the decision on which building to pursue will be deferred until the survey results are presented, so the firm should weight the payoff and find the most optimal method -maximum EMV of conducting the survey or not, based on both the company's and business analyst's market conditions probabilities. Payoff and EMV conclude as follow:

- If the company chooses not to hire a business analyst, the alternative with maximum EMV is to construct the apartment building with $316,000 (see *Table 1*).
- If the company chooses to hire a business analyst, the maximum EMV for a positive analysis report is $325,100 (see *Table 2.1*) and for a negative report is $117,500 (See *Table 2.2*) after deducting the survey fee from the payoff.

With the given probabilities by the business analyst of 0.52 for positive results and 0.48 for negative results, the EMV after weighting based on positive and negative report scenarios is $225,452. Thus, the company is not necessary to consider business analyst's probabilities as the EMV of not conducting the survey ($316,000) is higher.

Sensitivity Analysis

To determine the extent to which the probabilities of positive and negative results, or more specifically, the range of probabilities that could influence the decision made above, a sensitivity analysis should be implemented. The analysis equates the EMV equations for both hiring and not hiring a business analyst to calculate the probability

(p) at which the expected returns of both options are equal. This will determine the point at which the decision to conduct a survey or not becomes indifference. Visualize equations into the line graph shown in *Figure 2*, the cross point of these two equations occurs when the probability is approximately 0.956 so at this point the decision change.
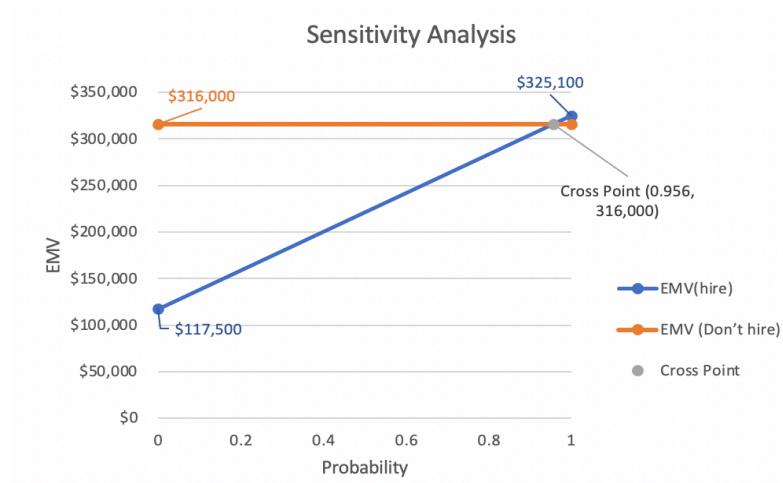

Figure 2: Sensitivity Chart

Recommendation

(1) Which development project should be selected?

Based on the decision tree (*Appendix B*) and EMV evaluation, the company should consider the apartment building construction project as it yields the highest EMV $316,000 among other projects, even include the possible unfavorable market condition.

(2) Should the company hire a business analyst and how sensitive this decision is?

Given the facts above, the company should not hire a business analyst since the maximum EMV of no survey is higher. Yet, the decision may be influenced by changes in the probabilities of a positive or negative report result. Based on the sensitivity analysis, if the probability of a positive report results falls between 0 and 0.956, the

decision not to hire a business analyst may not be affected. On the other hand, if the probability is between 0.956 and 1, then it would be more beneficial for the company to hire a business analyst as the EMV since this point is higher than not hiring one.

Appendix A: Payoff and EMV

Alternatives	States of Nature			EMV
	Optimistic	Realistic	Pessimistic	
Apartment Building	$410,000	$360,000	-$90,000	**$316,000**
Office Building	$440,000	$330,000	-$120,000	$303,400
Warehouse	$380,000	$320,000	-$140,000	$277,600
Probability	0.29	0.58	0.13	

Table 1: Payoff and EMV if the company does not hire a business analyst

Alternatives	States of Nature			EMV
	Optimistic Conditions	Realistic Conditions	Pessimistic Conditions	
Apartment Building	$402,000	$352,000	-$98,000	$321,500
Office Building	$432,000	$322,000	-$128,000	**$325,100**
Warehouse	$372,000	$312,000	-$148,000	$285,800
Probability	0.56	0.31	0.13	

Table 2.1: Payoff and EVM If hire a business analyst and the report is positive

Alternatives	States of Nature			EMV
	Optimistic Conditions	Realistic Conditions	Pessimistic Conditions	
Apartment Building	$402,000	$352,000	-$98,000	**$117,500**
Office Building	$432,000	$322,000	-$128,000	$97,700
Warehouse	$372,000	$312,000	-$148,000	$73,800
Probability	0.17	0.29	0.54	

Table 2.2: Payoff and EVM if hire a business analyst and the results are negative

Appendix B: Decision Tree