**RamSync Investment Analysis**

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**Overview of Financial Options**

A financial option is a contract which grants one party the right to either purchase or sell an asset within the agreed upon timespan and at the price in the contract. The asset being exchanged can vary depending on the contract and ranges from commodities to currency and ownership shares. In a typical call option, the party purchasing the long position has a right, but not an obligation, to purchase 100 shares of stock at the agreed upon exercise price at any point during the options lifespan. Profit is made if the stock’s price appreciates because the party maintaining the long position can exercise their option and purchase shares at the exercise price before reselling at the higher market valuation. Contrarily, put options give the buyer the right to sell an asset at a certain price, and profits grow as the asset’s market price depreciates.

The stock’s price, the option’s exercise price, time to maturity, price volatility, and interest rates all effect an option’s call price which is the premium investors pay to enter into an option contract. This is relevant, because option holders can sell their position for profit based on the value of the call option within itself. If the stock price of the underlying asset increases, the contract will gain in value as it is closer to a profitable position. This same effect is seen negatively when the stock price decreases. Price volatility is another factor in call price. A stock price with a historically unstable price is going to demand a higher premium as investors foresee more price fluctuations. Lastly, a longer time to maturity for an option contract will command a higher option premium. This is because a 6-month option contract will have twice as much time to land in the money compared to a 3-month contract. By examining the RamSync investment like a financial option, we built a Black-Scholes pricing model to demonstrate the impact these variables have on option price when changing (*Excel - Exhibit A*).

Before continuing, we must clarify the difference between intrinsic and time values for option pricing. The intrinsic value is calculated by subtracting the strike price from the underlying stock’s price and represents the portion of the option which is in-the-money. Contrarily, the option’s time value is found by subtracting the intrinsic value from the premium and represents the excess premium that can be charged on top of the contract itself. We demonstrated this difference by calculating the hypothetical intrinsic and time values of RamSync call and put options at varying times and prices (*Excel – Exhibit B*).

**The RamSync MRAM Growth Option**

By examining the RamSync opportunity like a financial option with the Black Scholes model, we were able to find a minimum value for which the investment would breakeven for the Hedge Fund. We believe that this investment can be analyzed like a financial option because it shares many of the same inputs, variables, and exit options. Just like the Black Scholes model, the MRAM project’s profitability will depend on stock price (DCFs), time to maturity, and interest rates. Through our analysis, we calculated that the MRAM growth option would need to generate discounted cash flows of $119.9m to breakeven (Excel – Exhibit C). After inputting RamSync’s Black Scholes sensitive variables into our model, we executed a goal seek function to find the minimum ‘stock price’ required. This ‘stock price’ represents the future discounted cash flows generated by the MRAM venture to satisfy the $33m ‘call price’. This ‘call price’ represents the project’s NPV, which must be at least $33m to overcome the -$33m NPV generated from RamSync’s general operations.

Further, we conducted a second sensitivity analysis which we believe covers all potential outcomes for the MRAM project (Excel – Exhibit D). In this model, we calculated the value of the project for any potential amount of discounted cash flow in a reasonable range, $100m - $300m. For instance, if the MRAM model generates $300m in DCFs, the RamSync investment would be worth much more than the breakeven value of $33m at $144.9m. Contrarily, if it only generates $100m it would not be worth the breakeven value of $33m. The decision of whether to invest into RamSync is heavily dependent on how confident your Hedge Fund is in RamSync’s pro forma projections of their own cash flows. Inaccuracies here would cause our Black Scholes analysis to be misguided. One of the variables that is included in our model is variability in RamSync’s discounted cash flows. We believe that this is important because of the just-discussed importance of accurate projections. If cash flow variance is high, we cannot be as certain that their pro forma projections are correct. However, low variance suggests that their cash flows are predictable and consistent. Since the accuracy of these projections is the most important variable in this investment making process, it is necessary to include predicted volatility.

**Conclusion and Results**

Our suggestion to your Hedge Fund is to make the investment into RamSync. We agree with your analysis that RamSync’s regular operations alone would not be a worthwhile investment because of their -$33m NPV. However, after analyzing many different potential outcomes for the MRAM venture, we believe that this innovative technology could generate cash flows that compensate for RamSync’s -$33m NPV and more. Specifically, we found that RamSync will become a profitable investment if the MRAM project could generate $119.9m in DCF, which is approximately $45m less than RamSync’s internal projections.

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| **Variables** | **Results Summary – Sensitivity Analysis** | | | | | |  |
| Stock Price **(DCF)** | **100** | **120** | **140** | **160** | **180** | **200** | **300** |
| Time Until Maturity | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Exercise Price | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Risk Free Rate | 6% | 6% | 6% | 6% | 6% | 6% | 6% |
| Volatility | 65% | 65% | 65% | 65% | 65% | 65% | 65% |
|  |  |  |  |  |  |  |  |
| **Calculations** |  |  |  |  |  |  |  |
| d1 | -0.1742 | -0.0488 | 0.0573 | 0.1492 | 0.2302 | 0.3027 | 0.5817 |
| d2 | -1.6276 | -1.5022 | -1.3961 | -1.3043 | -1.2232 | -1.1507 | -0.8718 |
| N(d1) | 0.4309 | 0.4806 | 0.5228 | 0.5593 | 0.5910 | 0.6189 | 0.7196 |
| N(d2) | 0.0518 | 0.0665 | 0.0813 | 0.0961 | 0.1106 | 0.1249 | 0.1917 |
| **Call Price (NPV)** | **23.90** | **33.03** | **43.07** | **53.90** | **65.41** | **77.52** | **144.89** |

Grade 40/40