**Introduction**

When starting a new business venture, it's critical to carefully analyze the potential outcomes and make informed decisions. This report analyzes the decision-making process for a lemonade stand using a decision tree model, a very powerful tool for analysis, which visually depicts the different possible decisions, actions, and their associated probabilities and payoffs. The focus is on evaluating the Expected Monetary Value (EMV) for two strategic options either adding cookies or not

To determine whether to add cookies to your lemonade stand based on demand scenarios, we will follow a similar approach as in the “Notes for LO4 Decision Tree.docx” example: 4.5 Activity: Lemonade stand Expected monetary value (EMV). We will calculate the Expected Monetary Value (EMV) for both options: adding cookies and not adding cookies.

**Step 1: List Possible Outcomes and Probabilities**

Demand Scenarios

* High Demand: 50% probability
* Medium Demand: 30% probability
* Low Demand: 20% probability

Profit Scenarios

* Monthly Profit (High Demand): $150
* Monthly Profit (Medium Demand): $100
* Monthly Profit (Low Demand): $50

Initial Investment

* **Initial Investment**: $300

**Step 2: Calculate Profits for Each Outcome**

**Option 1: Not Adding Cookies**

In this scenario, we will only consider the profits from lemonade sales.

* High Demand: Profit = $150 - $300 (initial investment) = -$150
* Medium Demand: Profit = $100 - $300 = -$200
* Low Demand: Profit = $50 - $300 = -$250

**Option 2: Adding Cookies**

Assuming that adding cookies will generate additional profits. Let's estimate the additional profit from cookies under each demand scenario:

* High Demand: Additional profit = $50 (total profit = $150 + $50 = $200)
* Medium Demand: Additional profit = $30 (total profit = $100 + $30 = $130)
* Low Demand: Additional profit = $10 (total profit = $50 + $10 = $60)

Now, we calculate the profits after accounting for the initial investment:

* High Demand: Profit = $200 - $300 = -$100
* Medium Demand: Profit = $130 - $300 = -$170
* Low Demand: Profit = $60 - $300 = -$240

**Step 3: Calculate Expected Monetary Value (EMV)**

**EMV formular**: (profit \_Hd\*prb\_Hd) + (profit \_Md\*prb\_Md) + (profit \_Ld\*prb\_Ld)

Formular\_interpretation= (Profit in High Demand\*Probability of High Demand)

+ (Profit in Medium Demand\*Probability of Medium Demand)

+ (Profit in Low Demand\*Probability of Low Demand)

**EMV Calculation for Not Adding Cookies**

EMV= (−150\*0.5) +(−200\*0.3) +(−250\*0.2)

= (-75) + (-60) +(−50) =−185EMV= (−75) +(−60) + (−50) =−185

**EMV Calculation for Adding Cookies**

**EMV** = (−100×0.5) +(−170×0.3) +(−240×0.2)

= (−50) +(−51) + (− 48) =−149EMV= (−50) + (−51) + (−48) =−149

Summary of Results

| **Option** | **EMV** |
| --- | --- |
| Not Adding Cookies | -185 |
| Adding Cookies | -149 |

Conclusion

Based on the calculated EMVs:

* Not adding cookies results in an EMV of **-$185**.
* Adding cookies results in an EMV of **-$149**.

Although both options lead to a negative expected monetary value, adding cookies minimizes losses compared to not adding them. Therefore, if you decide to proceed with your lemonade stand, it would be more beneficial to add cookies, as it offers a better financial outlook despite still being a loss overall.

This analysis illustrates how calculating EMV can guide decision-making by considering various demand scenarios and their financial implications.

Expected Monetary Value (EMV) is a pivotal statistical decision-making tool, particularly and mostly used in risk management. It quantifies the potential financial results of various decisions by putting into consideration, the probabilities of different scenarios and their respective monetary impacts. Below’s a discussion on the recommendations based on EMV, together with potential risks and variables that could influence decisions.

Statistical Recommendations Based on EMV

1. **Quantitative Decision-Making**: EMV provides a systematic approach to evaluate decisions by quantifying potential outcomes. Decision-makers should calculate the EMV for each option available to them, selecting the one with the highest EMV as it indicates the most favorable expected financial outcome.
2. **Risk Assessment**: By calculating EMV, decision-makers can identify and prioritize risks associated with each option. Options with higher negative EMVs indicate greater potential losses, prompting further analysis or alternative strategies to mitigate those risks.
3. **Resource Allocation**: EMV analysis can guide resource allocation by highlighting which risks require more attention and resources. This allows organizations to focus on high-impact risks that could significantly affect project outcomes.
4. **Cost-Benefit Analysis**: Using EMV facilitates a cost-benefit analysis of different strategies, helping decision-makers understand the trade-offs involved in their choices. This can lead to more informed and strategic decisions that align with organizational goals.

Potential Risks and Variables Influencing Decisions

1. **Data Accuracy**: The reliability of EMV calculations heavily depends on accurate data regarding probabilities and financial impacts. Inaccurate data can lead to flawed EMV calculations, resulting in poor decision-making.
2. **Cost fluctuation**: as time goes by unexpected changes in costs could alter profit margins
3. **Market Competition**:  Increased competition could impact sales and demand levels, success of the first entrepreneur might trigger other peer with capital potential to dive In the same business thereby bringing about competition
4. **Assumptions of Equal Probability**: EMV often assumes that all potential outcomes have equal likelihoods, which may not reflect reality. This can skew results if certain outcomes are more probable than others but are not adequately represented in the analysis.
5. **Market Conditions**: External factors such as market volatility, economic shifts, or changes in consumer behavior can significantly influence demand and profitability projections, affecting the accuracy of EMV calculations.
6. **Demand fluctuations or variability**:  the estimated probability might not accurately reflect real-word entrepreneur condition, thereby affecting profitability
7. **Risk Tolerance**: Different stakeholders may have varying levels of risk tolerance, which can impact decision-making processes. A strategy with a high potential return but also high risk may be deemed unacceptable by risk-averse stakeholders despite a favorable EMV.
8. **Complexity of Outcomes**: In scenarios involving multiple variables or complex interdependencies, calculating EMV can become complicated. Decision trees or other advanced analytical techniques may be necessary to capture the full scope of potential outcomes accurately.

Conclusion

In summary, utilizing Expected Monetary Value as a decision-making tool offers valuable insights into potential financial outcomes while highlighting associated risks. However, it is crucial for decision-makers to consider the accuracy of their data, assumptions made during calculations, and external factors that may influence their decisions. By doing so, they can enhance their strategic planning and improve overall project success rates while effectively managing risks.