



**Design and Implementation of a Secure and Efficient E-Governance
Model Using Blockchain for a Developed Country**

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Certificate of Original Authorship

I, *Haitham Assiri*, declare that this thesis is submitted in fulfilment of the requirements for the award of *Doctor of Philosophy in Information Systems* in the *School of Electrical and Data Engineering, Faculty of Engineering and Technology* at the *University of Technology Sydney, Australia*.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all of the information source and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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Abstract

We are witnessing the world steadily heading towards the fourth industrial revolution. With the advent of e-government systems, public service dispersion is being scaled up all around the world. Any e-government system that is vulnerable to cyberattacks, poses serious security challenges and raises concerns about confidentiality and data integrity, in turn resulting in public distrust. This research focuses on the Saudi Arabian e-government portal YESSER as a case study to determine its degree of vulnerability by exposing it to three network penetration testing tools, namely Zap, Rapid7 and Nessus and examine the possibility of strengthening the Saudi e-government system through a rigorous examination of the existing literature to address the security of future e-government frameworks. Blockchain is a distributed ledger, and it is described as a continuously increasing set of publicly available records that are encrypted to provide security against tampering and alteration. This work proposes an effective Blockchain e-government framework to secure the Saudi Arabian e-government portal (YESSER).

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List of Publications

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3. Blockchain in Saudi e-Government: A Systematic Literature Review. (Accepted and Published " *International Journal of Electrical and Computer Engineering* 16, no. 1 (2022): 11-19.”)
4. A Novel Design of e-Government System Using Blockchain. (Submitted to “Journal of Computer Security, Vol. 30,6 May 2022, ISSN print 0926-227X, ISSN online 1875-8924”)