



**UNIVERSITY OF NAIROBI**

**SCHOOL OF COMPUTING AND INFORMATICS**

**A DECISION SUPPORT SYSTEM  
FOR FORECASTING EXCHANGE RATES  
AND INVESTMENT OPTIMIZATION**

**By**

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## **ABSTRACT**

The problem addressed in this study is the use of a Decision Support System to forecast exchange rates of the currencies that Central Bank of Kenya invests its foreign reserves. The solution to the study is aimed at assisting the reserve manager make an informed decision based on what future exchange rates are likely to be and therefore allocate investible funds in appropriate percentage proportions that will maximize earnings. The study is aimed at comparing two techniques of forecasting; namely conventional and artificial intelligence methods in particular using the Artificial Neural Networks. The study also uses the Genetic Algorithms technique to optimize the *currency basket* mix. A Decision Support System is developed to forecast the currency exchange rates based on the conventional methods

Genetic Algorithms, a new field in artificial intelligence, is used to optimize the earnings expected when deposits are made in the three major currencies. The population size and the number of generations are two parameters that are varied with an aim of assessing their effects on the optimum earnings. These currencies are the US Dollar, Sterling Pound and the EURO. The results from this approach reveal the power of GA in solving real world problems such as the *currency basket* mix. A comparative study is again made using the results of GA, conventional method and actual earnings.

The collection and preparation of data is made from two sources. The International Financial Statistics issues provide the exchange rates, interest rates and inflation values of the countries where Central Bank of Kenya makes its investment. The second source of data is the minutes of the CBK's Investment Committee meetings that are held weekly.

The results reveal that in making predictions regarding exchange rates, a Decision Support System can be developed and implemented in a business enterprise whose objective is to maximize the earnings from its investment. The results reveal that the artificial intelligence methods possess some advantages over the conventional methods of forecasting.