Monte Carlo Simulation of factors affecting the smartphone industry market share

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Overview

The objective of this poster is to explore **Monte Carlo Simulation** in determining **future "Global Smartphone Market Share"** based on **historical statistical trends** of companies and different random factors affecting the market share.

Our research takes into consideration four leaders in the industry which are **Samsung, Apple, Huawei, and LG**, based on their performance over the last five years predictions are made for the future projections.

This data for the past five years was collected from articles and numbers published by these companies as part of their annual reporting.

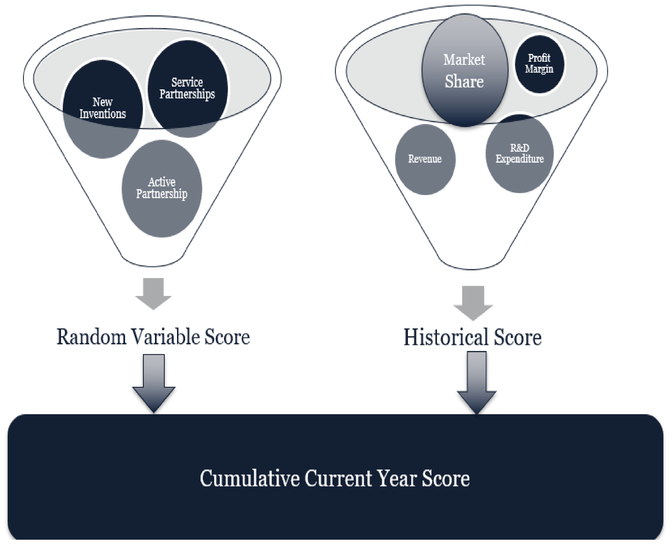
The research process involved running 10,000 simulations for each year for the next five years to derive the statistical value of market share for each company based on the input factors and random variables.

Hypotheses

The research involves testing hypothesis based on input parameters and random variables using Monte Carlo Simulation. Following are the **three hypotheses** which will be tested based on the simulations:

1. **Change in Market Share** of a company should **be more** with relatively **higher number of new inventions** in a given timeframe.
2. An **increase in service partnerships** should have a **positive impac**t on **company's market share**.
3. If a company sees a **rise in number of countries it is active** in, it should affect the **market share positively**.

Methodology

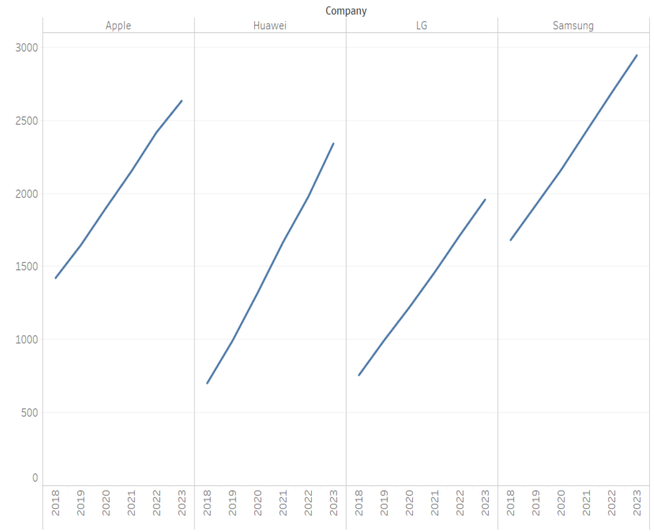


Historical Data: Historical Data comprises of four input factors: **Market Share, Revenue, Profit Margin, and Research and Development Expenditure**. The data for previous five years are taken as input data for each of the four companies. These input factors are currently assigned equal weightage scores.

Random Variables: Random variables are the factors which are not associated with any fixed pattern and can change year on year basis depending upon the real world activities of the companies. Random variable consists of: New technological inventions per year, Number of Service Partnership company has in each year, and Number of countries where the company is active in.

- **New inventions**: Score for a company increases if it had a new invention in that particular year and it decreases if no new invention has occurred in past two years.
- **Service Partnership**: Score will be adversely affected if service partnership has ended and it will increase if the company manages to add new service partners.
- **Active Countries**: Score for the companies depends on their presence in different countries across the globe. If a company has more presence it's score will be better than companies with less presence.

Results



After setting the number of countries for one company (Huawei), there was a steeper increase in market share over a period of 5 years compared to other companies in the simulation.

Future Work

Currently, the weightage for random variables are based on **general market assumption** but that is not always the case in real world scenario. To make our analysis more statistically accurate, historical data will be **sliced into training set and test set**. Based on the results of the test set, **the weightage scores given to random variables will be adjusted** to match real world scenario.
The performance of a corporation depends on other factors which are not taken into consideration while designing this Monte Carlo Simulation. Factors **like marketing expenditure**, **effect of management change**, and **adaptation of software platform** also play an important part in market share fluctuations which would be taken into account in future.

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