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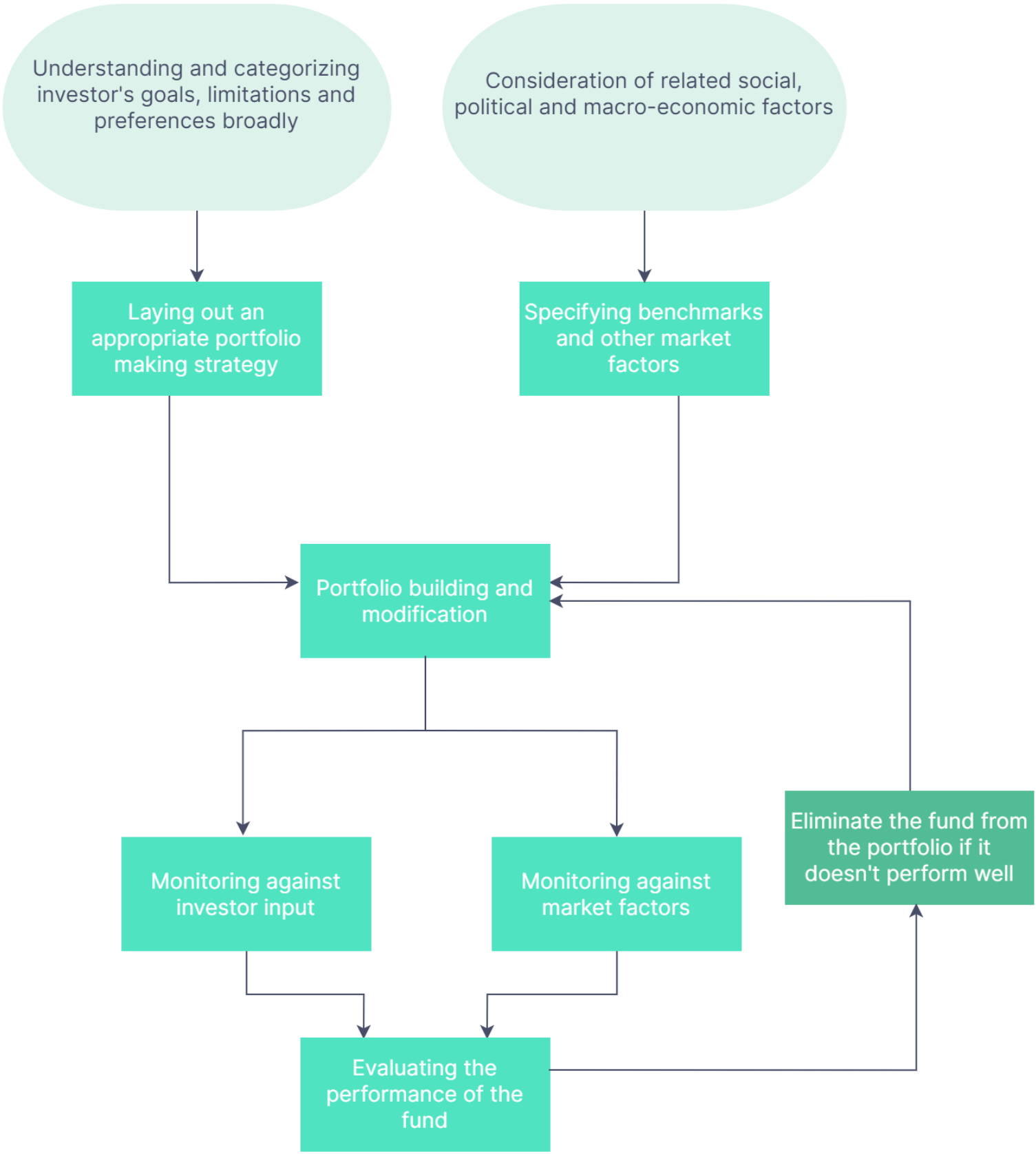
Name of case study	Quant

Flowchart


Understanding and categorizing investor's goals, limitations and preferences broadly
Consideration of related social, political and macro-economic factors
Laying out an appropriate portfolio making strategy
Specifying benchmarks and other market factors
Portfolio building and modification
Monitoring against investor input
Monitoring against market factors
Eliminate the fund from the portfolio if it doesn't perform well
Evaluating the performance of the fund

Introduction

We begin by understanding the investor's investment philosophy: the preferred asset class(for example - Alternative investments like private equity, private credit, real estate, liquid alternatives or mutual funds, etc.), the investment vehicle, risk tolerance, return expectation, etc. These factors determine the portfolio policies and strategies that may be followed. These factors and market considerations help select investments to make a well-diversified portfolio. Diversification is a risk management strategy (although it does not ensure profit) that works on the concept that some funds that outperform can cover up for those that incur losses.

Now, we carefully monitor these funds and collect information (we have the following information according to the problem statement:-the time series of returns, interest rates, commodity prices, benchmarks, etc.) in order to eliminate funds that do not deem profitable. Performance evaluation is a feedback tool that compares portfolio characteristics with investor goals. Selecting correct Benchmark index is also very important while analyzing a fund's performance.

Risk and Return

Portfolio returns are only one aspect of the narrative—without considering **risk-adjusted returns**, we can not understand the entire picture. It is critical to consider the amount of risk while investing as returns are closely affiliated with risks. The **risk-return tradeoff** principle states that the potential return rises with an increase in risk. Hence careful consideration of the risk tolerance of the investor is vital. Employing **risk management strategies** to reduce the risk is another important step. It involves identifying, analysing and either accepting or mitigating the risk. **Risk analysis** involves contemplating what could go wrong and calculating the probability and extent of the impact of that event. Risk analysis can be done quantitatively or qualitatively, and accomplishing both delivers a more comprehensive perspective. Quantitatively, some risk measures allow us to identify and quantify specific features of a fund to a certain extent:-

1) Beta

The beta of a fund is a measure of **relative risk (or volatility)** vis a vis its benchmark. It does not indicate the inherent risk of the fund but its relative risk. If a fund's beta is less than 1, it can be considered less risky than its benchmark.

2) Alpha

Alpha (also known as Jensen measure) is the **excess return** of the fund over the benchmark return **on a risk-adjusted basis**. It not only considers the return that the fund produces but also its volatility. The use of beta while calculating alpha allows us to get a broader view by considering both return and risk. The fund is rewarded (in terms of alpha) if returns are rendered by keeping a low-risk profile and is penalised for being volatile.
Mathematically,

*Alpha = (Mutual fund return – risk-free return) -(Benchmark return – risk-free return)*Beta*

Here **risk-free return** is the maximum return that can be generated without risk.

3) Standard deviation

It represents the riskiness of the fund. The higher it is, the higher is the volatility and hence the risk. It is the statistical measure of dispersion around central tendency, representing how much the return can deviate from our expectations, either incurring a profit or a loss. Using standard deviation as a percentage expressed as an annualised figure, we can assume:-

*Loss = Investment * (1-SD)*
*Gains = Investment * (1+SD)*

And therefore, the larger the SD, the larger the possibility of loss or gains. This volatility can be dealt with by diversifying and putting in more time.

4) Sharpe ratio

Knowing both the inherent risk (in terms of standard deviation) and return can give us a more definitive idea about a fund's performance by using the Sharpe ratio. Mathematically,

Sharpe ratio = [Fund return – risk-free return]/standard deviation of the fund

Evidently, the higher the Sharpe ratio, the better it is, as we want higher returns for every unit of risk undertaken. Although, the Sharpe ratio considers price based risk only and not credit or interest rate risk. Hence, it is not helpful for debt funds.

5) Treynor measure

Mathematically,

Treynor Measure=(portfolio return−risk-free rate)/beta

The numerator corresponds **to the risk premium**, and the denominator corresponds to **the portfolio risk**. The resulting value represents **the portfolio's return per unit risk**. This measure only considers systematic risk, assuming that the investor already has an adequately diversified portfolio and, therefore, unsystematic risk (diversifiable risk) is not considered. Therefore, this performance measure is most applicable for diversified portfolios.

6) R-squared

It is one of the most basic measuring tools for a complete analysis of mutual funds. It indicates to what degree a given fund matches a given benchmark. It does not measure how well a mutual fund performs or how well the entire portfolio performs, for that matter. Instead, it compares returns to a set benchmark and expresses that as a percentage between one and 100. The higher the figure, the more the portfolio mirrors the benchmark.

ESG

Although it can’t be used to eliminate funds it is becoming very popular among investors (while choosing funds), it is the environmental, social, and governance (ESG) criteria. These are a set of benchmarks for a company's operations that **socially aware investors use to screen potential investments.** Environmental criteria consider the company's impacts on nature. Social criteria examine how it manages social relationships with employees, clients, suppliers, and the societies where it operates. Governance deals with a company's leadership, audits, executive pay, internal controls, and shareholder rights. ESG criteria help investors avoid companies that might pose a greater financial risk due to their environmental or other practices.

Conclusion

We can calculate these measures through the data provided. We can comprehend which funds need to be dismissed by observing the funds where some of the factors are not as per expectations. In this way, we can revise our portfolio from time to time.

There are several other factors and methods that can also be used to compare and analyse the performance of a fund like **category average** (to compare the fund's performance against others), **trailing returns** (returns generated over a period of time), **regression analysis, Sensitivity analysis, Value at risk (VaR)** which is a statistic that quantifies the extent of possible financial losses, etc. We can also employ qualitative tools like SWOT analysis, decision matrix, game theory, Cause-effect diagrams, etc.

----------END OF CASE STUDY----------