

**USING FAULT TREE ANALYSIS IN A WORK BREAKDOWN STRUCTURE TO  
DEVELOP A LOW RISK ONLINE ELECTRONIC VOTING SYSTEM.  
A CASE STUDY FOR THE ELECTORAL COMMISSION OF KENYA**

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## **ABSTRACT**

The researcher seeks to answer the question, how can complex, manual, location dependent and tamper proof system of voting be improved in Kenya?

The researcher used two risk management techniques to accomplish the objectives; the techniques were fault-tree analysis and work breakdown structure.

The researcher analyzed every voting procedure by use of the risk management techniques and also used suggestions made by registered voters using data gathering tools like observation, interviews and questionnaires; and identified the risks involved in a voting procedure, where identified risks were mitigated by planning about the risk and determining on how the risks would be avoided or what measures were to be taken so that the risks had minimal impact on the voting process.

The researcher proceeded to develop a prototype system that mitigates and avoids risks identified by the researcher and which incorporates the registered voters' views. The prototype, an online voting system was developed, that incorporates properties and goals of performing risk management such as; being a tamper proof system, prevents incorrect tallying and promotes voter secrecy by using an authentication and session algorithm, where a ticket is used to conceal the identity of the voter, which is automatically generated when the voter provides the electoral number and passkey; the voting system being "easy to use" regardless of age, gender, medical condition or disability and also enables voting from multiple locations.

The prototype was tested using white box and black box software testing techniques to determine whether the prototype met all user requirements and integrated with risk management procedures established after risk analysis.

A number of registered voters were used in the testing exercise to determine whether it met the required user standards and provided a feedback on what areas were to be improved and also a test to ensure that risks identified had been successfully mitigated was performed.