

**ENERGY EFFICIENT CONGESTION CONTROL TECHNIQUES  
IN WIRELESS SENSOR NETWORKS**

*Thesis submitted in partial fulfillment of the degree of*

**DOCTOR OF PHILOSOPHY  
IN  
COMPUTER SCIENCE AND ENGINEERING**

*By*

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## **80\_RECOMMENDATION**

In future investigations, the impact of limited node mobility on throughput will be studied, focusing on how mobility affects data transmission rates. Additionally, future research will explore the effects of different traffic patterns on queue size, aiming to optimize queue management strategies under varying traffic conditions. Further studies will also concentrate on examining the influence of mobile sink nodes, the number of child nodes, and parent nodes on throughput, and exploring modified queue management strategies. Instead of a single tree topology, future work may consider implementing a number of clusters with cluster heads, which could potentially enhance network efficiency and scalability. These proposed enhancements will be validated through real-time testing to assess their practical applicability and performance in diverse operational scenarios.